TRANSPORTATION ANALYSIS

For

EL CAMINO REAL

ROAD AND BRIDGE WIDENING PROJECT

Prepared for

THE CITY OF SAN DIEGO

and

RICK ENGINEERING

SUBMITTAL: December 19, 2012

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TRAFFIC PLANNING & ENGINEERING, MARKETING & PROJECT SUPPORT
CONSULTANTS TO INDUSTRY AND GOVERNMENT
4540 Kearny Villa Road, Suite 106
San Diego, CA 92123-1573
(858) 560-4911

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1.0 EXECUTIVE SUMMARY

This analysis was initiated for the purpose of evaluating several alternative solutions to provide more capacity on El Camino Real between Via de la Valle and San Dieguito Road and to improve Via de la Valle to its planned width between El Camino Real and El Camino Real North. Based on this analysis we found that two alternatives, The Road Capacity Alternative and the Bicycle Safety Alternative do not meet the purpose and need for the project as identified in the DEIR so they will not be included in the Environmental Assessment. For traffic analysis purposes the Lower Elevation alternative is considered the same as the Central Alignment alternative because just changing the elevation does not alter its traffic handling characteristics.

In summary we found that the following alternatives meet both street segment and intersection level of service standards and the goals and objectives of the project.

ACCEPTABLE ALTERNATIVES		
Widening	4-lanes with median	
Western	4-lanes with median	
Eastern	4-lanes with median	Northern intersection at Via de la Valle Place
Lower	4-lanes with median	

It should be noted that the Eastern variation which intersects Via de la Valle at Via de la Valle Place provides essentially the same traffic service as each of the other acceptable alternatives.

The roundabout alternative, where signalized intersections are replaced with roundabouts as presented and discussed in Chapter 8 of this report, also is an acceptable alternative as long as 4 lanes are provided on El Camino Real and the roundabouts are designed to current standards to accommodate vehicular turning movements and pedestrians. The roundabouts are designed to current standards to accommodate vehicular turning movements and pedestrians.

2.0 INTRODUCTION

This traffic report was prepared to provide a technical basis for the EIR / EA for a Capital Improvements Project (CIP) in the City of San Diego.

The CIP project proposes the widening of El Camino Real from two (2) to four (4) lanes and to replace the existing river bridge with a new bridge. The project also proposes to widen Via de la Valle easterly from El Camino Real to El Camino Real North. The next section of this report includes a more complete description of the project alternatives being considered.

This report will become an appendix to the EIR / EA and is intended to provide basic traffic information for decision makers to ultimately consider impacts and mitigation associated with the project alternatives.

This report is divided into eleven parts with each part dealing with a specific topic. More specifically, there is an executive summary introduction, and there is a project description which defines the proposed project alternatives. From a vehicular traffic perspective, several alternatives will have similar impacts and any differences are described. Next, existing conditions in the project area are evaluated and discussed, and project impacts for the existing with project condition, project opening day, approximately March of 2016, are identified. In addition, Year 2035 conditions with and without the project are discussed. Lastly, a summary and conclusion section is included, along with a list of references used and identification of the preparers of this report.

This report is therefore divided into the following text sections:

1 Executive Summary

2 Introduction

3 Proposed Project Alternatives

4 Existing Conditions Analysis

5 Existing Plus Project Analysis

6 Opening Day Analysis (2016)

7 Year 2035 Analysis

8 Roundabout Analysis

9 Summary and Conclusions

10 References

11 Preparers

3.0 PROPOSED PROJECT ALTERNATIVES

The proposed project includes both the widening of El Camino Real from two to four lanes between Via de la Valle and San Dieguito Road and the construction of a new four lane bridge over the San Dieguito River, see **Figure 3-1**. Via de la Valle is also widened from El Camino Real to El Camino Real North. Alternatives to standard traffic signals, i.e. roundabouts, at four (4) locations are also being considered. Please see chapter 8 for a discussion of roundabouts as an alternative to traffic signals. The project is being proposed to accomplish two basic objectives. First, the project will implement the widened road configuration planned for El Camino Real in the City of San Diego planning documents, thus providing for an increased level of service for vehicular traffic. Second, the project will replace the existing El Camino Real bridge over the San Dieguito River so the bridge has adequate 100 year flood clearance and is seismically safe.

The concept for the proposed project which is referred to as the Central Alignment is shown in **Figure 3-2 and 3-3**. In addition to the Central Alignment alternative, there also are several variations to the proposed project. The variations are:

Road Capacity: This variation has a reduced footprint and a shifted alignment that avoids impacts to the existing drainage channel parallel to El Camino Real on the east side. The focus of this alternative is to provide road capacity increase. The bridge would be replaced and the road would be raised. This alternative would eliminate the parkway, pedestrian walkway, bicycle lanes and median, but would still provide four traffic lanes. Retaining walls are needed on each side of the road. See **Figure 3-4** for the proposed cross section.

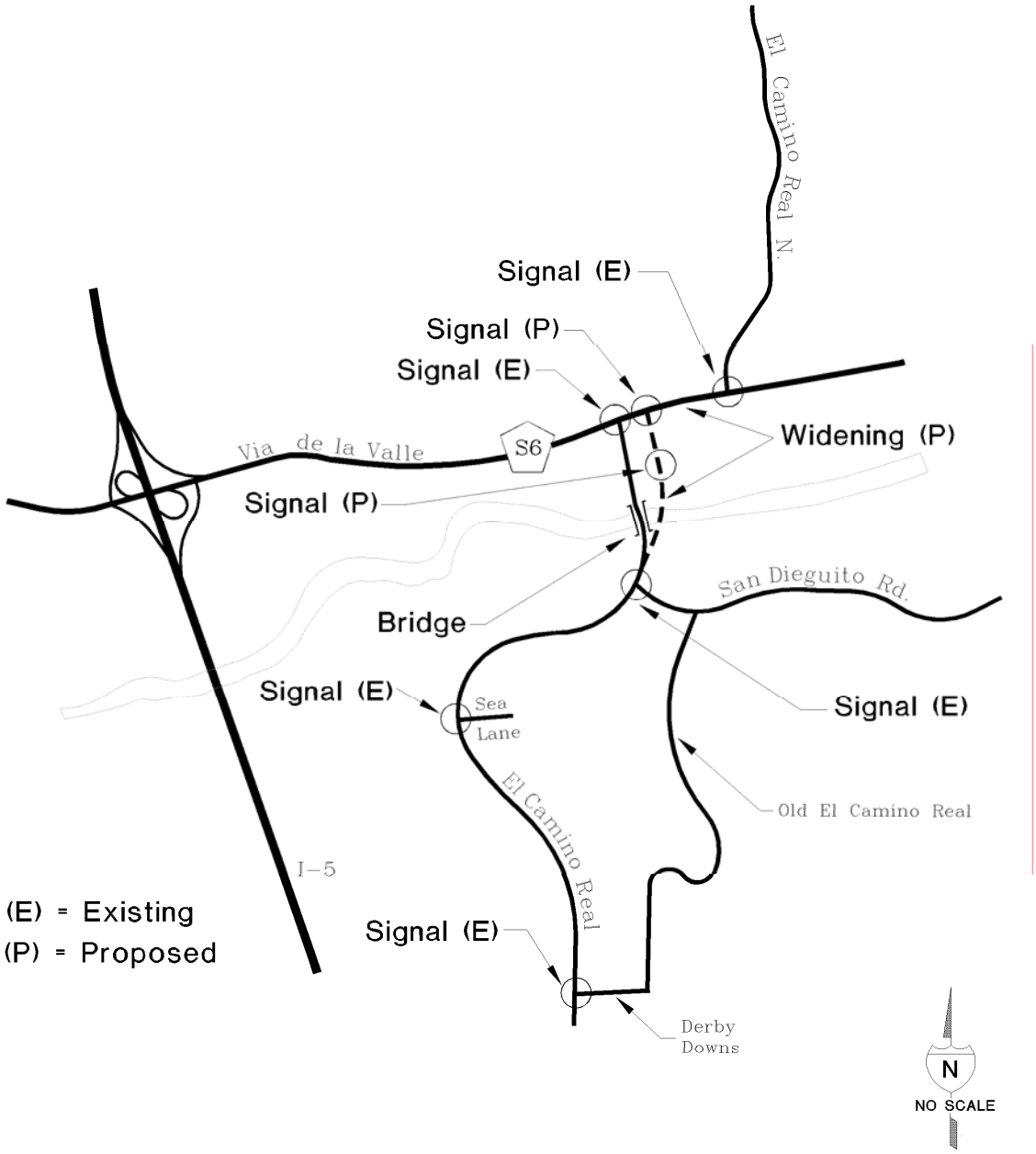

FIGURE 3-1

Proposed Project

(See Next Page)

FIGURE 3-2

Central Alignment Alternative and Lower Elevation Alternative

El Camino Real Road/Bridge Widening
Central Alignment

U:\147628\Exhibit\ECR Road-Bridge Widening CentralAlignment.mxd
Eagle Aerial Photo: March 2006
Exhibit Date: February 21, 2012

N W E S

0 75 150 300 Feet

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(See Next Page)

FIGURE 3-3

Roadway Capacity Alternative

El Camino Real Road/Bridge Widening
Roadway Capacity Alternative

N
W E
S

0 75 150 300 Feet

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Eagle Aerial Photo: March 2009
Exhibit Date: February 14, 2012

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(See Next Page)

FIGURE 3-4

Bicycle Safety Alternative

El Camino Real Road/Bridge Widening
Bicycle Safety Alternative

N
W E
S

0 75 150 300
Feet

Eagle Aerial Photo: March 2009
Exhibit Date: February 14, 2012

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The following seven (7) alternatives are evaluated in this traffic study:

- **See Figure 3-2** Central Alignment Alternative
- **See Figure 3-3** Road Capacity Alternative (Does not meet project purpose and need per FHWA and Caltrans)
- **See Figure 3-4** Bicycle Safety Alternative (Does not meet project purpose and need per FHWA and Caltrans)
- **See Figure 3-5** Western Alignment Alternative
- **See Figure 3-6** Eastern Alignment Alternative
- **See Figure 3-7** Roundabout Alternative (Same as eastern alignment alternative except at intersections)
- **Same as Figure 3-2** Lower Elevation Alternative (Same as central alignment alternative except lower)

For this project, two alternatives analyzed in detail in the EIR are not considered viable by Caltrans/FHWA because they do not provide all features needed to completely meet the purpose and need. These are the Road Capacity Alternative and the Bicycle Safety Alternative. The City would not be able to receive federal funds if either of those alternatives were chosen, and the two alternatives are not analyzed in the EA. In addition, the Lower Elevation Alternative is not analyzed for transportation separately in the EA because it has the same configuration as the Central Alignment.

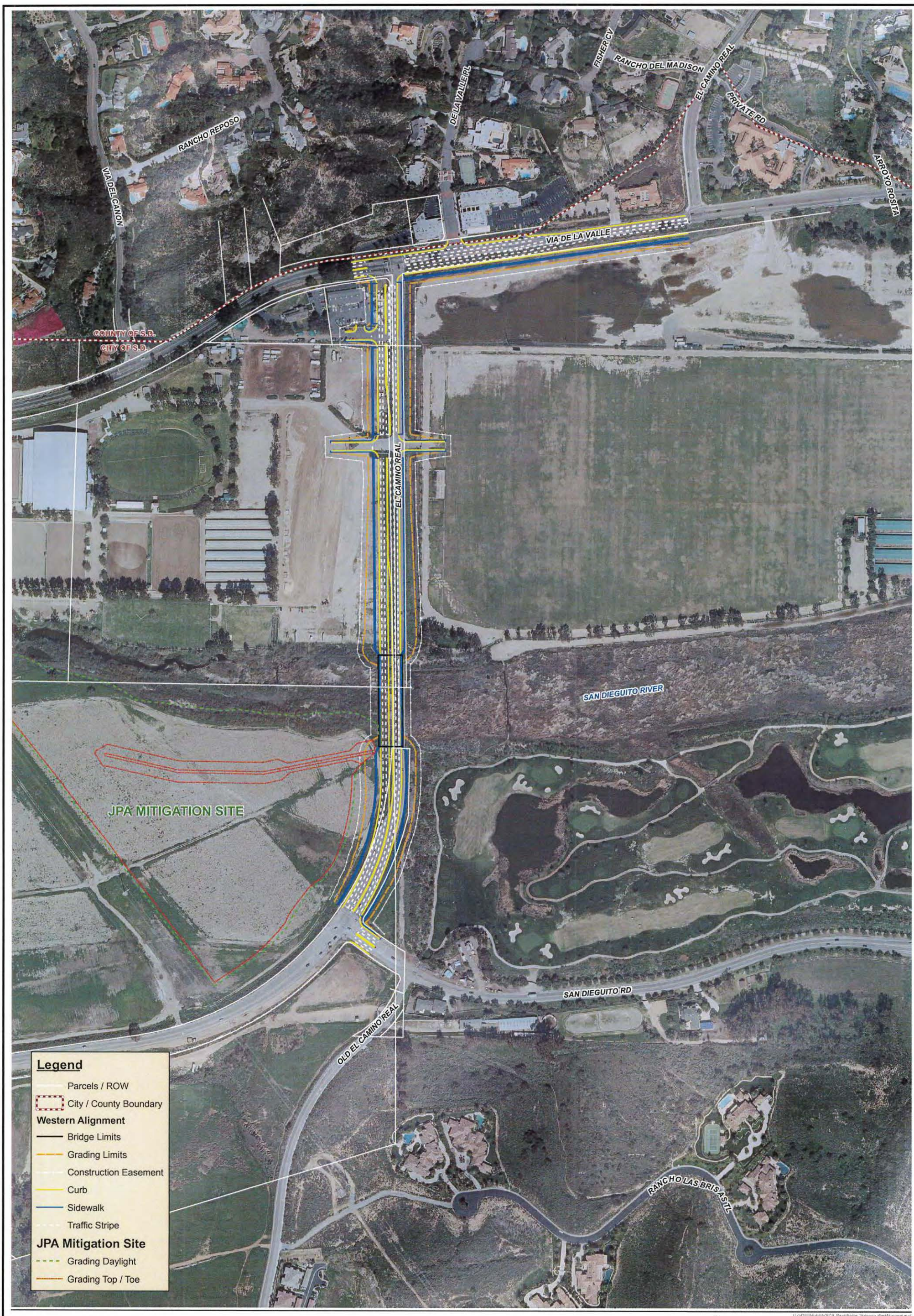
Common Design Features

All of the alternatives provide the following key components:

(See Next Page)

FIGURE 3-5

Western Alignment Alternative



El Camino Real Road/Bridge Widening Western Alignment

N W E S

0 75 150 300 Feet

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Eagle Aerial Photo: March 2009
Exhibit Date: February 21, 2012

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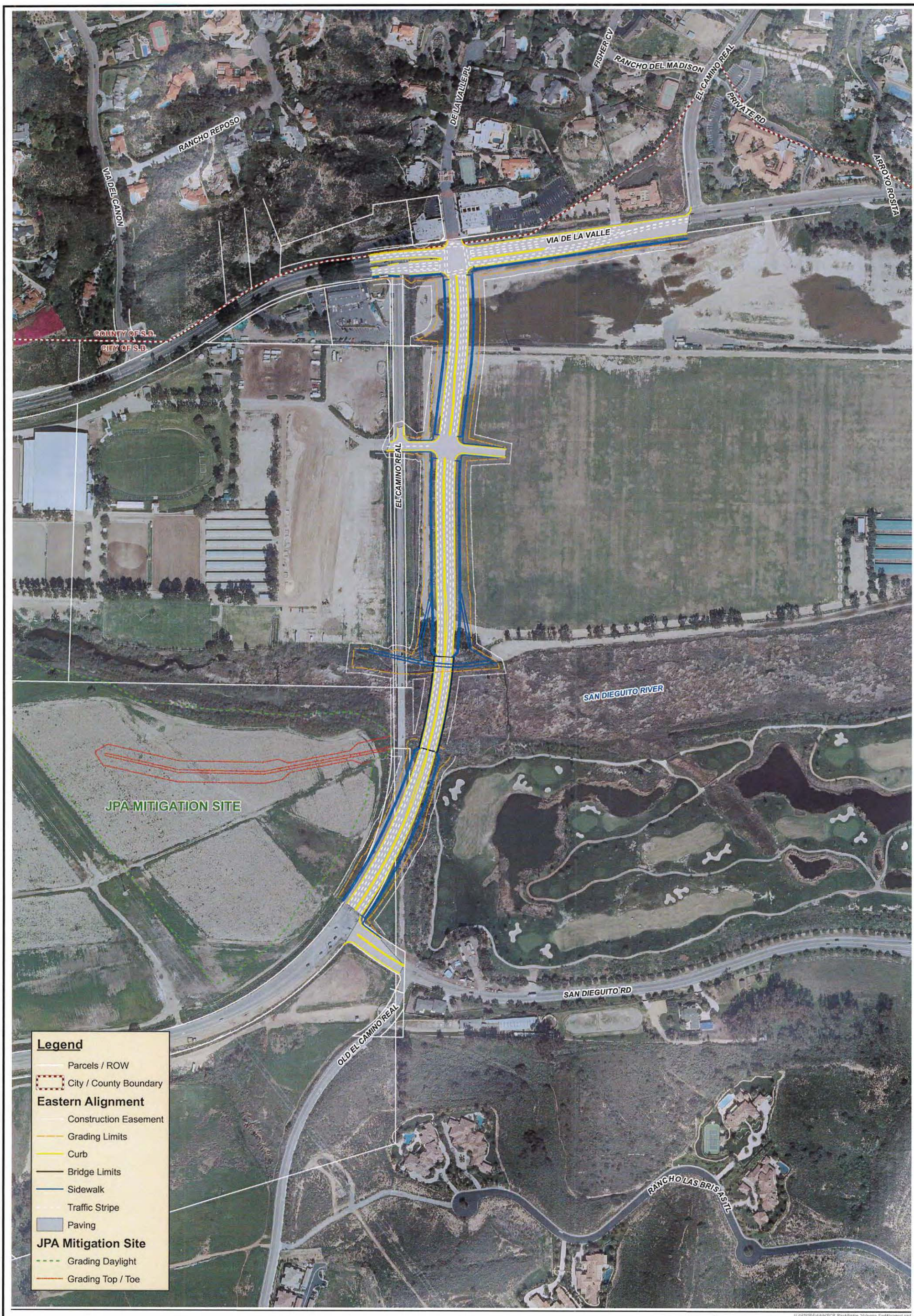
FIGURE 3-6

Eastern Alignment Alternative



El Camino Real Road/Bridge Widening
Eastern Alignment

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Eagle Aerial Photo: March 2006
Exhibit Date: February 21, 2012

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(See Next Page)

FIGURE 3-7

Roundabout Alternative

El Camino Real Road/Bridge Widening Roundabout Alternative

N W E S

0 75 150 300 Feet

U:\14752\B\Exhibits\ECR_BridgeWidening_Roundabout.dwg
Eagle Aerial Photo: March 2009
Exhibit Date: February 21, 2012

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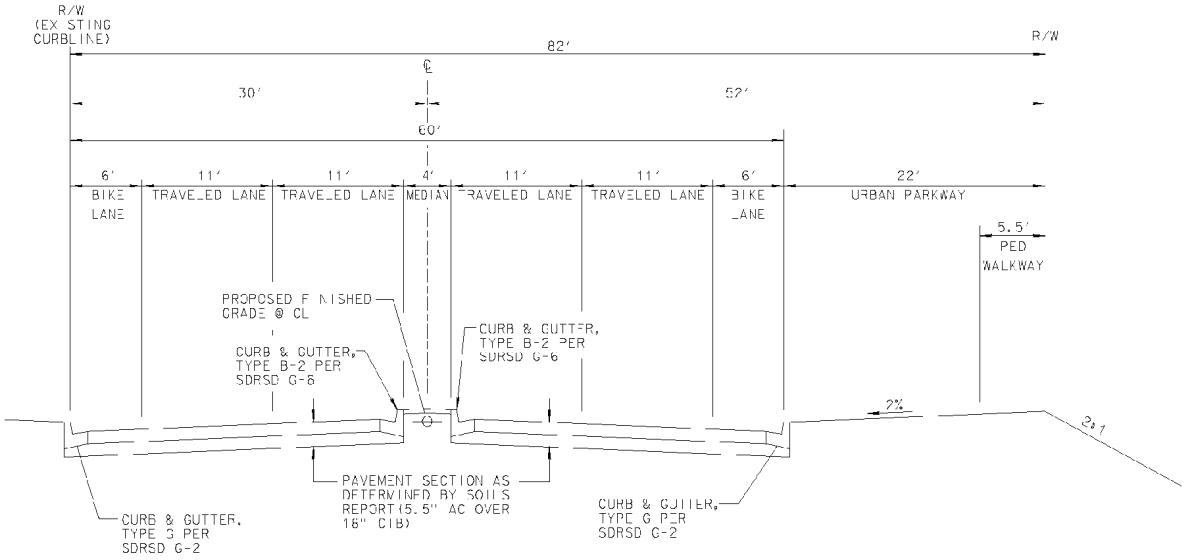
- The roadway of El Camino Real would be raised on fill above the 100-year flood level between San Dieguito Road and Via de la Valle and would meet existing grade at these locations.

- The bridge over the San Dieguito River would be demolished and replaced with a new structure raised above the 100-year flood level. The new bridge would be supported on cylindrical bridge piles and finished concrete columns. Abutments under the bridge would be protected from erosion by riprap, and the bank slope under the new bridge would be steepened to be approximately 1.5:1.

- All build alternatives except the Lower Elevation Alternative would provide an elevated multi-use trail undercrossing under the north bridge abutment. The trail undercrossing would be set at the 10-year flood level and would provide 12 feet of vertical clearance between the trail surface and the underside of the bridge. The new bridge height for alternatives with the trail undercrossing would be approximately 6 feet greater than the height of the existing bridge at the north abutment. The bridge height of the Lower Elevation Alternative would be only 3 feet higher because this alternative does not include the trail undercrossing.

- Via de la Valle would be widened to its ultimate width from the modified intersection with El Camino Real eastward to El Camino Real North **See Figure 3-8**. The existing dual 19-inch by 30-inch reinforced concrete pipe (RCP) storm drain culvert under Via de la Valle near El Camino Real North would be replaced with an underground triple reinforced concrete box (RCB) sized to pass the 100-year peak storm event from the upstream tributary north of Via de la Valle onto the property south of Via de la Valle. The 100-year peak storm event for that tributary is approximately 680 cubic feet per second (cfs).



TYPICAL SECTION - VIA DE LA VALLE
(SECTION LOOKING EAST)

FIGURE 3-8

Typical Section – Via de la Valle

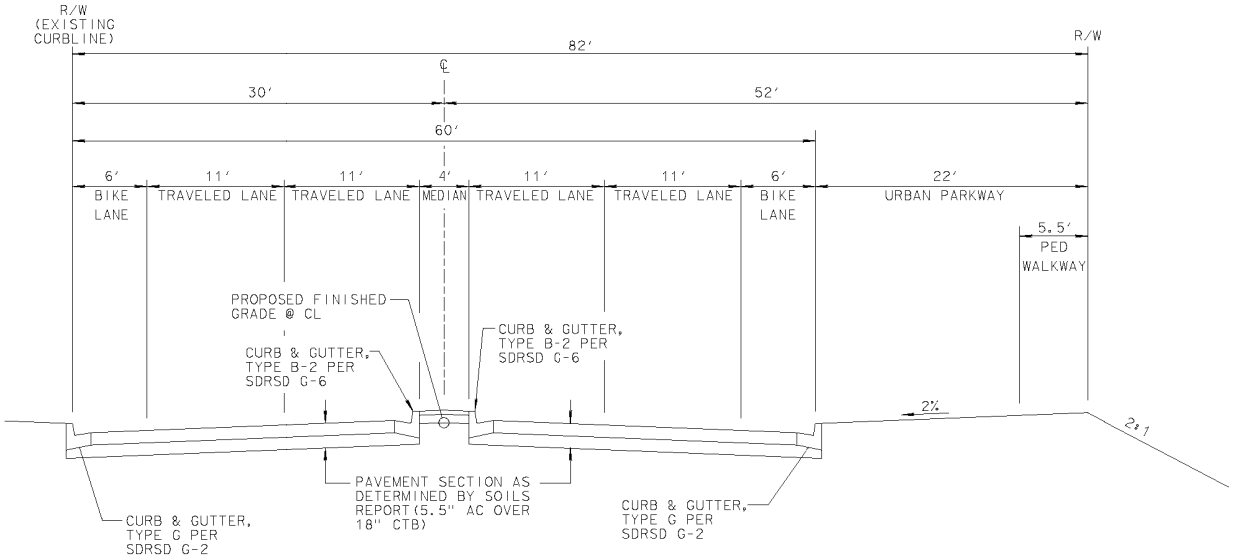
- Project impacts would be mitigated by either enhancement or creation on a parcel owned by the JPA located west of the affected portion of El Camino Real.

Key characteristics for each of the build alternatives are summarized below.

- Central Alignment Alternative: **See Figure 3-9.** This alternative would be roughly centered on the existing alignment of El Camino Real and would impact neighboring properties on the east and west sides of the road relatively equally. El Camino Real would be widened to a right-of-way of 104 feet to accommodate four travel lanes, a raised central median, bicycle lanes, and pedestrian walkways/parkways. The road would be elevated above the 100-year flood level on fill with 2:1 side slopes.

- Road Capacity Alternative: **See Figure 3-10.** This alternative would have an alignment that is shifted west to avoid impacts to the wetlands in the drainage ditch parallel to the eastern edge of El Camino Real. El Camino Real would be widened to a right-of-way of 60 feet to accommodate four travel lanes and a striped 2-foot wide median. This alternative would not provide left-turn pockets, raised central median, pedestrian walkways, parkways, or bicycle lanes. El Camino Real would be elevated above the 100-year flood level on fill with vertical retaining walls on both sides in order to keep the cross section as narrow as possible.

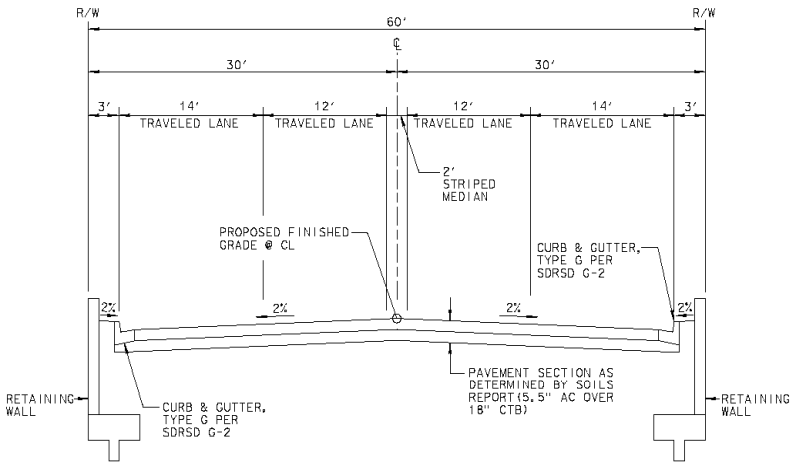
- Bicycle Safety Alternative: **See Figure 3-11.** This alternative would have an alignment that is shifted west to avoid impacts to the wetlands in the drainage ditch parallel to the eastern edge of El Camino Real. El Camino Real would be widened to a right-of-way of 60 feet to accommodate two travel lanes, bicycle lanes, and a raised central median. This alternative would not provide pedestrian



TYPICAL SECTION - VIA DE LA VALLE
(SECTION LOOKING EAST)

FIGURE 3-9

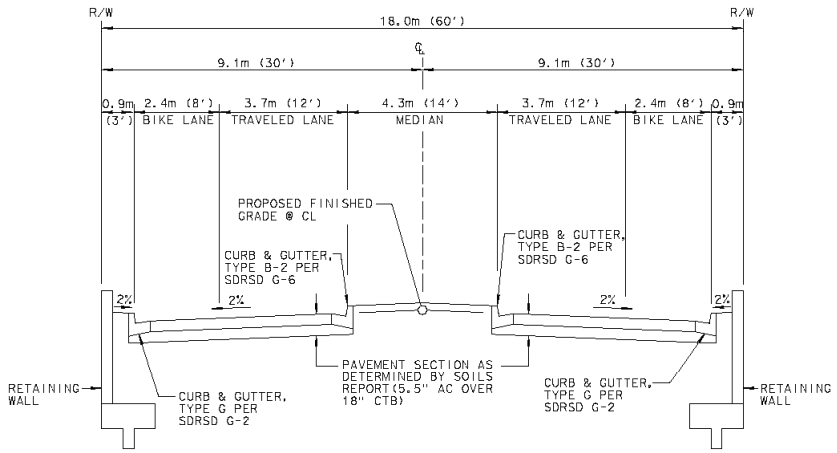
Typical Section – El Camino Real



TYPICAL SECTION - EL CAMINO REAL
ROADWAY CAPACITY ALTERNATIVE

FIGURE 3-10

Roadway Capacity Alternative – El Camino Real Typical Section



TYPICAL SECTION - EL CAMINO REAL
BICYCLE SAFETY ALTERNATIVE

FIGURE 3-11

Bicycle Safety Alternative – El Camino Real Typical Section

- walkways, parkways, or additional travel lanes. El Camino Real would be elevated above the 100-year flood level on fill with vertical retaining walls on both sides in order to keep the cross section as narrow as possible.

- Western Alignment Alternative: **See Figure 3-9.** This alternative would have an alignment that is shifted west to avoid impacts to the wetlands in the drainage ditch parallel to the eastern edge of El Camino Real. El Camino Real would be widened to a right-of-way of 104 feet to accommodate four travel lanes, a raised central median, bicycle lanes, and pedestrian walkways/parkways. The road would be elevated above the 100-year flood level on fill with 2:1 side slopes.

- Eastern Alignment Alternative: **See Figure 3-9.** This alternative would have an alignment that is shifted completely east of the drainage ditch to allow independent construction of the bridge, minimize impacts to developed properties along the western side of El Camino Real (Horsepark and Mary's Tack and Feed), and reduce impacts to wetlands in the drainage ditch parallel to the eastern edge of El Camino Real. El Camino Real would be widened to a right-of-way of 104 feet to accommodate four travel lanes, a raised central median, bicycle lanes, and pedestrian walkways/parkways. The road would be elevated above the 100-year flood level on fill with 2:1 side slopes and would intersect with Via de la Valle at De la Valle Place, east of the existing intersection of El Camino Real with Via de la Valle.

- Roundabout Alternative: This alternative would be in the same alignment as the Eastern Alignment Alternative. For the Roundabout Alternative, however, roundabouts instead of signalized intersections would be located where El Camino Real meets San Dieguito Road, the Polo Field/Horsepark driveways, and De la Valle Place, and where Via de la Valle meets El

Camino Real North. The footprint of the Roundabout Alternative would be larger than for the Eastern Alignment Alternative due to the need for transitions eastward and northward at the intersection of Via de la Valle and El Camino Real North, and the need for additional area to accommodate the roundabouts compared to typical intersections.

- Lower Elevation Alternative: This alternative would be roughly centered on the existing alignment of El Camino Real and would impact neighboring properties on the east and west sides of the road relatively equally. El Camino Real would be widened to a right-of-way of 104 feet to accommodate four travel lanes, a raised central median, bicycle lanes, and pedestrian walkways/parkways. The road would be elevated just to the 100-year flood level on fill with 2:1 side slopes.

From a traffic handling perspective, the six project alternatives fall into two basic categories. In the first category, each of the alternatives provide four (4) basic through lanes of traffic capacity. In the second category, only two (2) through lanes of traffic capacity are provided. There are other variables, i.e., shoulder width, bike lanes, turn lanes, median width, access points which are additional variables, which are also discussed and compared in this evaluation. **Table 3-1** summarizes the proposed project alternatives along with some of the design characteristics for each.

The roundabout alternative is in the same location as the eastern alignment alternative except at four locations signalized intersections are replaced with roundabouts. Chapter 8 of this report fully discusses the roundabout alternative so it is not included in **Table 3-1**.

TABLE 3-1

Summary of Proposed Project Alternatives

Reference	**Figure 3-2** **Figure 3-9**	**Figure 3-3** **Figure 3-10**	**Figure 3-4** **Figure 3-11**	**Figure 3-5** **Figure 3-9**	**Figure 3-6** **Figure 3-9**	**Figure 3-2** **Figure 3-9**
Characteristic/Impact	Central Alignment	**Road Capacity	**Bicycle Safety	Western Alignment	*Eastern Alignment	Lower Elevation
Number of travel lanes	4	4	2	4	4	4
Bicycle lanes?	Yes	No	Yes	Yes	Yes	Yes
Walkway/Parkway	Yes	No	No	Yes	Yes	Yes
Median width	4 Feet	2 Feet	14 Feet	4 Feet	4 Feet	4 Feet
Turn pockets at Horsepark	Yes	No	Yes	Yes	Yes	Yes
Retaining walls	No	Yes	Yes	No	No	No
Road embankment slope	2:1	None (vertical)	None (vertical)	2:1	2:1	2:1
Total right-of-way width (without slope easement)	104 Feet	60 Feet	60 Feet	104 Feet	104 Feet	104 Feet

*Please note: The roundabout alternative is not listed separately in the table above because it has the same characteristics as the Eastern Alignment Alternative except that signalized intersections are replaced with roundabouts, see also **Figure 3-7**.

**Alternative does not meet purpose and need to receive federal funding.

As previously noted two of the alternatives do not meet the requirements of the Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans). The two alternatives Bicycle and Road Capacity. These two alternatives do not provide all the features needed to meet the purpose and need of the project. They are therefore considered not to be viable.

4.0 EXISTING CONDITIONS ANALYSIS

El Camino Real between Via de la Valle and San Dieguito Road is approximately 0.5 miles long, and includes a bridge over the San Dieguito River. El Camino Real is currently a two-lane rural roadway without shoulders or sidewalks. El Camino Real between Via de la Valle and Derby Downs Road is ultimately classified as a four lane Major per the North City Future Urbanizing Area Plan. The two-lane river bridge was built in 1940 and is 340 feet long, has nine spans, and is supported on pier walls with driven concrete pile foundations. The bridge is approximately 24 feet wide curb-to-curb, and has a 1.3 foot wide area on both sides behind the curb. Both the road and the bridge at this location are subject to inundation by 100-year flood.

Along the west side of El Camino Real, there is a tack and feed store, Horsepark of San Diego (which is owned by the 22nd District Agricultural Association), and currently undeveloped private property that may be planned for future development. Along the east side of El Camino Real, there is currently undeveloped private property and the Polo Club. At the northern end of the intersection with Via de la Valle, there is a restaurant and commercial development. At the southern end of the project area, El Camino Real continues southward in a sweeping curve up a hill to Half Mile Drive and residential development in Carmel Valley.

Each of the existing land uses described above has access to El Camino Real. To the extent allowed by the City Street Standards and City Council Policy, access will be maintained or enhanced by the proposed project.

Existing average daily traffic (ADT) in the project area is shown on **Figure 4-1**. As shown on the figure, new traffic count data for the seven street segments discussed below were obtained on Thursday 11/3/2011. On El Camino Real between Via de la Valle and San Dieguito Road, there currently are approximately 14,559 average daily trips (ADT). South of San Dieguito Road on El Camino Real, the average daily traffic is approximately 13,902 ADT. East of the project portion of El Camino Real, El Camino real north of Via de la Valle has an ADT of approximately 3,664.

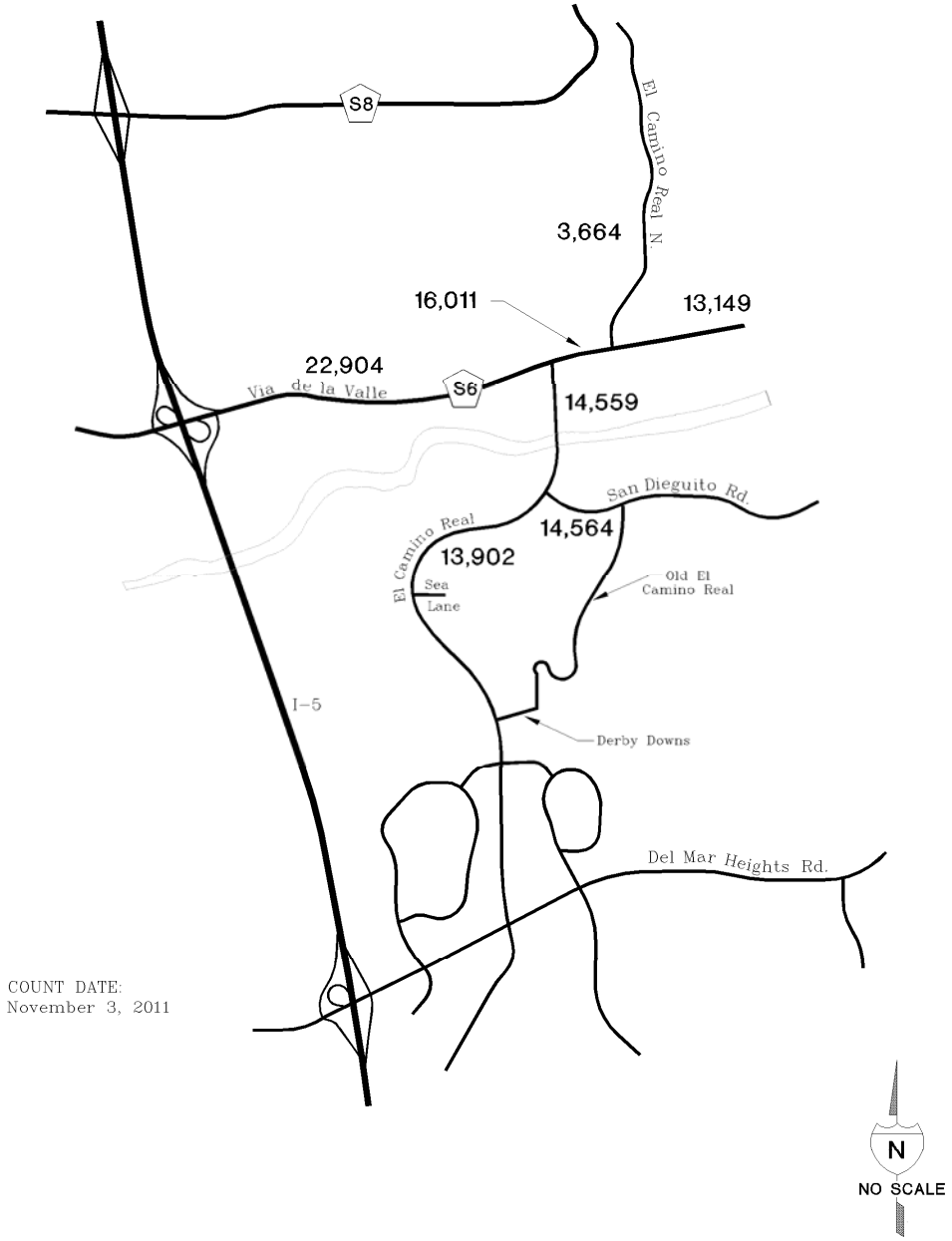


FIGURE 4-1

Existing Average Daily Traffic

San Dieguito Road east of El Camino Real currently carries 14,564 ADT, Via de la Valle currently carries 22,904 ADT west of El Camino Real, and 13,149 ADT east of El Camino Real (north).

Appendix A includes the actual daily and peak hour intersection count data obtained and used for this project analysis.

Figure 4-2 shows the existing lane configurations and functional use for all intersections in the vicinity of the project. **Figure 4-3** shows the existing AM and PM peak traffic volumes at the five intersections that will be directly impacted most significantly by the proposed project. The intersections and street segments studied are kept the same as those identified in the previous (May 9, 2006) traffic study completed for this project. As noted on **Figure 4-3** the intersection AM and PM traffic count data was obtained on Tuesday November 8, 2011.

Based on existing lane configurations and average daily traffic volumes as discussed above, street segment levels of service were determined. **Table 4-1** summarizes the results. As shown in the table, except for El Camino Real north of Via de la Valle and El Camino Real south of San Dieguito Road, all street segments presently operate at a level of service "F".

Based on existing peak hour intersection traffic counts and lane configurations, AM and PM peak intersection levels of service were determined using the Highway Capacity Manual 2000 software, see **Table 4-2**. **Appendix B** includes the HCS worksheets. As shown in the table, the intersection of Via de la Valle and El Camino Real currently operates at a LOS "D" during the morning peak and during the afternoon peak. The intersection of Via de la Valle and El Camino Real North currently operates at LOS "B" during the AM peak and "B" during the PM peak. At El Camino Real and Horsepark / Polo Grounds the unsignalized intersection operates at LOS D during the AM and F during the PM peaks.

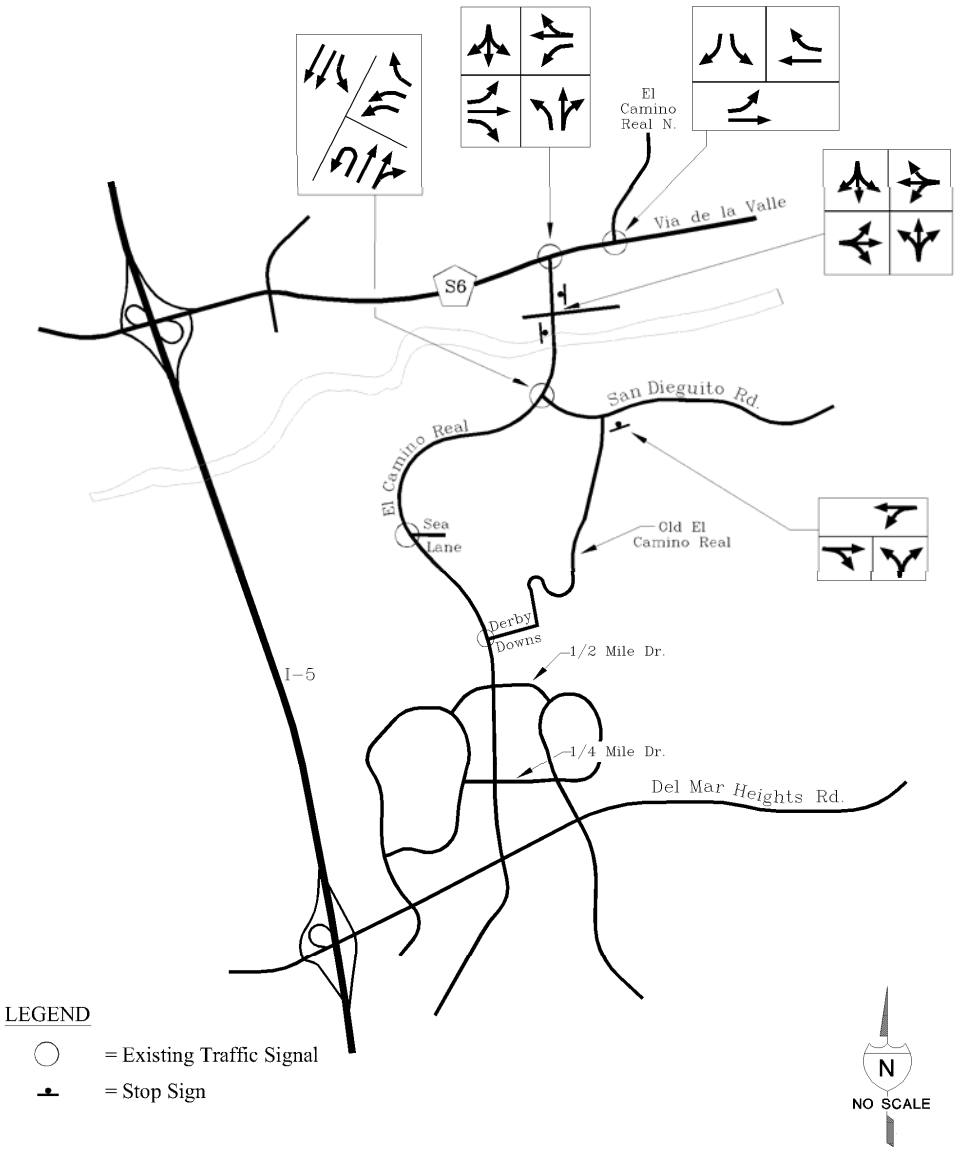
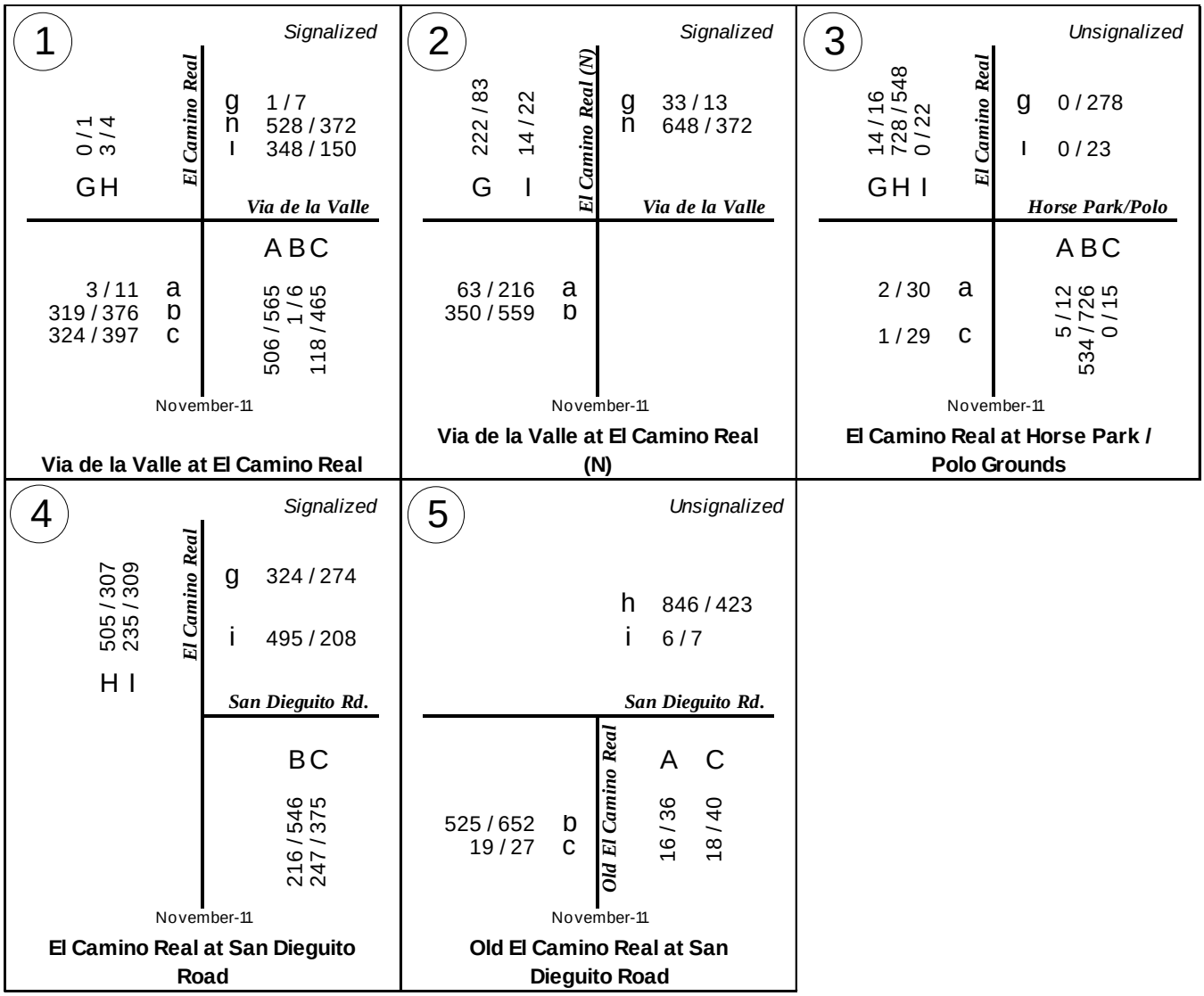


FIGURE 4-2

Existing Lane Configurations



COUNT DATE: Tuesday, Nov. 8, 2011

FIGURE 4-3

Existing AM / PM Peak Hour Traffic Volumes

TABLE 4-1

Existing Street Segment Levels of Service

Road	Segment	Standard	Class.	Cap.	Volume	V/C	LOS
Via de la Valle	West of El Camino Real	SD	2-Cb	10,000	22,904	2.29	F
	El Camino Real to El Camino Real (N)	SD	2-Cb	10,000	16,011	1.60	F
	East of El Camino Real (N)	SD	2-Cb	10,000	13,149	1.31	F
El Camino Real (N)	North of Via de la Valle	SD	2-Cb	10,000	3,664	0.37	A
El Camino Real	Via de la Valle to San Dieguito Road	SD	2-Cb	10,000	14,559	1.46	F
	South of San Dieguito Road	SD	4-M	40,000	13,902	0.35	A
San Dieguito Road	El Camino Real to Old El Camino Real	SD	2-Cb	10,000	14,564	1.46	F

Legend:

Yellow or shaded indicates unacceptable level of service.

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cb = 2 lane Collector

4-M = 4 lane Major

TABLE 4-2

Existing Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Via de la Valle at El Camino Real	Signalized	46.9	D	39.9	D
2	Via de la Valle at El Camino Real (N)	Signalized	12.1	B	11.3	B
3	El Camino Real at Horse Park / Polo Grounds	Unsignalized	28.8	D	53.6	F
4	El Camino Real at San Dieguito Road	Signalized	14.6	B	20.3	C
5	Old El Camino Real at San Dieguito Road	Unsignalized	26.2	D	24.1	C

Notes:

Yellow or shaded indicates unacceptable level of service.

LOS = Level of Service

At El Camino Real and San Dieguito Road, the intersection currently operates at LOS "B" during the morning peak and "C" during the afternoon peak. Old El Camino Real at San Dieguito Road operates at a level of service "D" during the AM peak and level of service C during the PM peak.

Existing traffic along the El Camino Real corridor and at both ends was also observed. Based on these field observations of actual conditions, March 9-11, 2004, some excessive queuing was identified at both El Camino Real at Via de la Valle and El Camino Real at San Dieguito Road. The actual observed conditions illustrate a level of service "D" or "E" at both locations. During the PM peak, north to eastbound traffic at Via de la Valle often requires two signal cycles to clear the intersections which illustrate a level of service "E". The waiting vehicles sometimes back up as far as the entrance to the Horsepark. During the AM peak at this location, west to southbound left turns also were backed up, sometimes 750 to about 1000 feet. At San Dieguito Road there were also significant queues observed which indicated a poorer level of service.

A corridor evaluation using HCS 2000 procedures was also completed. This analysis also confirms that the existing two lane El Camino Real segment between San Dieguito Road and Via de la Valle presently operates at a level of service "F". **Appendix C** includes the corridor worksheets.

5.0 EXISTING PLUS PROJECT (WIDENING) ANALYSIS

To meet current CEQA requirements based on recent case law, an existing plus project analysis was also completed. To complete this analysis, the SANDAG Series 12 calibration model run for the year 2010 was used. The model predicted existing traffic on El Camino Real at very nearly the actual measured daily volume (16,300 vs. 14,569). See **Appendix E**. The calibrated model assignment was then rerun but the network was coded as a four lane facility. The new forecast with project was then compared to the calibrated model run to determine how much traffic would most likely redistribute due to the added segment capacity resulting from building the project. That percentage changes was then used to determine new segment and intersection volumes to be used for analysis.

5.1 STREET SEGMENT ANALYSIS WITH WIDENING PROJECT

Table 5-1 summarizes the street segment volumes developed using the procedures and regional model forecasts discussed above. Also shown in **Table 5-1** are the analysis results. As shown, when the project is built, all street segments except Via de la Valle east of El Camino Real north are projected to operate at acceptable levels of service. The project segment on El Camino Real between Via de la Valle and San Dieguito Drive is projected to operate at a level of service B.

5.2 INTERSECTION ANALYSIS WITH WIDENING PROJECT

Using the same procedures discussed in Section 4.0, intersection peak hour volumes for the existing plus project condition were determined. See **Figure 5-1**. These volumes along with lane configurations that would exist in the with project condition were then analyzed. **Table 5-2** summarizes the analysis results. As shown, acceptable levels of service are shown during both the AM and PM peaks when existing redistributed traffic is loaded on to the with project system. Appendix E also includes the with project HCS analysis worksheets.

TABLE 5-1

Existing + Widening Street Segment Levels of Service

Road	Segment	Standard	Class.	Cap.	Volume	V/C	LOS
Via de la Valle	West of El Camino Real	SD	4-M	40,000	23,477	0.59	C
	El Camino Real to El Camino Real (N)	SD	4-M	40,000	16,347	0.41	B
	East of El Camino Real (N)	SD	2-Cb	10,000	13,425	1.34	F
El Camino Real (N)	North of Via de la Valle	SD	2-Cb	10,000	3,678	0.37	A
El Camino Real	Via de la Valle to San Dieguito Road	SD	4-M	40,000	16,015	0.40	B
	South of San Dieguito Road	SD	4-M	40,000	14,402	0.36	A
San Dieguito Road	El Camino Real to Old El Camino Real	SD	4-M	40,000	14,753	0.37	A

Legend:

Yellow or shaded indicates unacceptable level of service.

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cb = 2 lane Collector

4-M = 4 lane Major

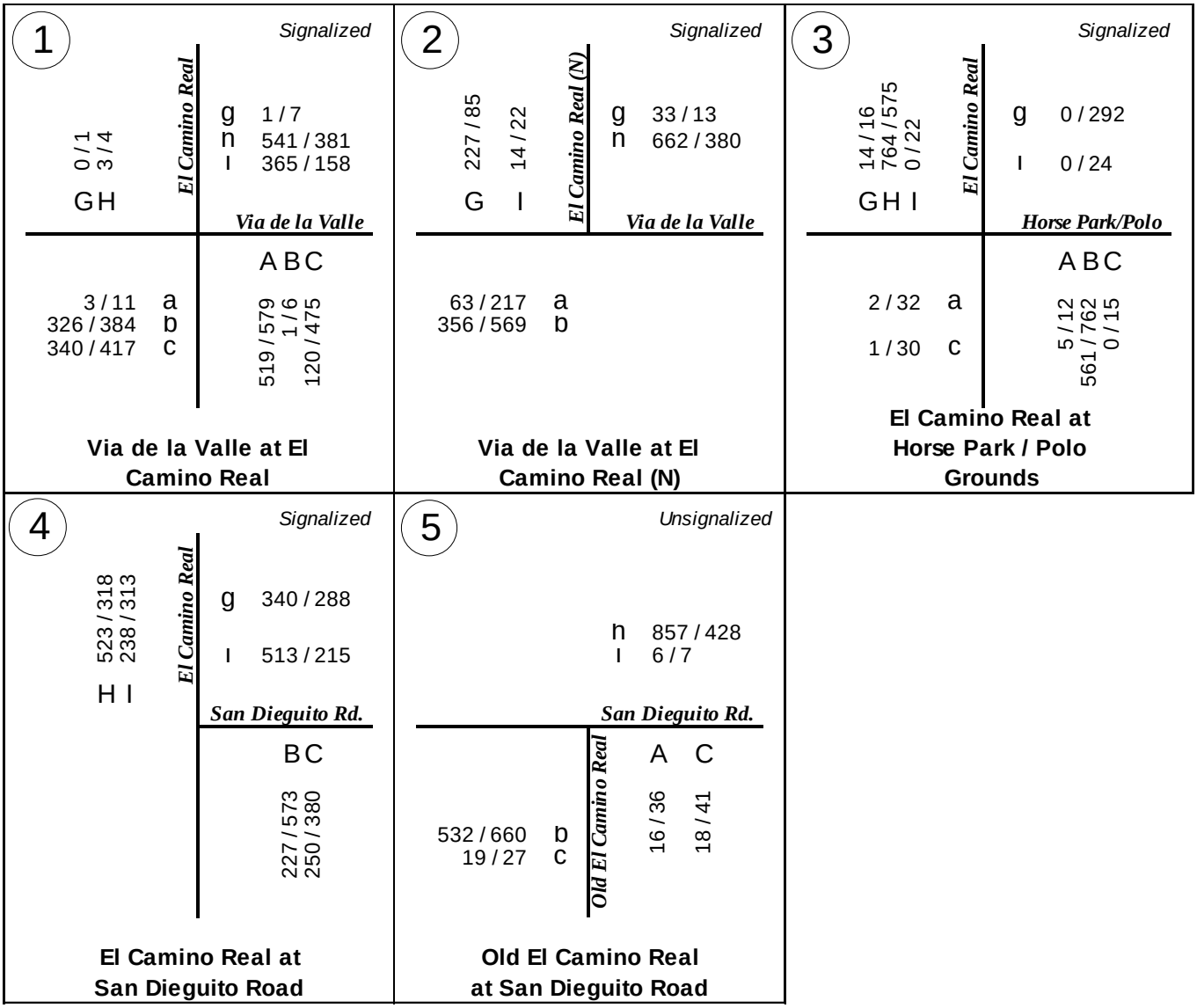


FIGURE 5-1

Existing + Widening AM / PM Peak Hour Traffic

TABLE 5-2

Existing + Widening Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Via de la Valle at El Camino Real	Signalized	22.9	C	24.3	C
2	Via de la Valle at El Camino Real (N)	Signalized	11.4	B	15.3	B
3	El Camino Real at Horse Park / Polo Grounds	Signalized	10.4	B	15.8	B
4	El Camino Real at San Dieguito Road	Signalized	12.9	B	14.2	B
5	Old El Camino Real at San Dieguito Road	Unsignalized	16.8	C	18.5	C

Notes:

LOS = Level of Service

6.0 OPENING DAY ANALYSIS

Projected opening day for the El Camino Real Widening project is March of 2016. In order to determine opening day street segment average daily traffic and peak hour intersection traffic, other projects expected to be developed or partially developed within the March 2016 time frame were identified. **Table 6-1** includes the list of cumulative projects along with a description used in this analysis. **Appendix F** summarizes these projects and shows how the other projects ADT and peak hour volumes were derived.

6.1 CUMULATIVE PROJECTS TRAFFIC

As discussed above and in Appendix F, cumulative projects daily traffic is shown in **Figure 6-1** and cumulative projects peak hour traffic is shown in **Figure 6-2**. For analysis purposes, existing traffic is added to cumulative projects traffic which then results in opening day traffic. In addition, to complete an analysis for opening day, lane configurations are also needed. **Figure 6-3** summarizes the opening day lane configurations used for this analysis. As shown on **Figure 6-3**, the intersection of Via de la Valle at El Camino Real includes a dedicated eastbound right turn lane which represents the Eastern Alignment only and used in the Opening Day with Widening intersection analysis. The Eastern Alignment is shifted to the north allowing for a dedicated right turn lane, the Central and Western alignments do not. The Central and Western alignments have an eastbound left turn lane, a through lane, and a through share right turn lane, see **Appendix I**. The analysis showed the intersection under the Central and Western alignment lane configuration would operate at a delay of 27.9 LOS C in the AM and delay of 31.8 LOS C in the PM.

6.2 OPENING DAY TRAFFIC

As discussed above, existing traffic was added to cumulative projects traffic to obtain opening day daily and peak hour volumes for analysis purposes. **Figure 6-4** presents the resulting opening day average daily traffic and **Figure 6-5** presents the opening day peak hour traffic. These volumes were then used for analysis based on the lane configurations previously discussed. Nationally recognized Highway Capacity Analysis Software was used for this analysis which referred to as HCS 2000.

TABLE 6-1

Cumulative Projects

	Project	Description	Size	Status	Study
1	Flower Hill Promenade	Adding 8,754 SF of Retail; 2,300 SF of Storage; 28,927 SF of Office; 35,000 SF Market	3,179 ADT	Approved	Included
2	22nd District Agricultural Master Plan	Replace Existing Flat Floor Exhibit Bldg. (add 26,220 SF); Pave East Parking Lot; New 60,000 SF Health Club; Solana Gate Improvement; Rooftop Sports Field; Conference Hotel	6,960 ADT	Approved	Included
3	Black Mountain Ranch	The 3,690 acre BMR VTM includes 2 golf courses; 1,212 dwelling units; parks, schools, fire station, etc. An additional 1,408 acres of new development are included in BMR	>20,222 ADT	Approved	Included
4	Morgan Run Country Club	Health Spa: 9,432 SF increase	283 ADT	Approved	Included
5	Palma de la Reina	54 Apt.; 19,500 SF Office; and 9,500 SF Retail	1,202 ADT	Approved	Included
6	Rancho Santa Fe Farms Golf Club	Recreation of 18 hole golf course	700 ADT	Approved	Included
7	Pueblo de la Valle (aka: Via de la Valle Townhomes)	22 Townhomes	220 ADT	Pending	Included
8	Rancho Del Mar	225 Senior Housing Units	900 ADT	Pending	Included
9	One Paseo	245,000 SF Corporate Office; 291,000 SF Multi-tenant Office; 150 room hotel; 220,000 SF Community Shopping Center; 10 screen Cinema; 608 MF DU	26,961 ADT	Pending	Included
10	Riverview Project	23,120 SF Office	560 ADT	Pending	Included
11	Sillstrop Single Family Homes	3 Apartments & 22 homes	244 ADT	Pending	Included
12	Solana Beach Towne Center	Office Alternative: 133,047 SF	3,310 ADT	Pending	Included
13	Solana Beach Mixed-Use Project	Mixed Use	630 ADT	Pending	Included
14	NCTD Mixed-Use	Mixed Use	3,585 ADT	Pending	Included
15	Stevens Avenue Office Bldg.	18,905 SF Office	380 ADT	Pending	Included
16	Shepard Medical Center	Medical Office: -4,394 SF	220 ADT	Pending	Included
17	Solana Gateway	Mixed Use: Hotel, restaurant, residential	1,760 ADT	Pending	Included
18	Helen Woodward Animal Center	Building Expansion: 41,600 SF	594 ADT	Pending	Included
19	Del Mar Country Estates	Residential: 14 estate homes	168 ADT	Pending	Included
20	Ranch Santa Fe	Included in Appendices to Flower Hill Promenade Traffic Study	Peak Hour Volumes provided	Pending	Included

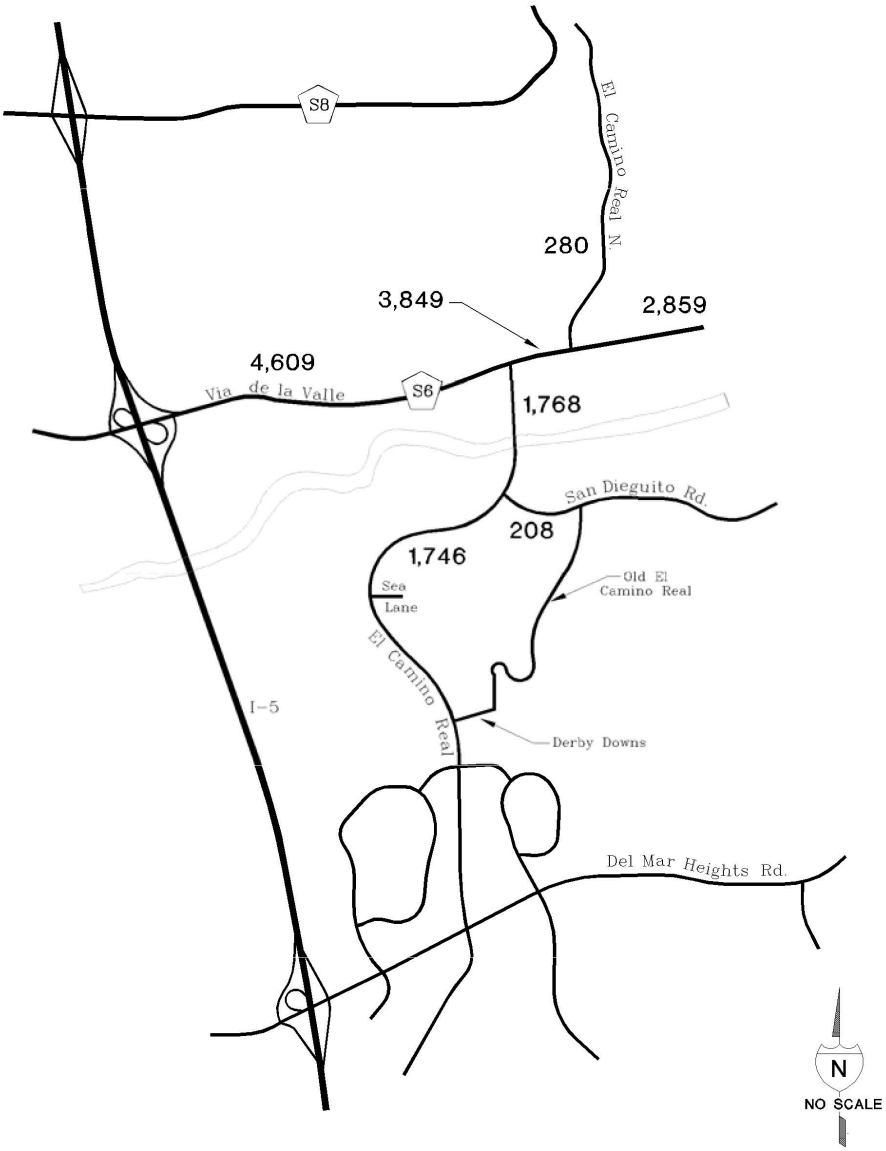


FIGURE 6-1

Cumulative Projects Only Average Daily Traffic Volumes

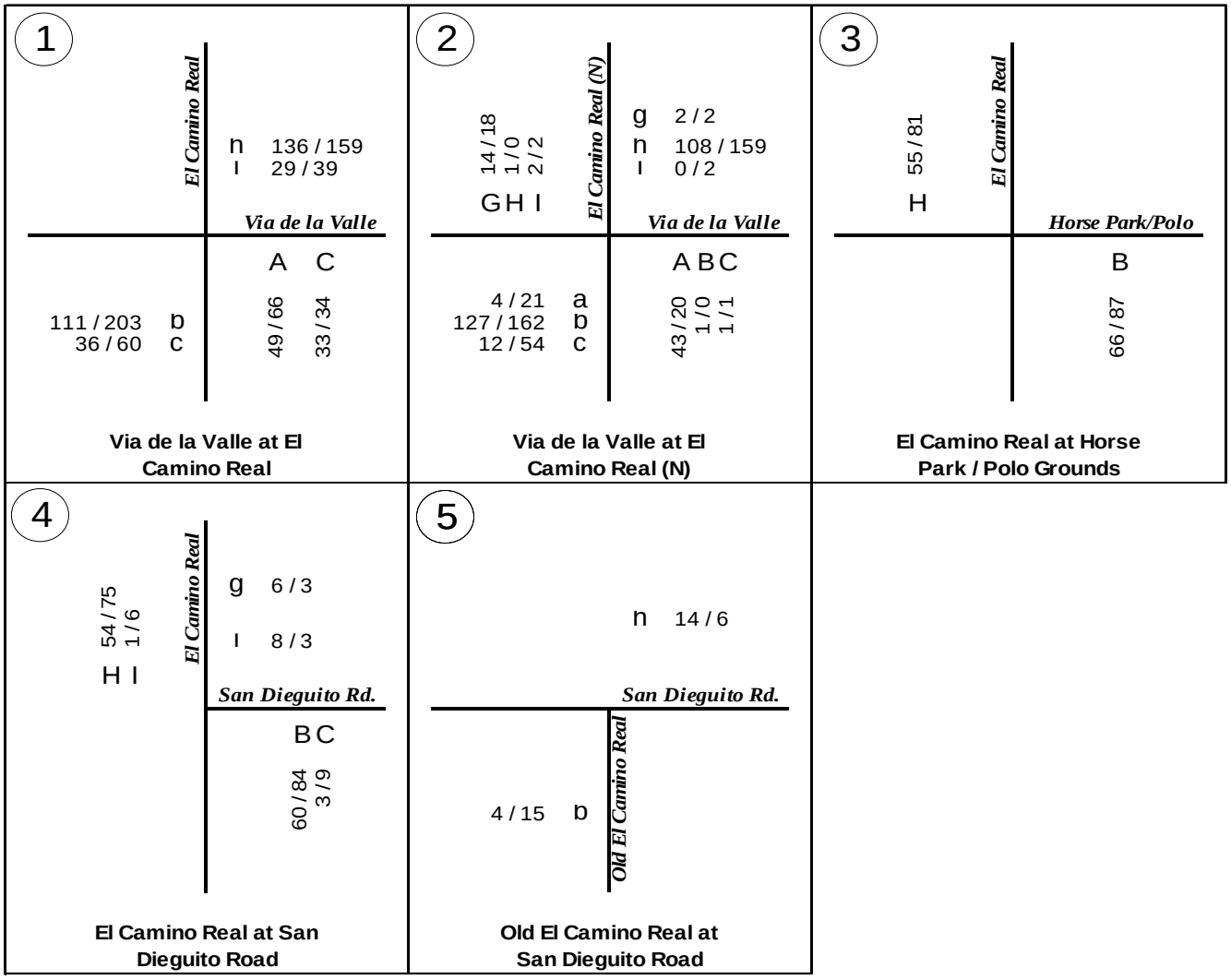


FIGURE 6-2

Cumulative Projects Only AM/PM Peak Hour Traffic Volumes

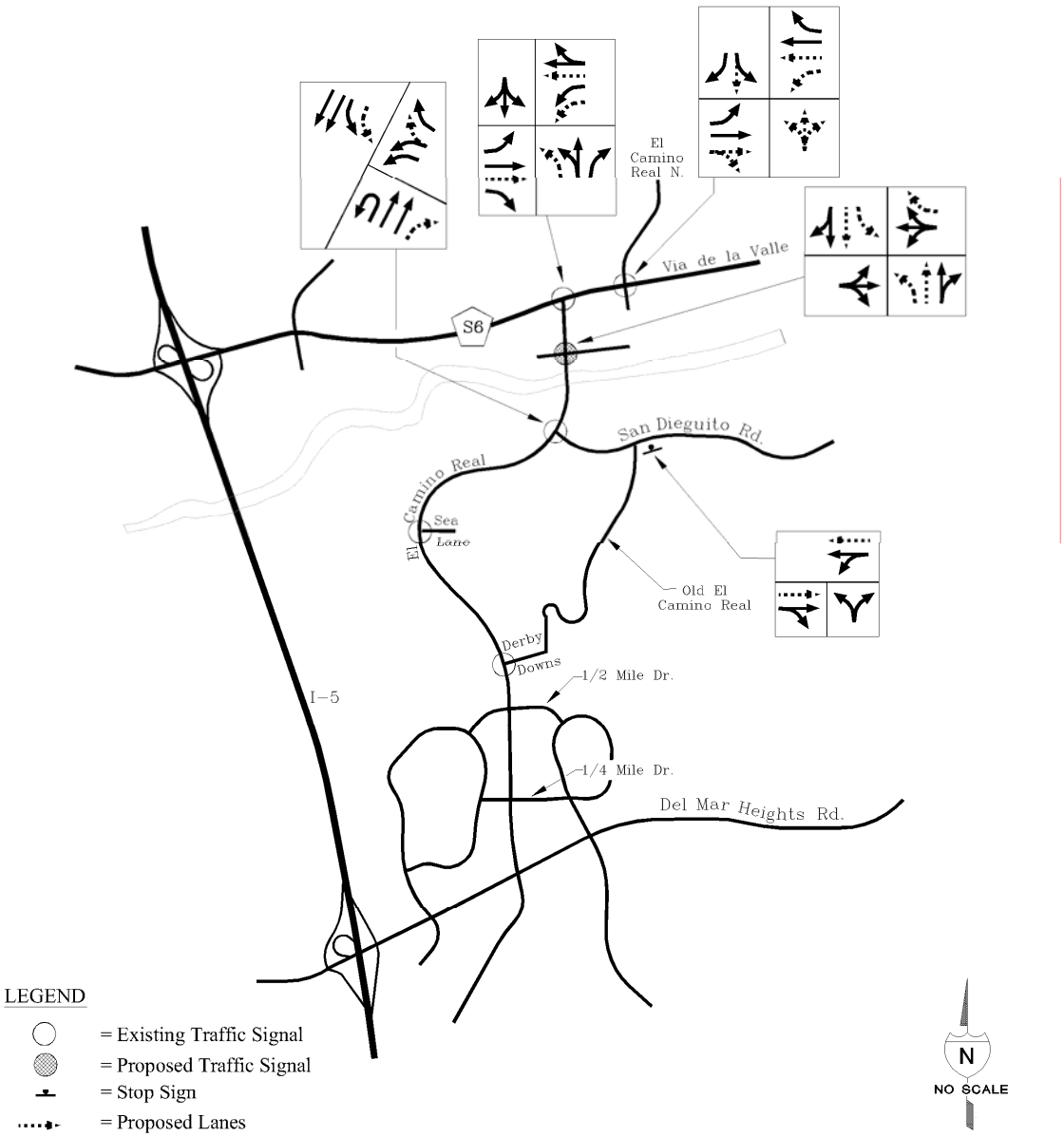


FIGURE 6-3

Proposed Opening Day With Project Lane Configurations

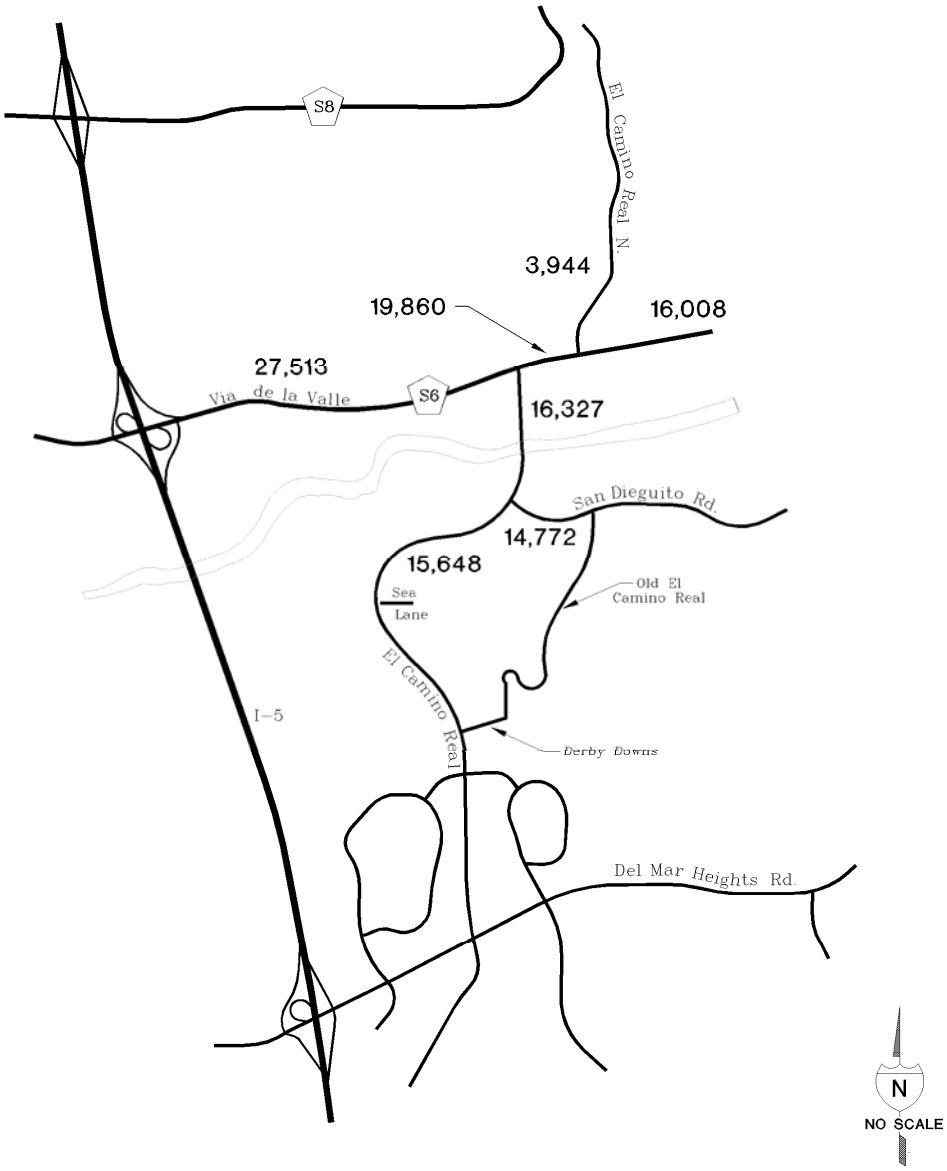


FIGURE 6-4

Opening Day Average Daily Traffic Volumes

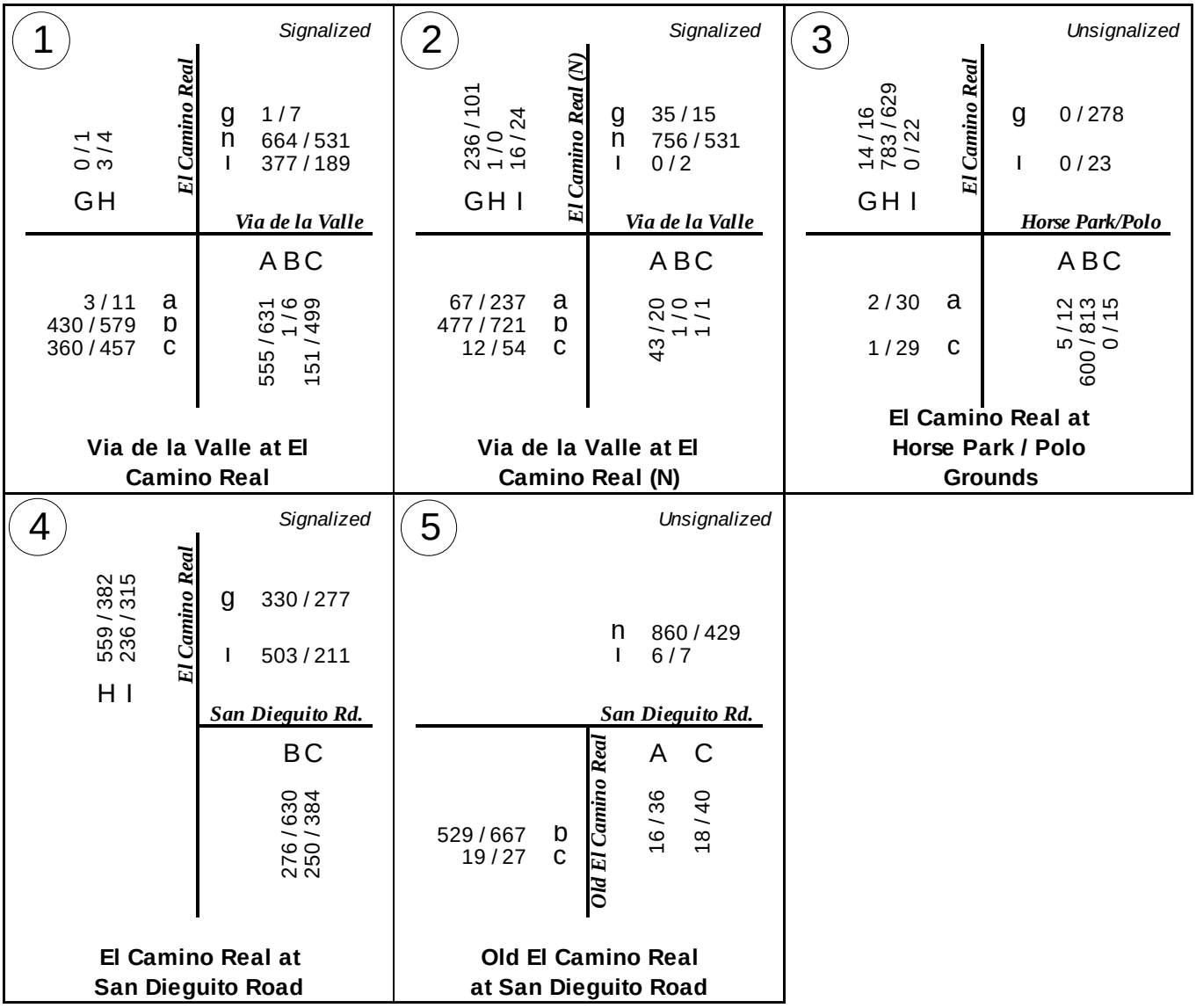


FIGURE 6-5

Opening Day AM/PM Peak Hour Traffic Volumes

6.3 ANALYSIS RESULTS WITH AND WITHOUT PROJECT

Table 6-2 summarizes the analysis results based on the assumptions noted and discussed above. **Table 6-2** evaluates the street segments based on average daily traffic assuming that the project is not built. As shown in the table, by the expected project opening day in March of 2016, all but two street segments are projected to fail. This means that less than acceptable levels of service, worse than level of service D, i.e. E or F, are expected if the project is not built. The two street segments in the project study area which will continue to function with acceptable levels of service are El Camino Real north of Via de la Valle and El Camino Real south of San Dieguito Road.

When the project is built and analyzed with opening day traffic, then all but one street segment is projected to function with acceptable levels of service, see **Table 6-3**. As shown in the table, only Via de la Valle east of El Camino Real (North) is projected to operate with an unacceptable level of service i.e. LOS F.

Next, opening day peak hour intersection operations with and without the project was evaluated. **Table 6-4** shows the results of an opening day analysis without the project. As shown, two locations are projected to operate at unacceptable levels of service, i.e. "E" or "F". At Via de la Valle and El Camino Real, the intersection is projected to operate at a level of service E during both peaks and at El Camino Real and the Horse Park/Polo Grounds access, the intersection will operate at a LOS D during the AM peak and LOS F during the PM peak.

When the project is built, all intersections are projected to operate with acceptable levels of service with opening day traffic, see **Table 6-5**. See **Appendix F** for Opening Day analysis worksheets.

TABLE 6-2

Opening Day Without Project Street Segment Levels of Service

Road	Segment	Standard	Class.	Cap.	Volume	V/C	LOS
Via de la Valle	West of El Camino Real	SD	2-Cb	10,000	27,513	2.75	F
	El Camino Real to El Camino Real (N)	SD	2-Cb	10,000	19,860	1.99	F
	East of El Camino Real (N)	SD	2-Cb	10,000	16,008	1.60	F
El Camino Real (N)	North of Via de la Valle	SD	2-Cb	10,000	3,944	0.39	A
El Camino Real	Via de la Valle to San Dieguito Road	SD	2-Cb	10,000	16,327	1.63	F
	South of San Dieguito Road	SD	4-M	40,000	15,648	0.39	B
San Dieguito Road	El Camino Real to Old El Camino Real	SD	2-Cb	10,000	14,772	1.48	F

Legend:

Yellow or shaded indicates unacceptable level of service.

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cb = 2 lane Collector

4-M = 4 lane Major

TABLE 6-3

Opening Day With Project Street Segment Levels of Service

Road	Segment	Standard	Class.	Cap.	Volume	V/C	LOS
Via de la Valle	West of El Camino Real	SD	4-M	40,000	27,513	0.69	C
	El Camino Real to El Camino Real (N)	SD	4-M	40,000	19,860	0.50	C
	East of El Camino Real (N)	SD	2-Cb	10,000	16,008	1.60	F
El Camino Real (N)	North of Via de la Valle	SD	2-Cb	10,000	3,944	0.39	A
El Camino Real	Via de la Valle to San Dieguito Road	SD	4-M	40,000	16,327	0.41	B
	South of San Dieguito Road	SD	4-M	40,000	15,648	0.39	B
San Dieguito Road	El Camino Real to Old El Camino Real	SD	4-M	40,000	14,772	0.37	A

Legend:

Yellow or shaded indicates unacceptable level of service.

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cb = 2 lane Collector

4-M = 4 lane Major

TABLE 6-4

Opening Day Without Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Via de la Valle at El Camino Real	Signalized	65.2	E	63.5	E
2	Via de la Valle at El Camino Real (N)	Signalized	23.6	C	24.9	C
3	El Camino Real at Horse Park / Polo Grounds	Unsignalized	34.0	D	185.1	F
4	El Camino Real at San Dieguito Road	Signalized	16.0	B	21.0	C
5	Old El Camino Real at San Dieguito Road	Unsignalized	26.8	C	24.9	C

Notes:

Yellow or shaded indicates unacceptable level of service.

LOS = Level of Service

TABLE 6-5

Opening Day With Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Via de la Valle at El Camino Real	Signalized	24.6	C	27.7	C
2	Via de la Valle at El Camino Real (N)	Signalized	16.8	B	17.5	B
3	El Camino Real at Horse Park / Polo Grounds	Signalized	10.3	B	18.4	B
4	El Camino Real at San Dieguito Road	Signalized	13.2	B	14.4	B
5	Old El Camino Real at San Dieguito Road	Unsignalized	16.7	B	17.1	C

Notes:

LOS = Level of Service

7.0 YEAR 2035 ANALYSIS

Year 2035 segment and peak hour forecast volumes were developed, reviewed by City staff and agreed on for analysis. Daily volumes are summarized on **Figure 7-1** and peak hour intersection volumes are summarized on **Figure 7-2**. Year 2035 with project lane configurations are summarized on **Figure 7-3**. As shown on Figure 7-3, the lane configuration and analysis at Via de la Valle / El Camino Real represents the Eastern Alignment. As noted in the Opening Day analysis, the Central and Western alignments show an eastbound left turn lane, a through lane, and a through shared right turn lane at this intersection, see **Appendix I**. The analysis showed Via de la Valle / El Camino Real to operate at 73.6 LOS E in the AM and 136.6 LOS F in the PM peak hour.

7.1 YEAR 2035 ANALYSIS WITHOUT PROJECT

If the project is not built, Year 2035 segment volumes would result in unacceptable levels of service at all locations except two, see **Table 7-1**. El Camino Real north of Via de la Valle would continue to operate with an acceptable level of service and El Camino Real south of San Dieguito Road would operate at an acceptable level of service. For intersections only El Camino Real at San Dieguito Road would continue to operate with acceptable levels of service in the Year 2035, see **Table 7-2**.

7.2 YEAR 2035 TRAFFIC WITH PROJECT ANALYSIS

If the project is built, and the street segments are evaluated using 2035 volumes, the all street segments except one are expected to operate with acceptable levels of service, see **Table 7-3**. Only Via de la Valle east of El Camino Real (North) is shown to operate at a level of service F. As shown in **Table 7-4**, all intersections are expected to operate with acceptable levels of service when the project is built. See **Appendix G** for Year 2035 analysis worksheets.

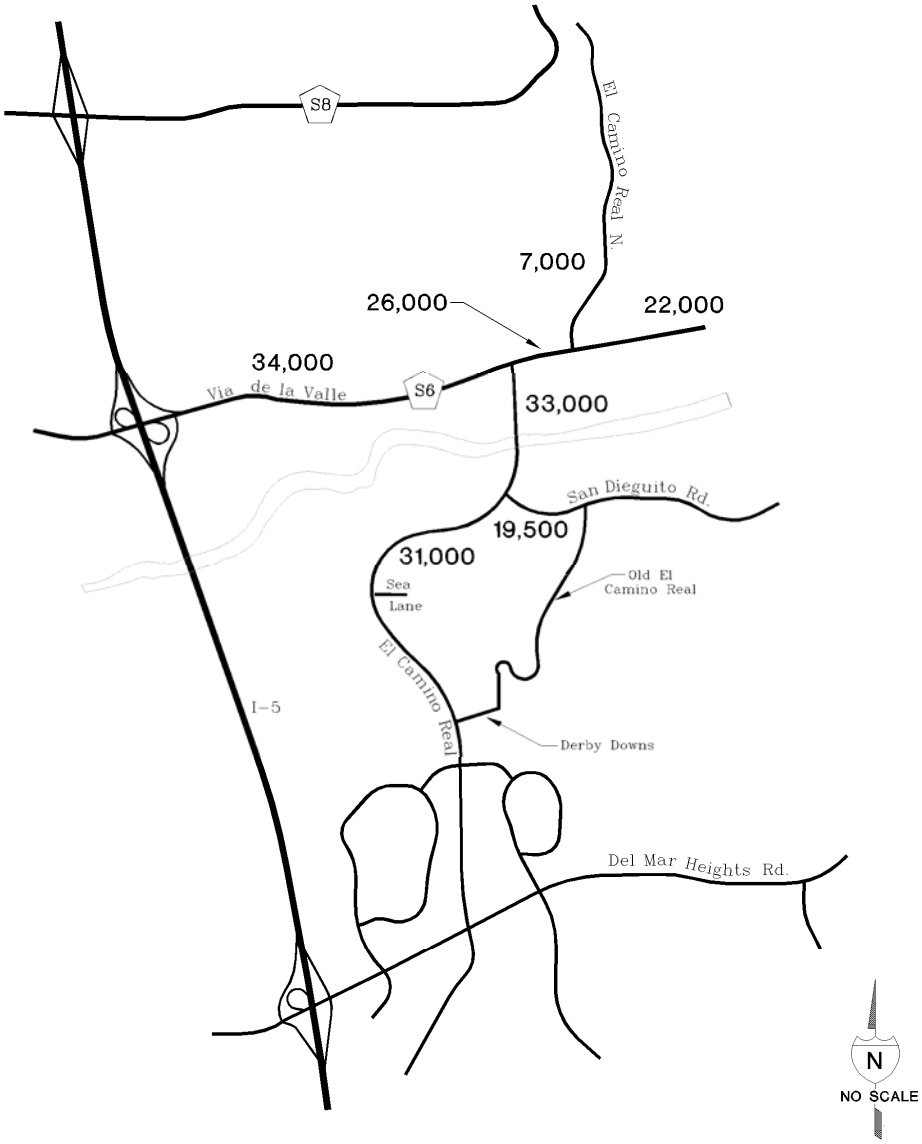


FIGURE 7-1

Year 2035 With Project Average Daily Traffic

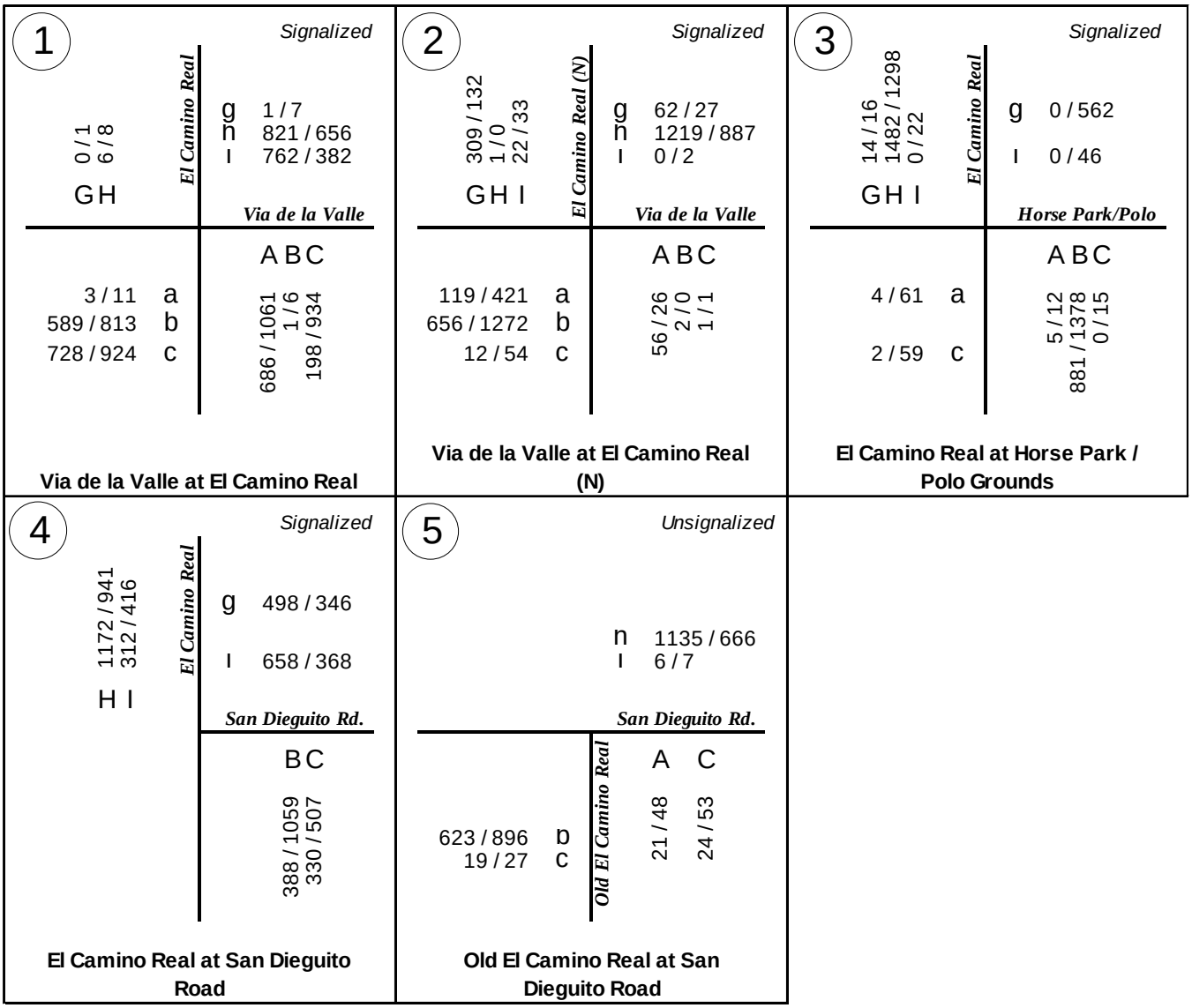


FIGURE 7-2

Year 2035 AM/PM Peak Hour Traffic Volumes

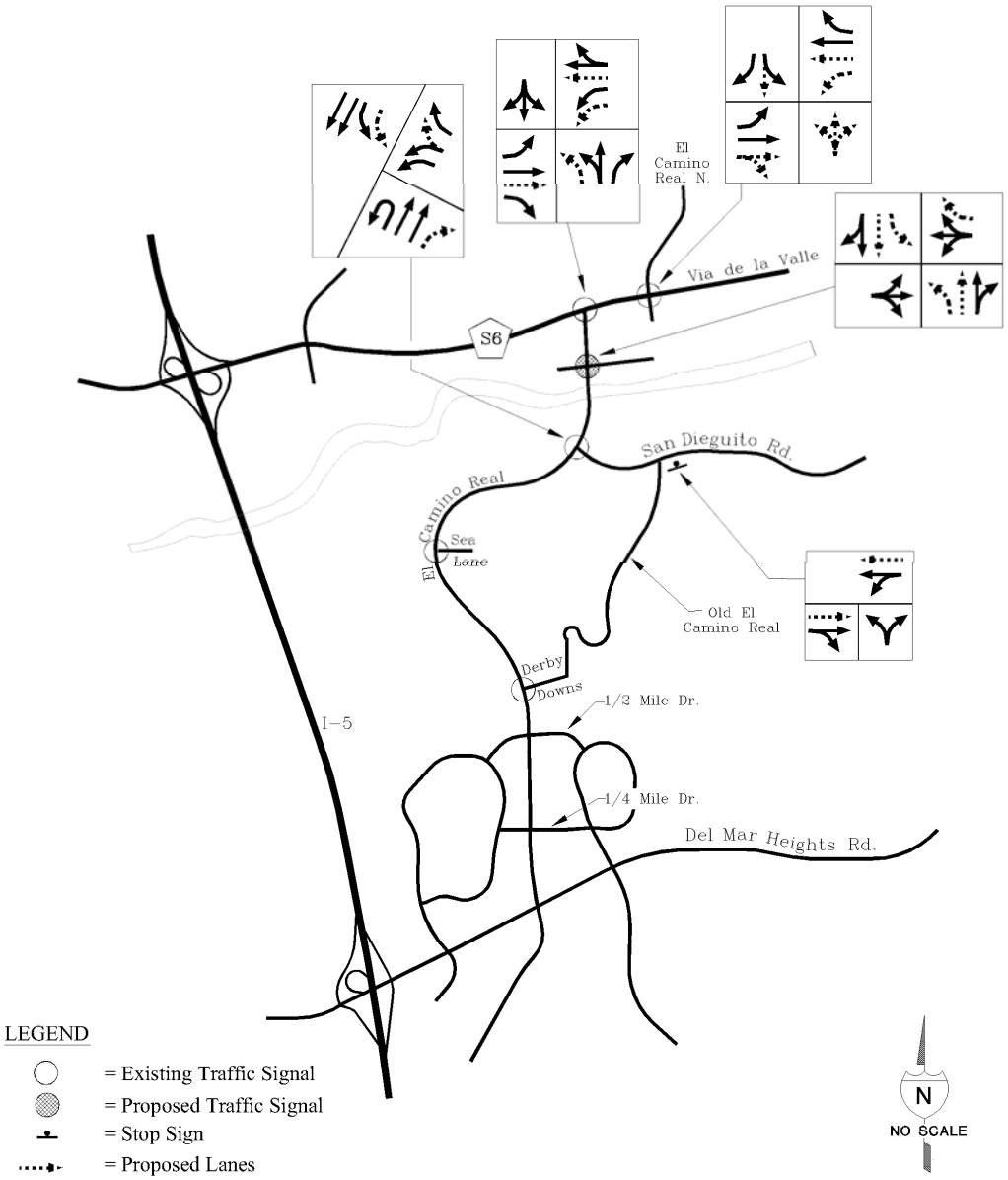


FIGURE 7-3

Proposed Year 2035 With Project Lane Configurations

TABLE 7-1

Year 2035 Without Project Street Segment Levels of Service

Road	Segment	Standard	Class.	Cap.	Volume	V/C	LOS
Via de la Valle	West of El Camino Real	SD	2-Cb	10,000	34,000	3.40	F
	El Camino Real to El Camino Real (N)	SD	2-Cb	10,000	26,000	2.60	F
	East of El Camino Real (N)	SD	2-Cb	10,000	22,000	2.20	F
El Camino Real (N)	North of Via de la Valle	SD	2-Cb	10,000	7,000	0.70	C
El Camino Real	Via de la Valle to San Dieguito Road	SD	2-Cb	10,000	33,000	3.30	F
	South of San Dieguito Road	SD	4-M	40,000	31,000	0.78	D
San Dieguito Road	El Camino Real to Old El Camino Real	SD	2-Cb	10,000	19,500	1.95	F

Legend:

Yellow or shaded indicates unacceptable level of service.

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cb = 2 lane Collector

4-M = 4 lane Major

TABLE 7-2

Year 2035 Without Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Via de la Valle at El Camino Real	Signalized	192	F	262.1	F
2	Via de la Valle at El Camino Real (N)	Signalized	90.8	F	103.4	F
3	El Camino Real at Horse Park / Polo Grounds	Unsignalized	209.2	F	6,749	F
4	El Camino Real at San Dieguito Road	Signalized	22.3	C	46	D
5	Old El Camino Real at San Dieguito Road	Unsignalized	53	F	88.6	F

Notes:

Yellow or shaded indicates unacceptable levels of service.

LOS = Level of Service

TABLE 7-3

Year 2035 With Project Street Segment Levels of Service

Road	Segment	Standard	Class.	Cap.	Volume	V/C	LOS
Via de la Valle	West of El Camino Real	SD	4-M	40,000	34,000	0.85	D
	El Camino Real to El Camino Real (N)	SD	4-M	40,000	26,000	0.65	C
	East of El Camino Real (N)	SD	2-Cb	10,000	22,000	2.20	F
El Camino Real (N)	North of Via de la Valle	SD	2-Cb	10,000	7,000	0.70	C
El Camino Real	Via de la Valle to San Dieguito Road	SD	4-M	40,000	33,000	0.83	D
	South of San Dieguito Road	SD	4-M	40,000	31,000	0.78	D
San Dieguito Road	El Camino Real to Old El Camino Real	SD	4-M	40,000	19,500	0.49	B

Legend:

Yellow or shaded indicates unacceptable level of service.

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cb = 2 lane Collector

4-M = 4 lane Major

TABLE 7-4

Year 2035 With Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Via de la Valle at El Camino Real	Signalized	37.1	D	48.7	D
2	Via de la Valle at El Camino Real (N)	Signalized	24.9	C	35.4	D
3	El Camino Real at Horse Park / Polo Grounds	Signalized	9.6	A	22.9	C
4	El Camino Real at San Dieguito Road	Signalized	19.6	B	20.1	C
5	Old El Camino Real at San Dieguito Road	Unsignalized	22.3	C	30.8	D

Notes:

LOS = Level of Service

8.0 ROUNDABOUT ANALYSIS

This chapter of the traffic impact analysis was prepared to summarize information regarding the use of roundabouts at four (4) locations instead of traffic signals along the Eastern Alignment Alternative. The analysis (Dated May 25, 2012) was prepared by Ourston Roundabout Engineering in cooperation with Rick Engineering Company. The full technical analysis included in **Appendix H** of this report. This chapter represents only a summary of the Ourston analysis.

An operational analysis was completed for four intersections located on the El Camino Real / Via de la Valle corridor between San Dieguito Road and Via de la Valle and between El Camino Real and El Camino Real North. This analysis evaluated roundabouts at the following intersections for the eastern alignment alternative:

1. El Camino Real at San Dieguito Road
2. El Camino Real at the polo club access drive
3. El Camino Real at Via de la Valle
4. Via de la Valle at North El Camino Real

8.1 OPERATIONAL ANALYSIS METHODOLOGY

Based on Year 2035 AM and PM peak hour traffic forecasts, the capacity for the roundabout intersections was analyzed using ARCADY roundabout design and capacity analysis software. ARCADY (Assessment of Roundabout Capacity and Delay) is a program based on U.K. empirical research into geometry-capacity relationships. Two additional features that ARCADY provides is its ability take into

account horizontal geometric design sensitivity and its ability to be calibrated to the recent NCHRP Report 672 (Roundabouts in the United States, 2007) roundabout capacity model.

The ARCADY analysis was calibrated to the NCHRP Report 672 empirical results, which indicate a reasonable 10% capacity reduction for calibration to U.S. roundabouts. The findings on capacity performance for U.S. roundabouts to date suggest a reduction in the modeling of expected capacity is appropriate until more data is available to suggest otherwise. Currently some single lane roundabouts are performing better than expected but this may not be the case everywhere in the U.S., and may not hold true for multi-lane roundabouts.

The results represent the most probable capacity of the roundabout and employ capacity measures of level of service (LOS), delay and queuing, consistent with typical unsignalized capacity analysis methodologies (Highway Capacity Manual, 2010). The combination of using ARCADY with calibration allows for consideration of the U.S. data obtained by NCHRP. Please refer to **Appendix H** for a more complete discussion of the use of the Arcady Model when the degree if saturation is greater than 0.9, which is the case for this corridor.

The Year 2035 AM and PM peak hour traffic forecasts were prepared by Urban Systems Associates, Inc. (USAI), and have been approved by the City of San Diego. The original traffic forecasts were not balanced between the intersections but USAI has balanced the forecast volumes along the corridor for the intersection analysis, which are illustrated in Figure 1 (For Figures, please refer to the end of this section).

The following sections discuss the operational analysis results for each of the four intersections evaluated.

8.2 EL CAMINO REAL & SAN DIEGUITO ROAD (ARCADY ANALYSIS)

The operational analysis was performed with the 2035 traffic volumes for the proposed roundabout configuration, as illustrated in **Figure 2**. The overall intersection levels of service and anticipated delay by approach are listed in **Table 1**.

Table 1. El Camino Real & San Dieguito Road – 2035 Traffic Forecasts

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach								
				SB - El Camino Real			NB - El Camino Real			WB - San Dieguito Rd		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	B	12.4	C	20.3	25	A	3	1	A	8.1	5
PM	Calibrated	A	8.1	A	5.6	9	B	10	22	A	7.8	13

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix A, pages A.2.1 and A.2.2

Discussion of Proposed Roundabout Geometry

The proposed roundabout is at a T intersection and is a conventional two lane roundabout with through/left and through lanes southbound, through and through/right lanes northbound, and left and left/right lanes westbound. If the traffic forecasts were to change in the future, the City could provide some flexibility in the design by protecting right-of-way for future westbound partial right turn bypass lanes (see dashed lines in Figure 2 at the end of this section).

8.3 EL CAMINO REAL & HORSEPARK / POLO GROUNDS (ARCADY ANALYSIS)

The operational analysis was performed with the 2035 traffic volumes for the proposed roundabout configuration, as illustrated in **Figure 3**. The overall intersection levels of service and anticipated delay by approach are listed in **Table 2.**

Table 2. El Camino Real & Horse Park/Polo Grounds – 2035 Traffic Forecasts

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - El Camino Real			EB - Horse Park			NB - El Camino Real			WB - Polo Grounds		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% queue (veh)	Level of Service	Average Delay	95th% queue (veh)	Level of Service	Average Delay	95th% queue (veh)	Level of Service	Average Delay	95th% queue (veh)
AM	Calibrated	A	4.0	A	4.8	3	A	10.0	1	A	2.6	1	A	0.0	0
PM	Calibrated	A	9.7	A	4.1	3	B	12.8	1	A	4.6	3	D	32.9	18

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix B, pages B.2.1 and B.2.2

Discussion of Proposed Roundabout Geometry

The proposed roundabout is a standard two by one roundabout with two through lanes for southbound and northbound directions, with a left/through and right only lane for eastbound, and a left/through and right only lane entry for westbound. This analysis does take into account event related traffic for the Horse Park (Fairgrounds). For further discussion and alternatives please see the full report by Ourston in **Appendix H**.

8.4 EL CAMINO REAL & VIA DE LA VALLE (ARCADY ANALYSIS)

The operational analysis was performed using the 2035 traffic volumes for the proposed roundabout configuration, as illustrated in **Figure 4**. The overall intersection levels of service and anticipated delay by approach are listed in **Table 3**.

Table 3. El Camino Real & Via de la Valle 2035 Traffic Forecasts

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - Driveway			*EB - Via de la Valle			*NB - El Camino Real			WB - Via de la Valle		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	A	5.9	C	18.8	1	*A/A	*3.4/9.4	*1/4	*A/A	*3.3/3.3	*1/1	A	6.7	4
PM	Calibrated	A	9.3	B	10.4	1	*A/A	*3.2/8.2	*1/4	*A/C	*7/23.3	*4/17	A	4.7	2

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*
*Due to proposed partial right turn bypass a lane by lane analysis was complete for this intersection (left/thru)/(right turn bypass)

The ARCADY operational analysis data is documented in Appendix C, pages C.3.1 and C.3.6

The proposed roundabout design has an interim lane configuration and with minimal rework it can be upgraded to the ultimate lane configuration. The interim roundabout design consists of a single southbound lane, a conventional left/through and through/right lane for the eastbound and westbound directions, as well as a left turn only lane and a left/through/right lane for the northbound direction. The interim design will not be able to handle the projected 2035 traffic forecasts and will have to be upgraded to the ultimate lane configuration, the additions consists of a second southbound through lane, dual partial right turn bypass lanes for the eastbound and northbound directions, as well as an additional left turn for westbound direction, illustrated in Figure 4 as dashed lines. Please refer to Section 8.7 of this summary for further discussion regarding the proposed interim design.

8.5 VIA DE LA VALLE & NORTH EL CAMINO REAL (ARCADY ANALYSIS)

The operational analysis was performed with the 2035 traffic volumes for the proposed roundabout configuration, as illustrated in **Figure 5**. The overall intersection levels of service and anticipated delay by approach are listed in **Table 4**.

Table 4. Via de la Valle & North El Camino Real 2035 Traffic Forecasts

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - N. El Camino Real			EB - Via de la Valle			NB - Driveway			WB - Via de la Valle		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	A	5.6	A	5.5	1	A	2.5	1	A	5.2	1	A	7.6	5
PM	Calibrated	A	7.1	A	3.3	1	A	8.1	8	C	20.8	1	A	5.5	3

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix D, pages D.2.1 and D.2.2

Discussion of Proposed Roundabout Geometry

The proposed intersection layout is a conventional multilane roundabout T intersection with southbound and westbound approaches flaring from single lanes to two lanes at the entries. In the future a fourth leg could be added to access a proposed development in the south quadrant, however this is not shown on **Figure 5**.

8.6 ADDITIONAL CONSIDERATIONS REGARDIG:

- Design vehicle
- Bike accommodations
- Pedestrian accommodations

Design Vehicle

A WB-67 was selected to be accommodated in all the roundabouts except for the north leg of the Via de la Valle and El Camino Real roundabout and is a conservative estimation of the truck paths; the WB-67 has a longer trailer than the standard Cal Trans vehicle STAA-STD-50. The STAA-STD-50 was used to design the entry and exit to the shopping center for the north leg of the Via de la Valle and El Camino Real roundabout. The design vehicle turning movements are shown in Appendix E of the full Ourston report.

Bike Accommodations

Cyclist will have two options to traverse the roundabouts.

They may choose to travel through the roundabout like the other vehicles; or,

- They may choose to exit the roadway at the bike off-ramp and use the wider shared use sidewalk to travel on foot and re-enter the roundabout at the downstream bike on ramp.

Pedestrian Accommodations

The proposed roundabout designs meet the current accessibility design standards by providing accessible pedestrian crosswalks at most of the entries and exits of the four proposed roundabouts along the El Camino Real corridor. The crosswalks are at grade crosswalks located between 20 feet and 25 feet of the entries and exits. At this time studies of pedestrian safety at roundabouts have found no evidence that roundabouts put pedestrians at greater risk of being struck, or at greater risk of injury when involved in a motor vehicle collision. The documented evidence that they are actually safer is for the following reasons:

- Roundabout have slower operating speeds;
- Pedestrians only need to look in one direction as they cross;
- Shorter crossing distances; and,
- Pedestrians are more alert when crossing, because it is an uncontrolled crossing.

Notwithstanding, the uncontrolled pedestrian crosswalks at roundabouts are uncomfortable for pedestrians, i.e. their sense of safety is low. This presents a challenge for some pedestrians with disabilities, e.g. visually impaired. In response to these concerns the US Access Board is proposing the use of , pedestrian actuated crossing systems, e.g. hybrid beacons (PHB) at pedestrian crosswalks for multi-lane roundabouts. Final rule-making and legislation has not been enacted, thus the City is not obliged to install additional devices at this time.

To be proactive the City could consider placing underground conduit for a possible future pedestrian crossing signal on one or more roundabout approaches or exits. The basis of determining which intersection legs could be candidates for pedestrian actuated signals requires further discussion and

examination of the potential pedestrian desire lines. This examination, while allowing the City to place pedestrian crossings at the appropriate locations, will minimizing unneeded pedestrian crossings. One such example might be to strategically place one pedestrian crossing on Via de la Valle between the El Camino Real (south) and El Camino Real (north) roundabouts instead of one at each roundabout. We can offer further guidance on the setback distance and design of these devices.

Knowledge of pedestrian crossings at roundabouts both un-signalized and signalized is growing. Generally, pedestrian crossing capacity is optimal when there is roadway congestion because gaps in approaching traffic occur more frequently as vehicle queues develop. Impact of signalized pedestrian crossings can be modeled based on some U.S. research but mostly from European research. In general, the same expectations prevail, that roundabouts with congestion are more accessible because traffic is queued near the roundabout crossing locations. Pedestrian actuated signals are then more useful in off-peak conditions when speeds of approach and departure are higher and gaps are more difficult to predict.

Prediction of the impact of potential pedestrian signals on a roundabout operation will require determination of future pedestrian crossing volumes. From field reports we understand that pedestrian traffic is very low at present. Pedestrian crossing counts and travel patterns for the corridor have not been obtained to date. Notwithstanding, if the expected pedestrian traffic is as low as the current conditions, the effect on roundabout operations will be negligible. The NCHRP Report 672 documents the research into potential capacity effect of pedestrian crossings (see Section 4.5.4). A 10% effect on capacity requires over 200 pedestrian crossings per hour with moderate traffic circulating in front of the roundabout entry in question. Given the improved efficiency of newer pedestrian actuated signal technology, e.g. push-button, split phase, count-down and gap-out detection, the effect on roundabout operations is not likely to be significant.

8.7 ROUNDABOUT CONCLUSIONS

The results of the ARCADY analysis of the proposed roundabouts show an overall intersection LOS and a LOS B or better for the El Camino Real/San Dieguito roundabout, El Camino Real/Horse Park/Polo Fields roundabout , Via de la Valle/North El Camino Real roundabout, and the ultimate lane configuration for the Via de la Valle/El Camino Real roundabout.

For the Via de la Valle/El Camino Real roundabout an interim/ultimate staging plan is being proposed. The interim lane configuration will have significant delay at the 2035 forecasted traffic volumes, but with minimal rework the roundabout could be upgraded to the ultimate lane configuration. Also if the traffic patterns would change in the future then only some elements of the ultimate lane configuration would be needed. The interim design is recommended at the initial stage because:

- It will be easier for drivers to navigate;
- Safer design due to slower entry speeds and reduced number of conflict points;
- The interim two lanes for the westbound direction will reach capacity at approximately 95% of the projected traffic growth;
- Uncertainty in the event traffic from the Polo Fields ; and,
- Avoidance of overbuilding the layout if traffic growth is lower than expected. Several state agencies with long time roundabout experience have found it necessary to stage roundabout construction in response to concerns from communities for overbuilding and over complicating their roundabouts by needing to build for an uncertain ultimate traffic horizon.

As summarized in the table below, the results of the ARCADY analysis of the proposed roundabouts show an overall intersection LOS B for the AM peak hour for the El Camino Real & San Dieguito Road roundabout. For all the other peaks and three locations a level of service "A" is achieved. Due to the numerous future projects in the area and the potential for future growth the City should build the interim layouts but plan for the ultimate designs as discussed in the full Oursten report (Appendix H). The interim designs foster for safer operations with significant delay at the 2035 traffic forecasts but provides flexibility with future expansion if the future traffic forecast were to increase and/or origin destination patterns were to change.

Location	**Overall Intersection Level of Service**	
	AM Peak LOS (Delay)	**PM Peak LOS (Delay)**
El Camino Real at San Dieguito Road	B (12.4)	A (8.1)
El Camino Real at Horse Park / Polo Grounds	A (4.0)	A (9.7)
El Camino Real at Via de la Valle	A (5.9) Interim Design E (37.0)	A (9.3) Interim Design F (204.2)
Via de la Valle at El Camino Real North	A (5.6)	A (7.1)

Figure 1: 2035 AM and PM Turning Movement Diagrams for the intersections (AM/PM)

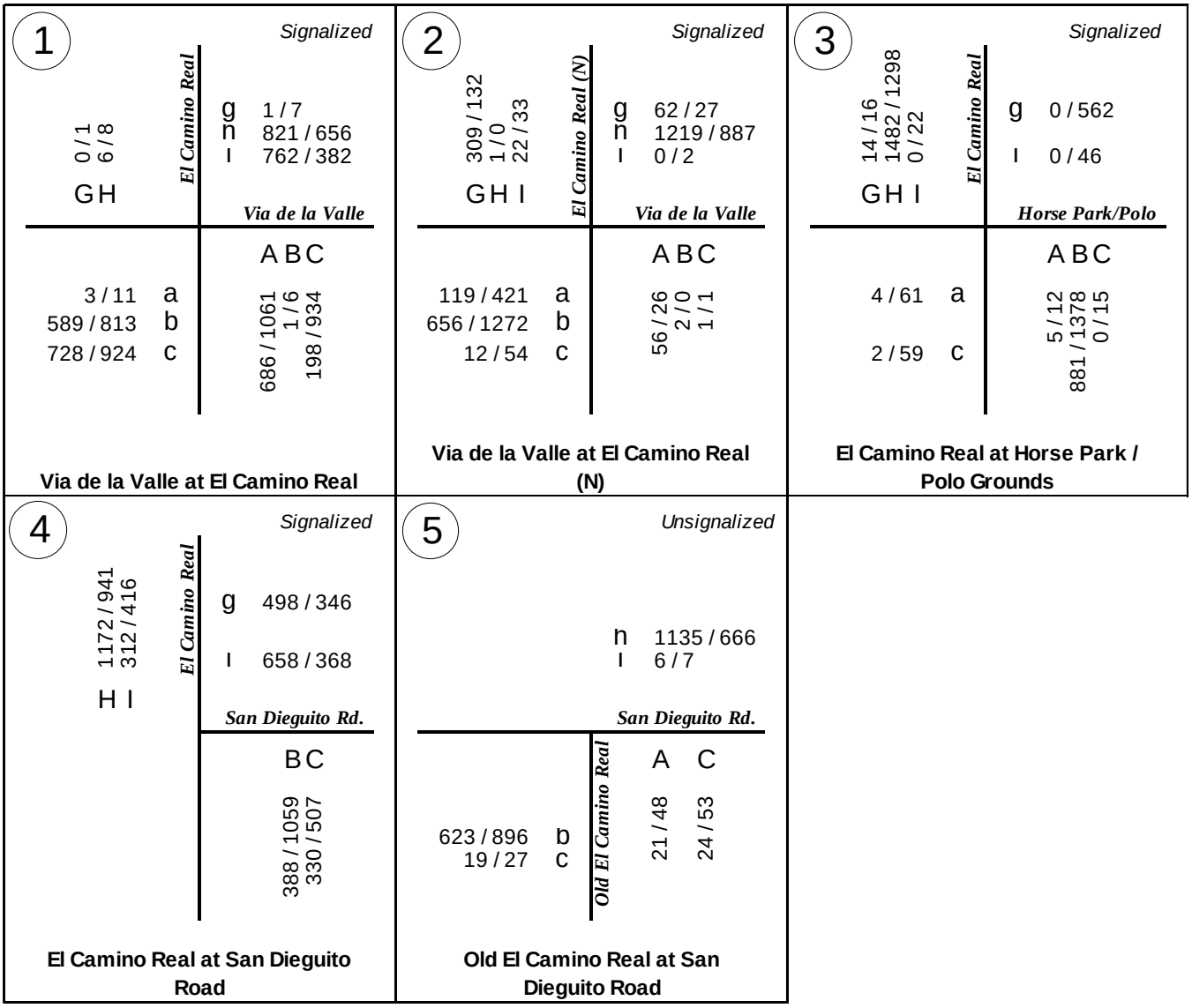


Figure 2: Lane Configuration for El Camino Real & San Dieguito Road

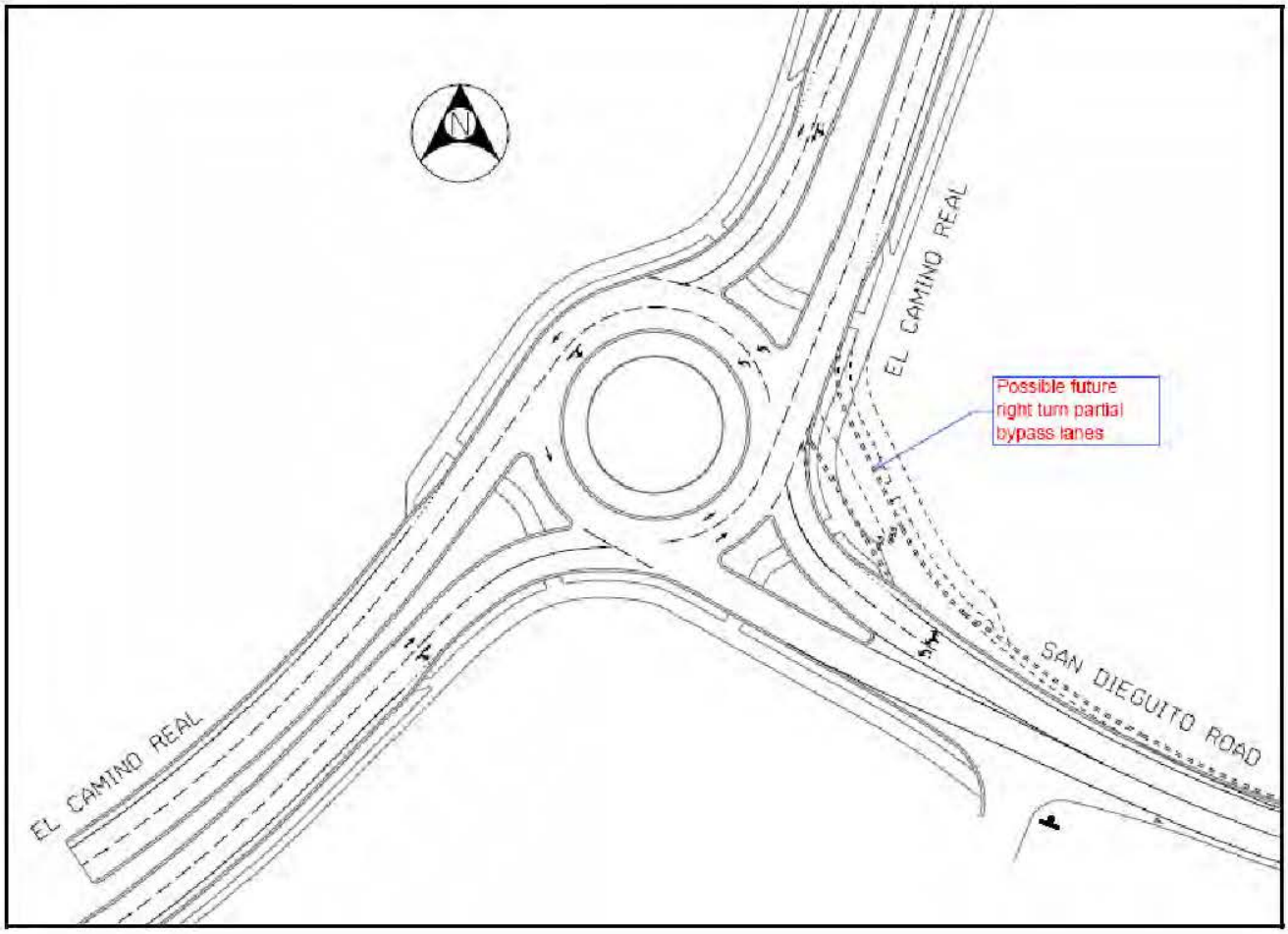


Figure 3: Lane Configuration for El Camino Real & Horse Park/Polo Grounds

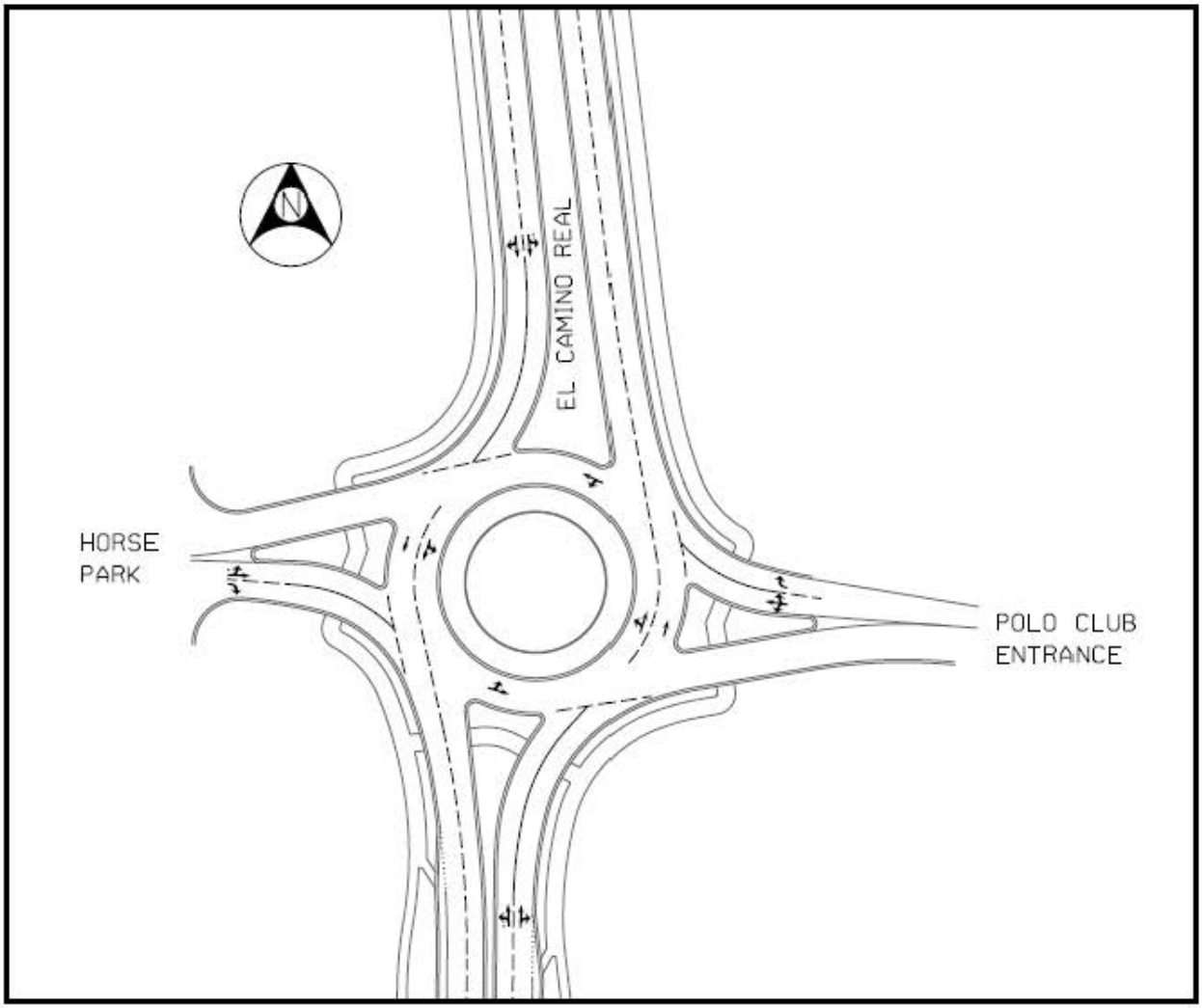


Figure 4: Lane Configuration for El Camino Real & Via de la Valle

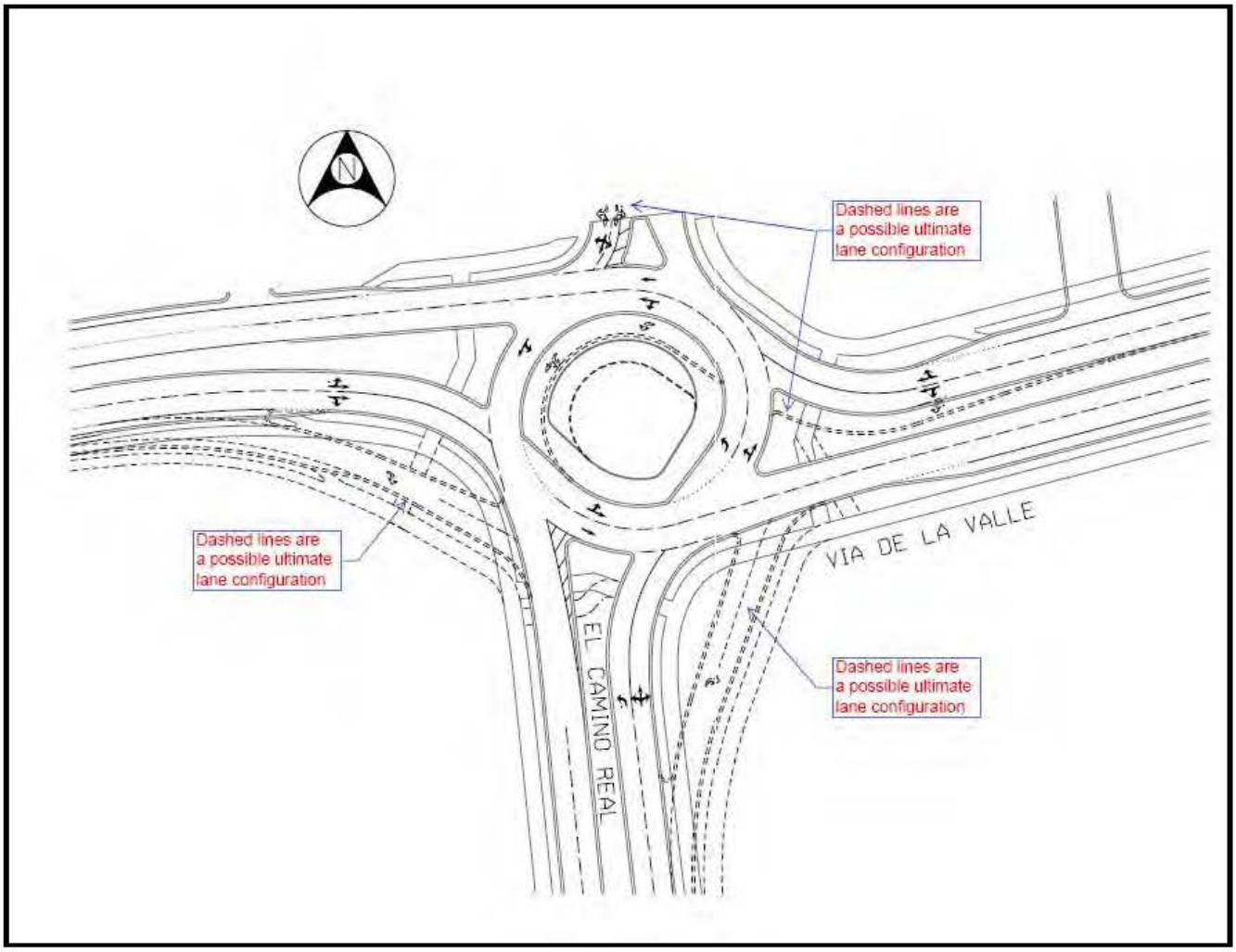
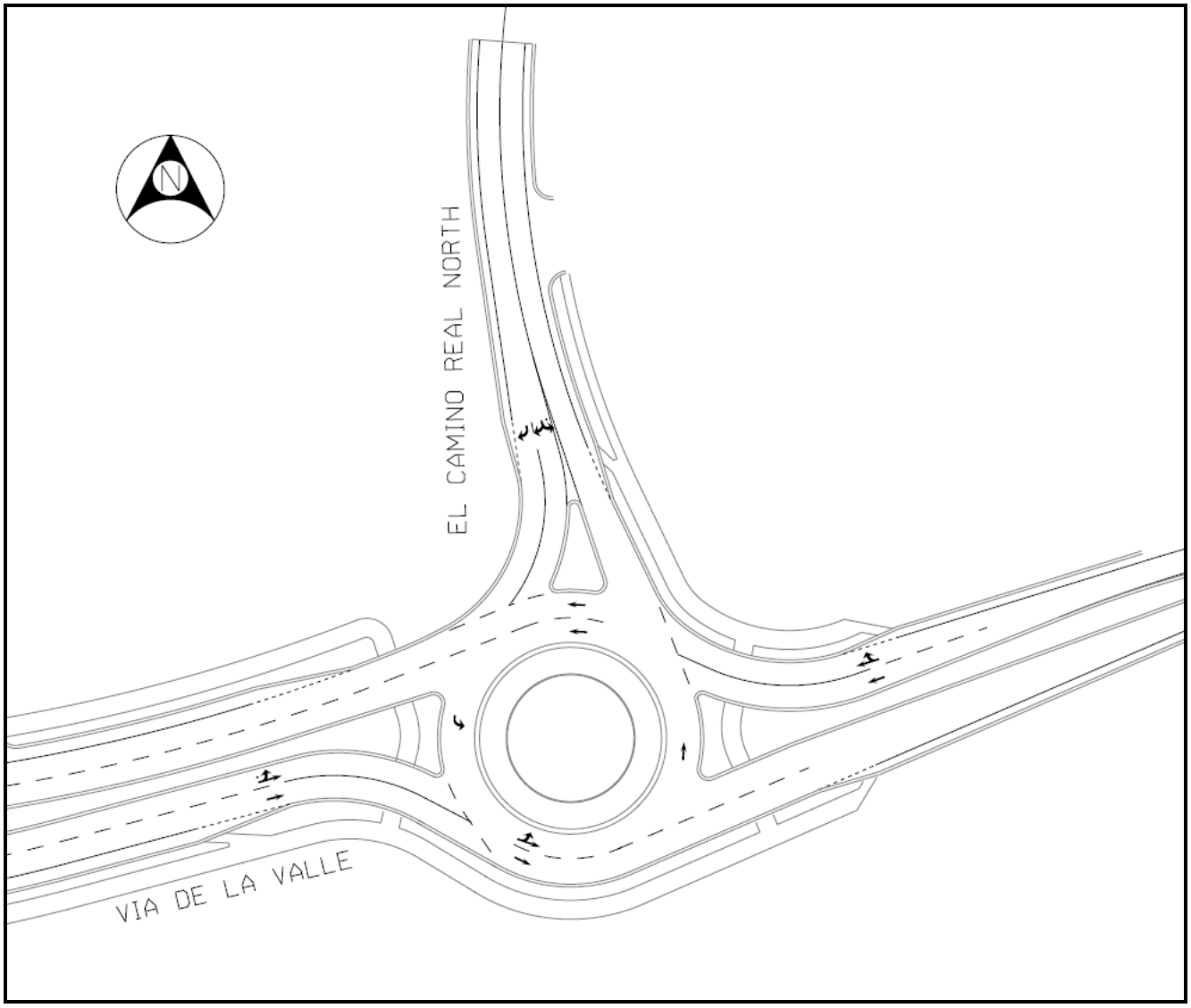


Figure 5: Lane Configuration for Via de la Valle & North El Camino Real



9.0 SUMMARY AND CONCLUSIONS

Table 9-1 summarizes the results of this analysis. As shown, the no project (NO BUILD) alternative does not meet the present or future traffic demand because only two lanes with no median presently exists. The same is true for the Road Capacity and Bicycle alternatives. These alternatives do not provide an adequate number of lanes or adequate median width to accommodate present and future traffic flows at an acceptable level of service which is level of service "D" or better.

The four lane Central Alignment and the Western, Eastern and Lower alternatives all achieve acceptable levels of service for both street segments and intersections. We therefore conclude that the following alternatives adequately serve future traffic demand.

ACCEPTABLE ALTERNATIVES		
Central	4-lanes with median	
Western	4-lanes with median	
Eastern	4-lanes with median	Northern intersection at Via de la Valle Place
Lower	4-lanes with median	

It should be noted that the Eastern alignment alternative which intersects Via de la Valle at Via de la Valle Place provides essentially the same traffic service as each of the other acceptable alternatives.

TABLE 9-1

Summary of Analysis

Project Alternative	Number of Lanes	Median?	Meets Segment Level of Service Standard?*	Meets Intersection Level of Service Standard?*
No Project	2	No	No	No
Central Alignment	4	Yes	Yes	Yes
Road Capacity	4	No**	No	No
Bicycle Safety	2	Yes	No	No
Western Alignment	4	Yes	Yes	Yes
Eastern Alignment	4	Yes	Yes	Yes
Lower Elevation	4	Yes	Yes	Yes

* = Level of Service D or Better
** = Two Foot Median, Not Adequate for Turn Lanes

9.1 ROUNDABOUT ALTERNATIVE

The roundabout alternative, where signalized intersections are replaced with roundabouts as presented and discussed in Chapter 8 of this report, is also acceptable as long as 4 lanes are provided on El Camino Real and the ultimate configuration is provided at Via de la Valle and El Camino Real.

9.2 VIA DE LA VALLE

For all alternatives, the widening of Via de la Valle to its planned width is also acceptable.

10.0 REFERENCES

San Diego Region Traffic Engineer's Council (SANTEC) and Institute of Transportation Engineers (ITE), California Border Section, Guidelines for Congestion Management Program (CMP) Traffic Impact Report, San Diego, CA (2008)

City of San Diego, Development Services Department, San Diego Municipal Code, Land Development Code, Trip Generation Manual, May 2003, San Diego, CA

City of San Diego, Development Services Department, California Environmental Quality Act, Significant Determination Thresholds, January 2007, San Diego, CA

San Diego Association of Governments, 2006 Congestion Management Program Update, Appendix D, July 2006, San Diego, CA

Transportation Research Board (TRB) 2000 Highway Capacity Manual, Washington D.C.

11.0 URBAN SYSTEMS ASSOCIATES, INC. PREPARERS

Principal Engineer

Andrew P. Schlaefli; M.S. Civil Engineering, B.S. Civil Engineering
Registered Civil Engineer, Licensed Traffic Engineer

Senior Project Manager

Justin P. Schlaefli; B.S. Civil Engineering, MCE
Registered Civil Engineer, Licensed Traffic Engineer

Project Manager

Jacob D. Swim; B.S. Civil Engineering

Senior Technical Support, Graphics and Illustrations

Jacob D. Swim: B.S. Civil Engineering

Word Processing, Report Production and Compilation

Lisa Diaz

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APPENDIX A

TRAFFIC COUNTS

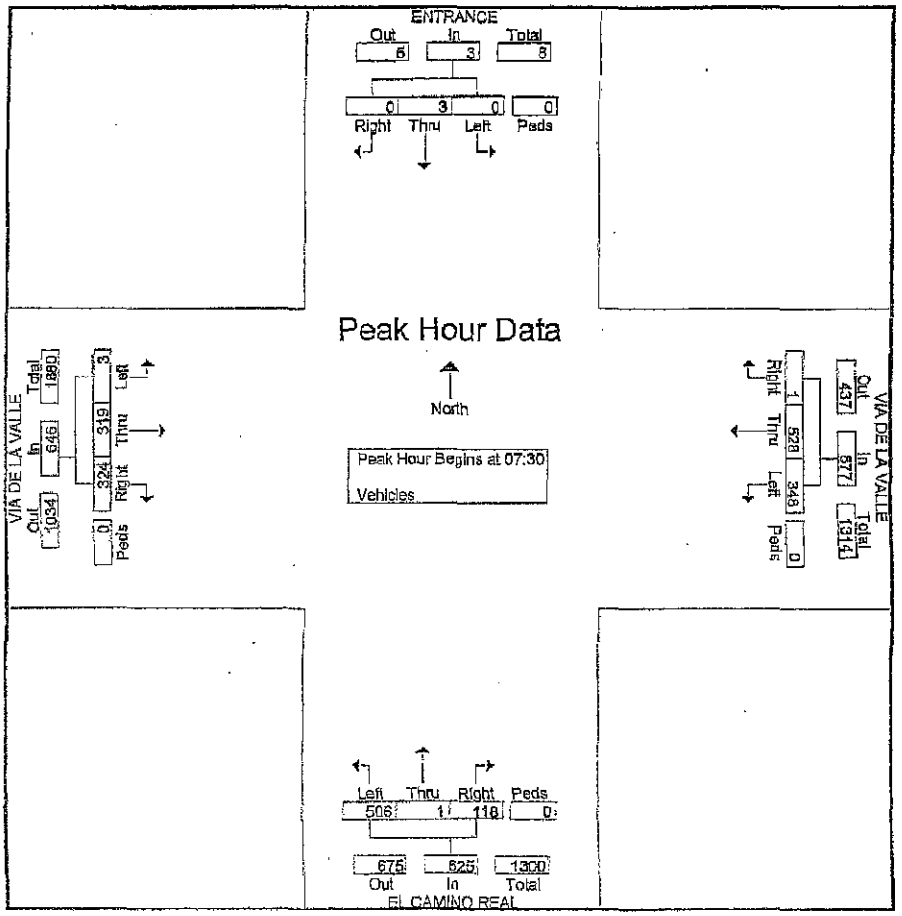
Directional Segment Counts	Thursday 11/3/2011	7 Locations
I/S Counts AM + PM	Tuesday 11/8/2011	5 Locations

True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.01.VIA DE LA VALLE.EL CAMINO REAL
Site Code : 00000000
Start Date : 11/8/2011
Page No : 2

	ENTRANCE Southbound					VIA DE LA VALLE Westbound					EL CAMINO REAL Northbound					VIA DE LA VALLE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30																					
07:30	0	1	0	0	1	117	95	0	0	212	124	0	30	0	154	2	78	87	0	167	534
07:45	0	0	0	0	0	89	122	0	0	211	100	0	28	0	128	0	81	82	0	163	502
08:00	0	0	0	0	0	72	132	0	0	204	124	0	25	0	149	1	81	87	0	169	522
08:15	0	2	0	0	2	70	179	1	0	250	158	1	35	0	194	0	79	68	0	147	593
Total Volume	0	3	0	0	3	348	528	1	0	877	506	1	118	0	625	3	319	324	0	646	2151
% App. Total	0	100	0	0		39.7	60.2	0.1	0		81	0.2	18.9	0		0.5	49.4	50.2	0		
PHF	.000	.375	.000	.000	.375	.744	.737	.250	.000	.877	.801	.250	.843	.000	.805	.375	.985	.931	.000	.956	.907

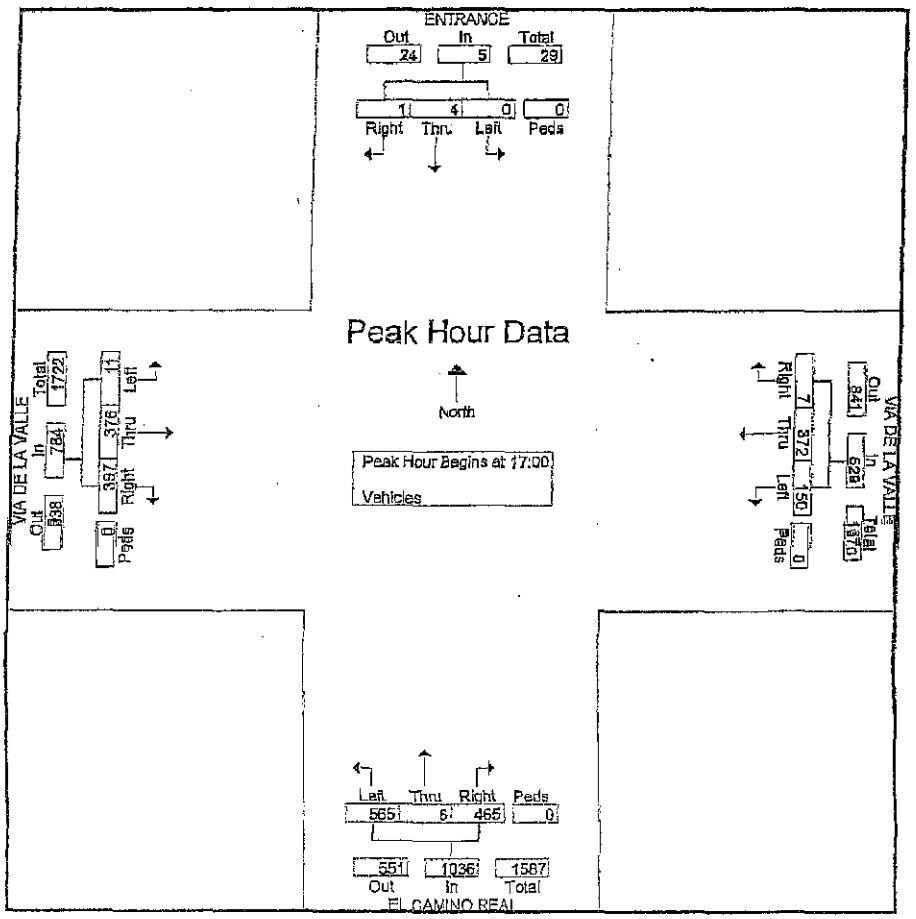


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.01.VIA DE LA VALLE.EL CAMINO REAL
Site Code : 00000000
Start Date : 11/8/2011
Page No : 3

	ENTRANCE Southbound					VIA DE LA VALLE Westbound					EL CAMINO REAL Northbound					VIA DE LA VALLE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	0	1	0	0	1	37	100	0	0	137	105	0	128	0	233	2	101	108	0	211	582
17:15	0	0	1	0	1	54	98	5	0	157	155	1	123	0	279	3	90	98	0	191	628
17:30	0	0	0	0	0	36	86	0	0	122	165	1	116	0	282	2	90	106	0	198	602
17:45	0	3	0	0	3	23	88	2	0	113	140	4	98	0	242	4	95	85	0	184	542
Total Volume	0	4	1	0	5	150	372	7	0	529	565	6	465	0	1036	11	376	397	0	784	2354
% App. Total	0	80	20	0		28.4	70.3	1.3	0		54.5	0.6	44.9	0		1.4	48	50.6	0		
PHF	.000	.333	.250	.000	.417	.694	.930	.350	.000	.842	.856	.375	.908	.000	.918	.688	.931	.919	.000	.929	.937



True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.01.VIA DE LA VALLE.EL CAMINO REAL
Site Code : 00000000
Start Date : 11/8/2011
Page No : 1

Groups Printed- Vehicles

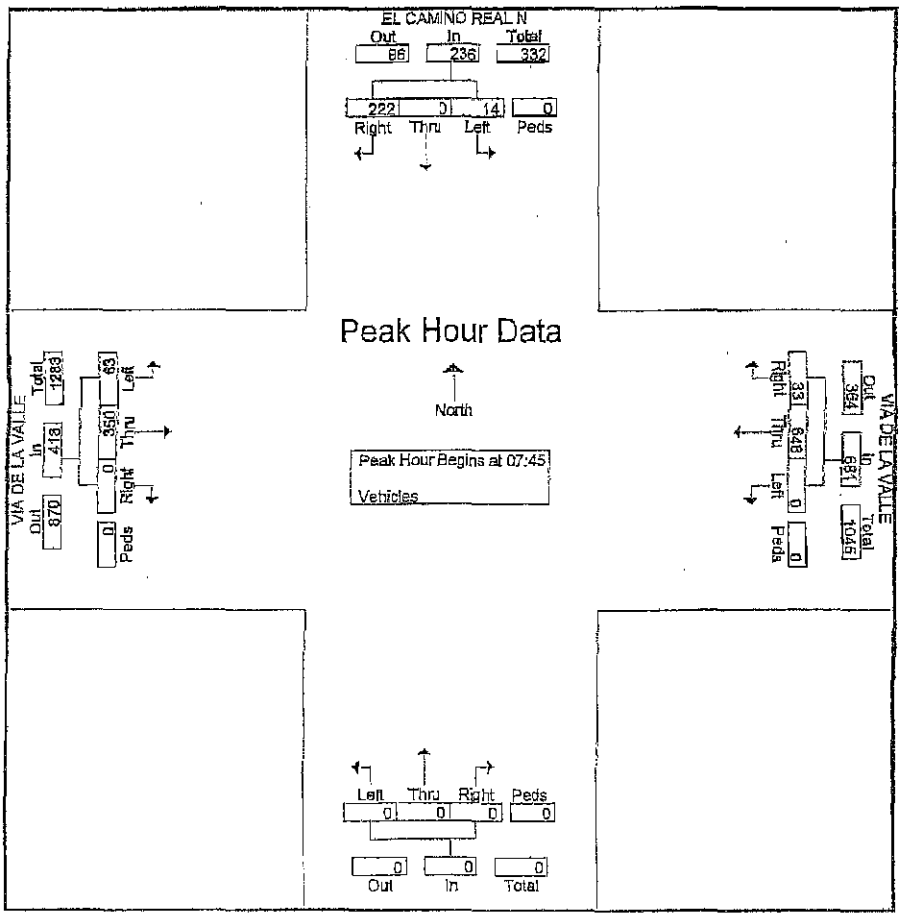
	ENTRANCE Southbound				VIA DE LA VALLE Westbound				EL CAMINO REAL Northbound				VIA DE LA VALLE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00	0	0	0	0	124	105	0	0	78	0	17	0	0	54	92	0	470
07:15	0	2	0	0	100	115	0	0	102	0	38	0	0	73	81	0	511
07:30	0	1	0	0	117	95	0	0	124	0	30	0	2	78	87	0	534
07:45	0	0	0	0	89	122	0	0	100	0	28	0	0	81	82	0	502
Total	0	3	0	0	430	437	0	0	404	0	113	0	2	286	342	0	2017
08:00	0	0	0	0	73	132	0	0	124	0	25	0	1	81	87	0	522
08:15	0	2	0	0	70	179	1	0	158	1	35	0	0	79	68	0	593
08:30	0	0	0	0	71	133	0	0	79	0	35	0	0	80	88	0	486
08:45	0	0	0	0	52	95	1	0	81	1	22	0	0	80	65	0	397
Total	0	2	0	0	265	539	2	0	442	2	117	0	1	320	308	0	1998
*** BREAK ***																	
16:00	0	0	0	0	52	96	1	0	103	0	56	0	0	108	119	0	535
16:15	1	0	1	0	29	102	0	0	102	1	95	0	0	119	108	0	558
16:30	3	2	0	0	46	82	1	0	98	2	62	0	1	115	93	0	505
16:45	0	0	0	0	40	71	0	0	111	1	104	0	1	83	115	0	526
Total	4	2	1	0	167	351	2	0	414	4	317	0	2	425	435	0	2124
17:00	0	1	0	0	37	100	0	0	105	0	128	0	2	101	108	0	582
17:15	0	0	1	0	54	98	5	0	155	1	123	0	3	90	98	0	628
17:30	0	0	0	0	36	86	0	0	165	1	116	0	2	90	106	0	602
17:45	0	3	0	0	23	88	2	0	140	4	98	0	4	95	85	0	542
Total	0	4	1	0	150	372	7	0	565	6	465	0	11	376	397	0	2354
Grand Total	4	11	2	0	1012	1699	11	0	1825	12	1012	0	16	1407	1482	0	8493
Apprch %	23.5	64.7	11.8	0	37.2	62.4	0.4	0	64.1	0.4	35.5	0	0.6	48.4	51	0	
Total %	0	0.1	0	0	11.9	20	0.1	0	21.5	0.1	11.9	0	0.2	16.6	17.4	0	

True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.02.VIA DE LA VALLE.EL CAMINO REAL N
Site Code : 00000000
Start Date : 11/8/2011
Page No : 2

	EL CAMINO REAL N Southbound					VIA DE LA VALLE Westbound					Northbound					VIA DE LA VALLE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45																					
07:45	5	0	78	0	83	0	141	12	0	153	0	0	0	0	0	12	82	0	0	94	330
08:00	2	0	45	0	47	0	149	5	0	154	0	0	0	0	0	16	87	0	0	103	304
08:15	3	0	53	0	56	0	177	10	0	187	0	0	0	0	0	14	89	0	0	103	346
08:30	4	0	46	0	50	0	181	6	0	187	0	0	0	0	0	21	92	0	0	113	350
Total Volume	14	0	222	0	236	0	648	33	0	681	0	0	0	0	0	63	350	0	0	413	1330
% App. Total	5.9	0	94.1	0		0	95.2	4.8	0		0	0	0	0		15.3	84.7	0	0		
PHF	.700	.000	.712	.000	.711	.000	.895	.688	.000	.910	.000	.000	.000	.000	.000	.750	.951	.000	.000	.914	.950

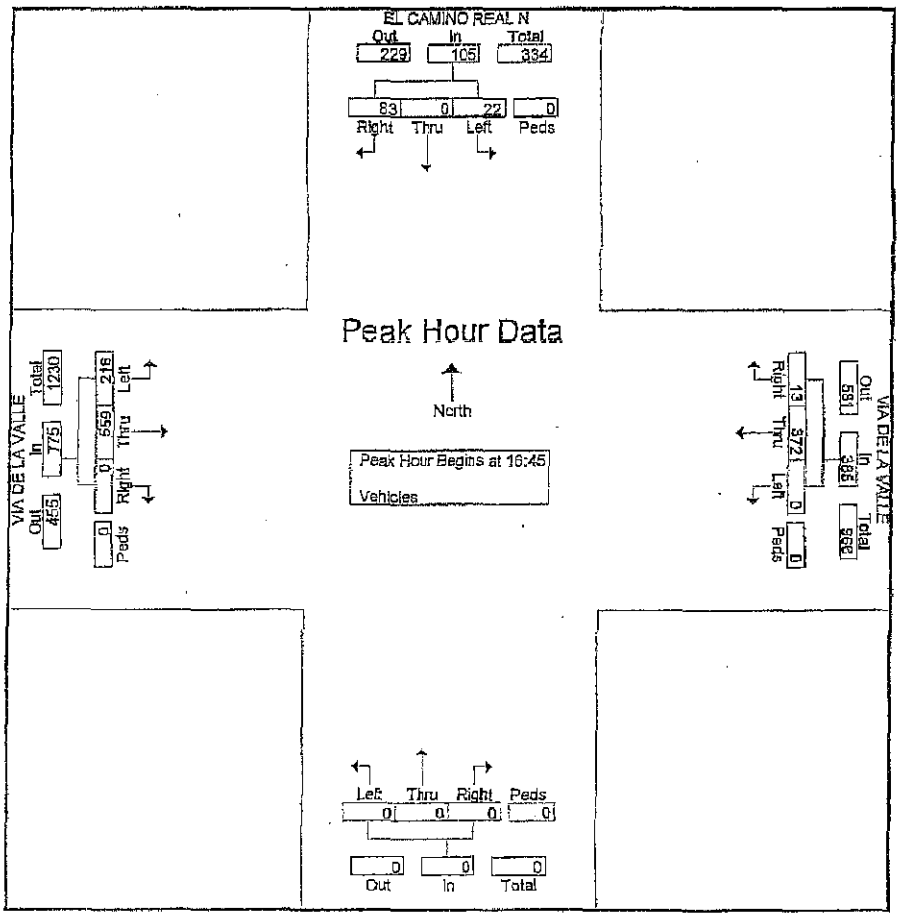


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.02.VIA DE LA VALLE.EL CAMINO REAL N
Site Code : 00000000
Start Date : 11/8/2011
Page No : 3

	EL CAMINO REAL N Southbound					VIA DE LA VALLE Westbound					Northbound					VIA DE LA VALLE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:45																					
16:45	7	0	24	0	31	0	80	5	0	85	0	0	0	0	0	41	136	0	0	177	293
17:00	6	0	18	0	24	0	96	1	0	97	0	0	0	0	0	48	154	0	0	202	323
17:15	7	0	24	0	31	0	107	4	0	111	0	0	0	0	0	67	146	0	0	213	355
17:30	2	0	17	0	19	0	89	3	0	92	0	0	0	0	0	60	123	0	0	183	294
Total Volume	22	0	83	0	105	0	372	13	0	385	0	0	0	0	0	216	559	0	0	775	1265
% App. Total	21	0	79	0		0	96.6	3.4	0		0	0	0	0		27.9	72.1	0	0		
PHF	.786	.000	.865	.000	.847	.000	.869	.650	.000	.867	.000	.000	.000	.000	.000	.806	.907	.000	.000	.910	.891



True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.02.VIA DE LA VALLE.EL CAMINO REAL N
Site Code : 00000000
Start Date : 11/8/2011
Page No : 1

Groups Printed- Vehicles

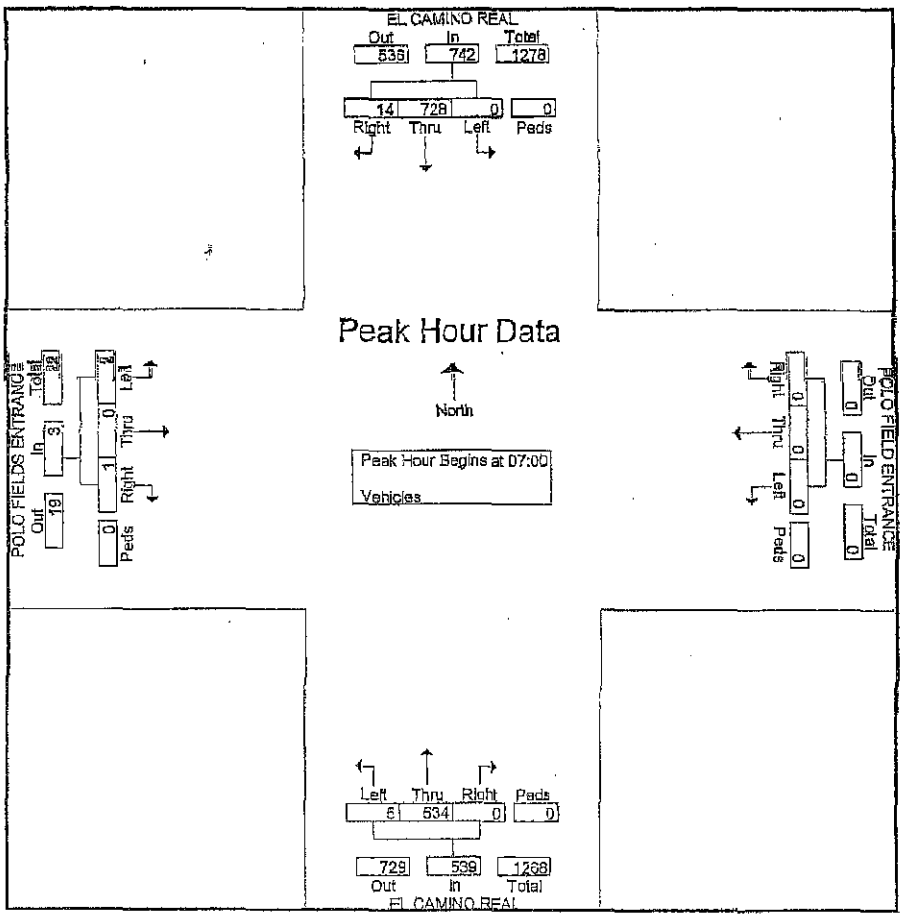
	EL CAMINO REAL N Southbound				VIA DE LA VALLE Westbound				Northbound				VIA DE LA VALLE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00	4	0	55	0	0	116	2	0	0	0	0	0	7	57	0	0	243
07:15	1	0	82	0	0	149	2	0	0	0	0	0	12	73	0	0	319
07:30	5	0	79	0	0	130	4	0	0	0	0	0	10	101	0	0	329
07:45	5	0	78	0	0	141	12	0	0	0	0	0	12	82	0	0	330
Total	15	0	294	0	0	538	20	0	0	0	0	0	41	313	0	0	1221
08:00	2	0	45	0	0	149	5	0	0	0	0	0	16	87	0	0	304
08:15	3	0	53	0	0	177	10	0	0	0	0	0	14	89	0	0	346
08:30	4	0	46	0	0	181	6	0	0	0	0	0	21	92	0	0	350
08:45	4	0	32	0	0	131	6	0	0	0	0	0	12	76	0	0	261
Total	13	0	176	0	0	638	27	0	0	0	0	0	63	344	0	0	1261
*** BREAK ***																	
16:00	5	0	22	0	0	119	6	0	0	0	0	0	41	120	0	0	313
16:15	4	0	22	0	0	116	7	0	0	0	0	0	43	132	0	0	324
16:30	4	0	23	0	0	74	2	0	0	0	0	0	30	154	0	0	287
16:45	7	0	24	0	0	80	5	0	0	0	0	0	41	136	0	0	293
Total	20	0	91	0	0	389	20	0	0	0	0	0	155	542	0	0	1217
17:00	6	0	18	0	0	96	1	0	0	0	0	0	48	154	0	0	323
17:15	7	0	24	0	0	107	4	0	0	0	0	0	67	146	0	0	355
17:30	2	0	17	0	0	89	3	0	0	0	0	0	60	123	0	0	294
17:45	0	0	11	0	0	93	1	0	0	0	0	0	57	128	0	0	290
Total	15	0	70	0	0	385	9	0	0	0	0	0	232	551	0	0	1262
Grand Total	63	0	631	0	0	1950	76	0	0	0	0	0	491	1750	0	0	4961
Apprch %	9.1	0	90.9	0	0	96.2	3.8	0	0	0	0	0	21.9	78.1	0	0	
Total %	1.3	0	12.7	0	0	39.3	1.5	0	0	0	0	0	9.9	35.3	0	0	

True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.03.EL CAMINO REAL.POLO FIELDS ENTRANCE
Site Code : 00000000
Start Date : 11/8/2011
Page No : 2

	EL CAMINO REAL Southbound					POLO FIELD ENTRANCE Westbound					EL CAMINO REAL Northbound					POLO FIELDS ENTRANCE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	220	5	0	225	0	0	0	0	0	2	131	0	0	133	0	0	0	0	0	358
07:15	0	144	1	0	145	0	0	0	0	0	0	138	0	0	138	1	0	0	0	1	284
07:30	0	209	6	0	215	0	0	0	0	0	1	130	0	0	131	0	0	0	0	0	346
07:45	0	155	2	0	157	0	0	0	0	0	2	135	0	0	137	1	0	1	0	2	296
Total Volume	0	728	14	0	742	0	0	0	0	0	5	534	0	0	539	2	0	1	0	3	1284
% App. Total	0	98.1	1.9	0		0	0	0	0		0.9	99.1	0	0		66.7	0	33.3	0		
PHF	.000	.827	.583	.000	.824	.000	.000	.000	.000	.000	.625	.967	.000	.000	.976	.500	.000	.250	.000	.375	.897

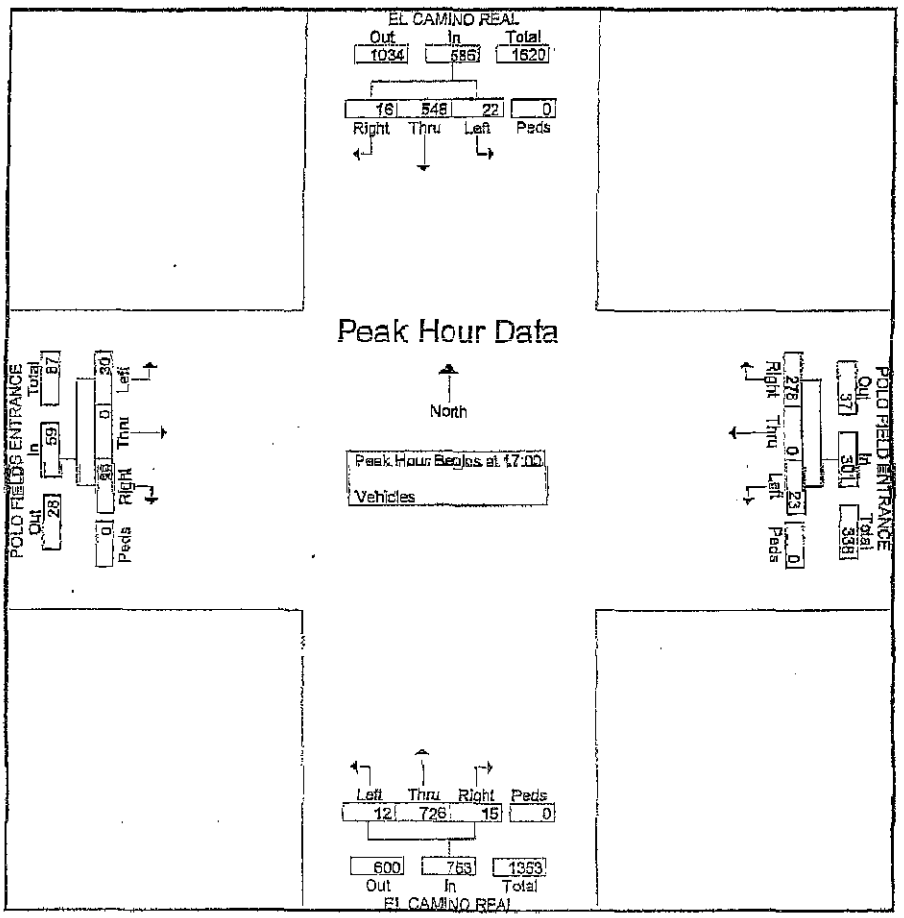


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.03.EL CAMINO REAL.POLO FIELDS ENTRANCE
Site Code : 00000000
Start Date : 11/8/2011
Page No : 3

	EL CAMINO REAL Southbound					POLO FIELD ENTRANCE Westbound					EL CAMINO REAL Northbound					POLO FIELDS ENTRANCE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	16	137	3	0	156	4	0	57	0	61	5	169	11	0	185	11	0	3	0	14	416
17:15	4	142	8	0	154	8	0	83	0	91	6	168	3	0	177	9	0	13	0	22	444
17:30	1	149	4	0	154	10	0	94	0	104	1	171	1	0	173	7	0	7	0	14	445
17:45	1	120	1	0	122	1	0	44	0	45	0	218	0	0	218	3	0	6	0	9	394
Total Volume	22	548	16	0	586	23	0	278	0	301	12	726	15	0	753	30	0	29	0	59	1699
% App. Total	3.8	93.5	2.7	0		7.6	0	92.4	0		1.6	96.4	2	0		50.8	0	49.2	0		
PHF	.344	.919	.500	.000	.939	.575	.000	.739	.000	.724	.500	.833	.341	.000	.864	.682	.000	.558	.000	.670	.954



True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.03.EL CAMINO REAL.POLO FIELDS ENTRANCE
Site Code : 00000000
Start Date : 11/8/2011
Page No : 1

Groups Printed- Vehicles

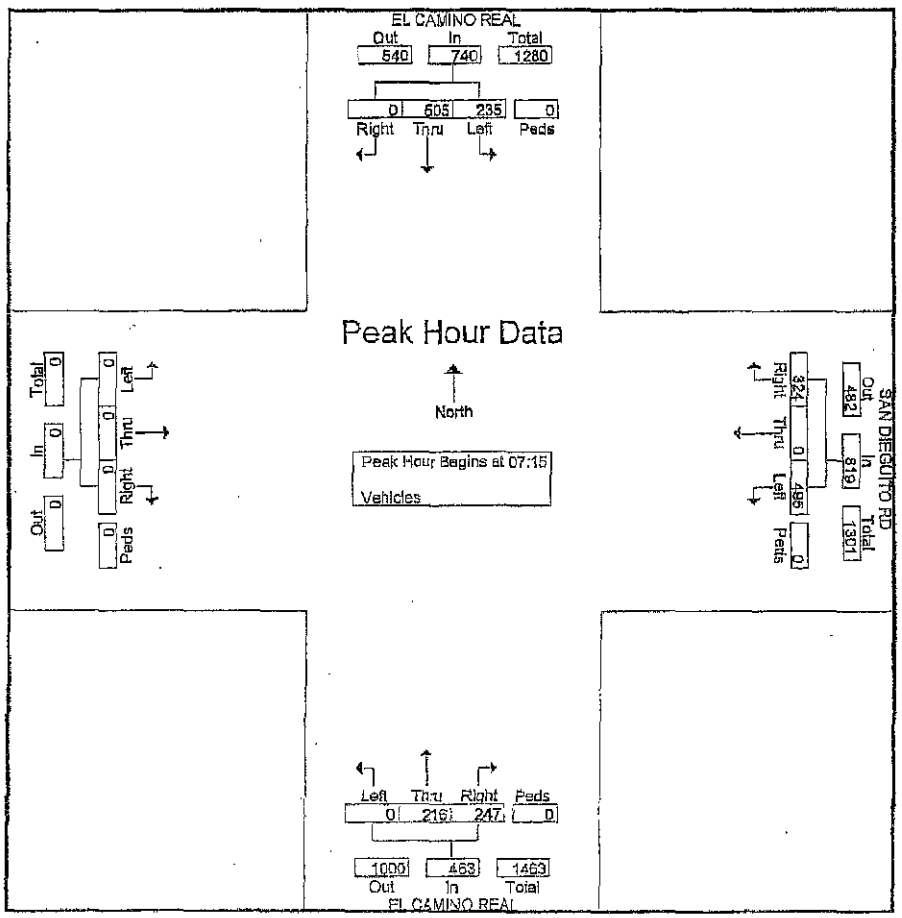
	EL CAMINO REAL Southbound				POLO FIELD ENTRANCE Westbound				EL CAMINO REAL Northbound				POLO FIELDS ENTRANCE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00	0	220	5	0	0	0	0	0	2	131	0	0	0	0	0	0	358
07:15	0	144	1	0	0	0	0	0	0	138	0	0	1	0	0	0	284
07:30	0	209	6	0	0	0	0	0	1	130	0	0	0	0	0	0	346
07:45	0	155	2	0	0	0	0	0	2	135	0	0	1	0	1	0	296
Total	0	728	14	0	0	0	0	0	5	534	0	0	2	0	1	0	1284
08:00	1	149	4	0	0	0	0	0	0	163	0	0	0	0	2	0	319
08:15	1	144	4	0	0	0	0	0	1	156	0	0	2	0	0	0	308
08:30	0	120	5	0	0	0	0	0	2	109	0	0	2	0	1	0	239
08:45	0	101	8	0	0	0	0	0	4	96	0	0	3	0	1	0	213
Total	2	514	21	0	0	0	0	0	7	524	0	0	7	0	4	0	1079
*** BREAK ***																	
16:00	19	154	3	0	2	0	14	0	3	131	7	0	5	0	1	0	339
16:15	16	122	8	0	0	0	4	0	6	152	6	0	7	0	1	0	322
16:30	18	109	2	0	1	0	6	0	3	166	12	0	2	0	4	0	323
16:45	24	119	2	0	4	0	13	0	2	170	12	0	1	0	0	0	347
Total	77	504	15	0	7	0	37	0	14	619	37	0	15	0	6	0	1331
17:00	16	137	3	0	4	0	57	0	5	169	11	0	11	0	3	0	416
17:15	4	142	8	0	8	0	83	0	6	168	3	0	9	0	13	0	444
17:30	1	149	4	0	10	0	94	0	1	171	1	0	7	0	7	0	445
17:45	1	120	1	0	1	0	44	0	0	218	0	0	3	0	6	0	394
Total	22	548	16	0	23	0	278	0	12	726	15	0	30	0	29	0	1699
Grand Total	101	2294	66	0	30	0	315	0	38	2403	52	0	54	0	40	0	5393
Approch %	4.1	93.2	2.7	0	8.7	0	91.3	0	1.5	96.4	2.1	0	57.4	0	42.6	0	
Total %	1.9	42.5	1.2	0	0.6	0	5.8	0	0.7	44.6	1	0	1	0	0.7	0	

True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.04.EL CAMINO REAL.SAN DIEGUITO ROAD
Site Code : 00000000
Start Date : 11/8/2011
Page No : 2

	EL CAMINO REAL Southbound					SAN DIEGUITO RD Westbound					EL CAMINO REAL Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15																					
07:15	41	170	0	0	211	105	0	74	0	179	0	57	46	0	103	0	0	0	0	0	493
07:30	55	104	0	0	159	139	0	86	0	225	0	56	50	0	106	0	0	0	0	0	490
07:45	64	135	0	0	199	121	0	96	0	217	0	53	77	0	130	0	0	0	0	0	546
08:00	75	96	0	0	171	130	0	68	0	198	0	50	74	0	124	0	0	0	0	0	493
Total Volume	235	505	0	0	740	495	0	324	0	819	0	216	247	0	463	0	0	0	0	0	2022
% App. Total	31.8	68.2	0	0		60.4	0	39.6	0		0	46.7	53.3	0		0	0	0	0		
PHF	.783	.743	.000	.000	.877	.890	.000	.844	.000	.910	.000	.947	.802	.000	.890	.000	.000	.000	.000	.000	.926

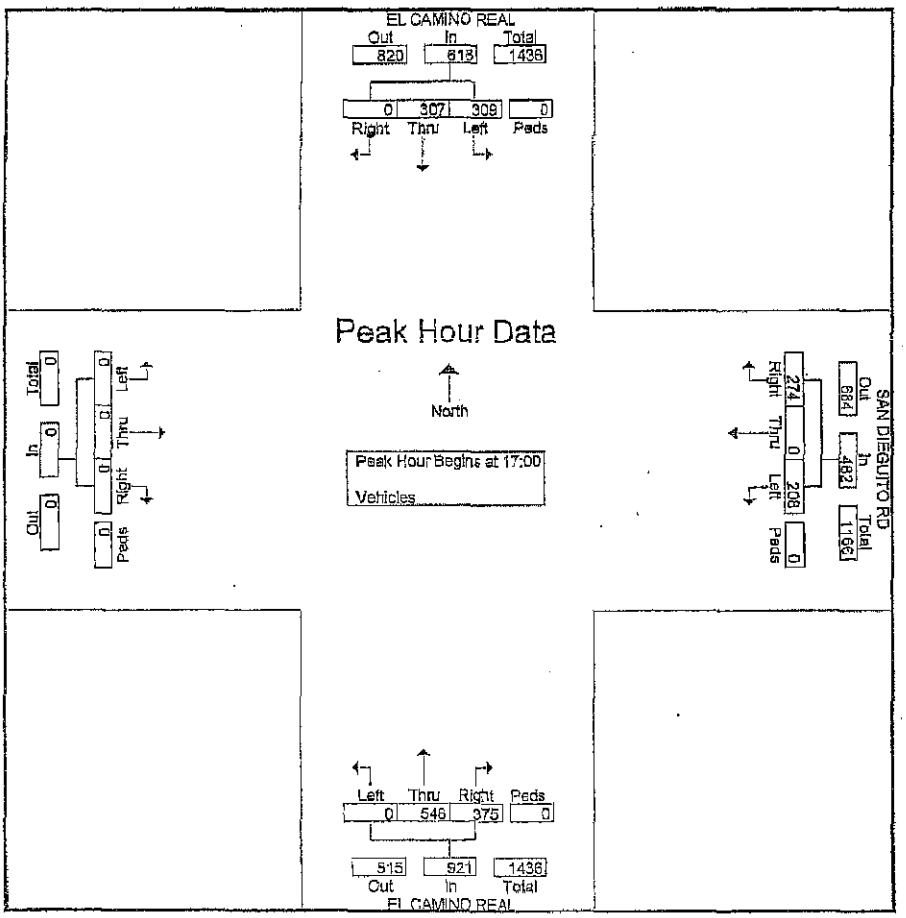


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11108.04.EL CAMINO REAL.SAN DIEGUITO ROAD
Site Code : 00000000
Start Date : 11/8/2011
Page No : 3

	EL CAMINO REAL Southbound					SAN DIEGUITO RD Westbound					EL CAMINO REAL Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	80	63	0	0	143	58	0	73	0	131	0	145	87	0	232	0	0	0	0	0	506
17:15	72	85	0	0	157	55	0	73	0	128	0	146	86	0	232	0	0	0	0	0	517
17:30	78	84	0	0	162	49	0	56	0	105	0	123	86	0	209	0	0	0	0	0	476
17:45	79	75	0	0	154	46	0	72	0	118	0	132	116	0	248	0	0	0	0	0	520
Total Volume	309	307	0	0	616	208	0	274	0	482	0	546	375	0	921	0	0	0	0	0	2019
% App. Total	50.2	49.8	0	0		43.2	0	56.8	0		0	59.3	40.7	0		0	0	0	0		
PHF	.966	.903	.000	.000	.951	.897	.000	.938	.000	.920	.000	.935	.808	.000	.928	.000	.000	.000	.000	.000	.971



True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.04.EL CAMINO REAL.SAN DIEGUITO ROAD
Site Code : 00000000
Start Date : 11/8/2011
Page No : 1

Groups Printed- Vehicles

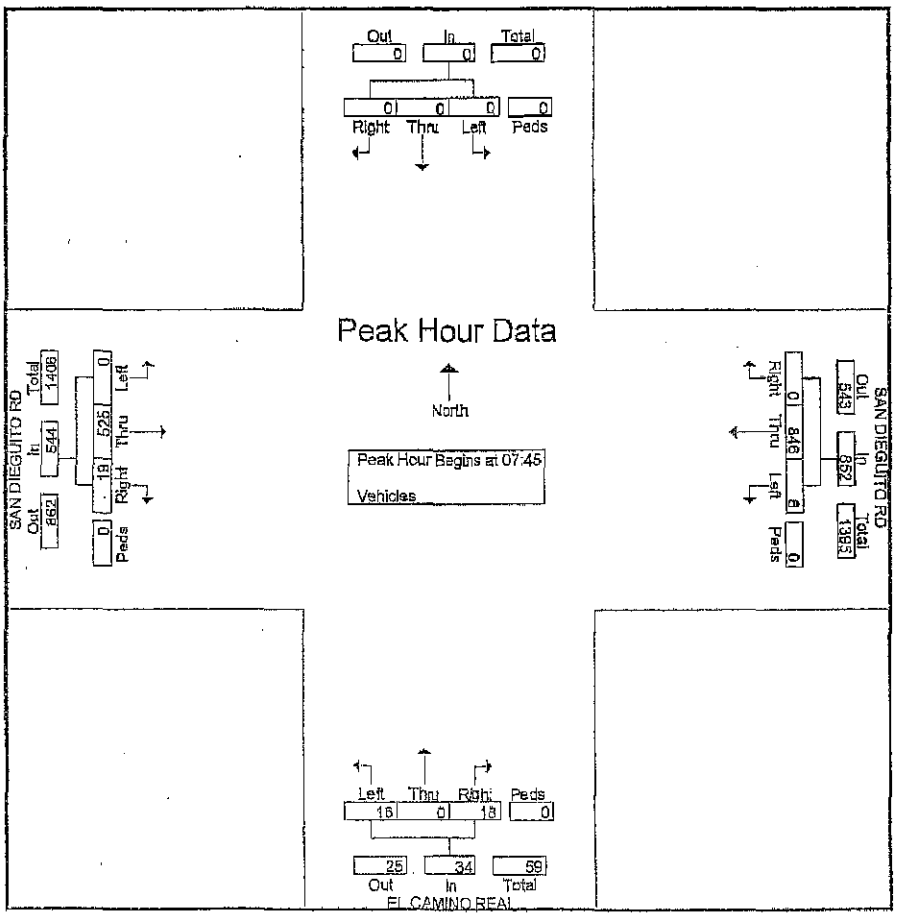
	EL CAMINO REAL Southbound				SAN DIEGUITO RD Westbound				EL CAMINO REAL Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00	38	83	0	0	70	0	43	0	0	23	31	0	0	0	0	0	288
07:15	41	170	0	0	105	0	74	0	0	57	46	0	0	0	0	0	493
07:30	55	104	0	0	139	0	86	0	0	56	50	0	0	0	0	0	490
07:45	64	135	0	0	121	0	96	0	0	53	77	0	0	0	0	0	546
Total	198	492	0	0	435	0	299	0	0	189	204	0	0	0	0	0	1817
08:00	75	96	0	0	130	0	68	0	0	50	74	0	0	0	0	0	493
08:15	79	82	0	0	98	0	109	0	0	53	60	0	0	0	0	0	481
08:30	60	77	0	0	115	0	124	0	0	49	54	0	0	0	0	0	479
08:45	70	69	0	0	89	0	74	0	0	29	66	0	0	0	0	0	397
Total	284	324	0	0	432	0	375	0	0	181	254	0	0	0	0	0	1850
*** BREAK ***																	
16:00	73	62	0	0	74	0	65	0	0	68	56	0	0	0	0	0	398
16:15	79	53	0	0	65	0	79	0	0	84	64	0	0	0	0	0	424
16:30	72	49	0	0	46	0	66	0	0	105	84	0	0	0	0	0	422
16:45	71	47	0	0	43	0	71	0	0	119	82	0	0	0	0	0	433
Total	295	211	0	0	228	0	281	0	0	376	286	0	0	0	0	0	1677
17:00	80	63	0	0	58	0	73	0	0	145	87	0	0	0	0	0	506
17:15	72	85	0	0	55	0	73	0	0	146	86	0	0	0	0	0	517
17:30	78	84	0	0	49	0	56	0	0	123	86	0	0	0	0	0	476
17:45	79	75	0	0	46	0	72	0	0	132	116	0	0	0	0	0	520
Total	309	307	0	0	208	0	274	0	0	546	375	0	0	0	0	0	2019
Grand Total	1086	1334	0	0	1303	0	1229	0	0	1292	1119	0	0	0	0	0	7363
Apprch %	44.9	55.1	0	0	51.5	0	48.5	0	0	53.6	46.4	0	0	0	0	0	
Total %	14.7	18.1	0	0	17.7	0	16.7	0	0	17.5	15.2	0	0	0	0	0	

True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.05.SAN DIEGUITO RD.OLD EL CAMINO REAL
Site Code : 00000000
Start Date : 11/8/2011
Page No : 2

	Southbound					SAN DIEGUITO RD Westbound					EL CAMINO REAL Northbound					SAN DIEGUITO RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45																					
07:45	0	0	0	0	0	1	214	0	0	215	6	0	5	0	11	0	132	6	0	138	364
08:00	0	0	0	0	0	0	198	0	0	198	2	0	4	0	6	0	150	1	0	151	355
08:15	0	0	0	0	0	4	206	0	0	210	5	0	5	0	10	0	127	9	0	136	356
08:30	0	0	0	0	0	1	228	0	0	229	3	0	4	0	7	0	116	3	0	119	355
Total Volume	0	0	0	0	0	6	846	0	0	852	16	0	18	0	34	0	525	19	0	544	1430
% App. Total	0	0	0	0		0.7	99.3	0	0		47.1	0	52.9	0		0	96.5	3.5	0		
PHF	.000	.000	.000	.000	.000	.375	.928	.000	.000	.930	.667	.000	.900	.000	.773	.000	.875	.528	.000	.901	.982

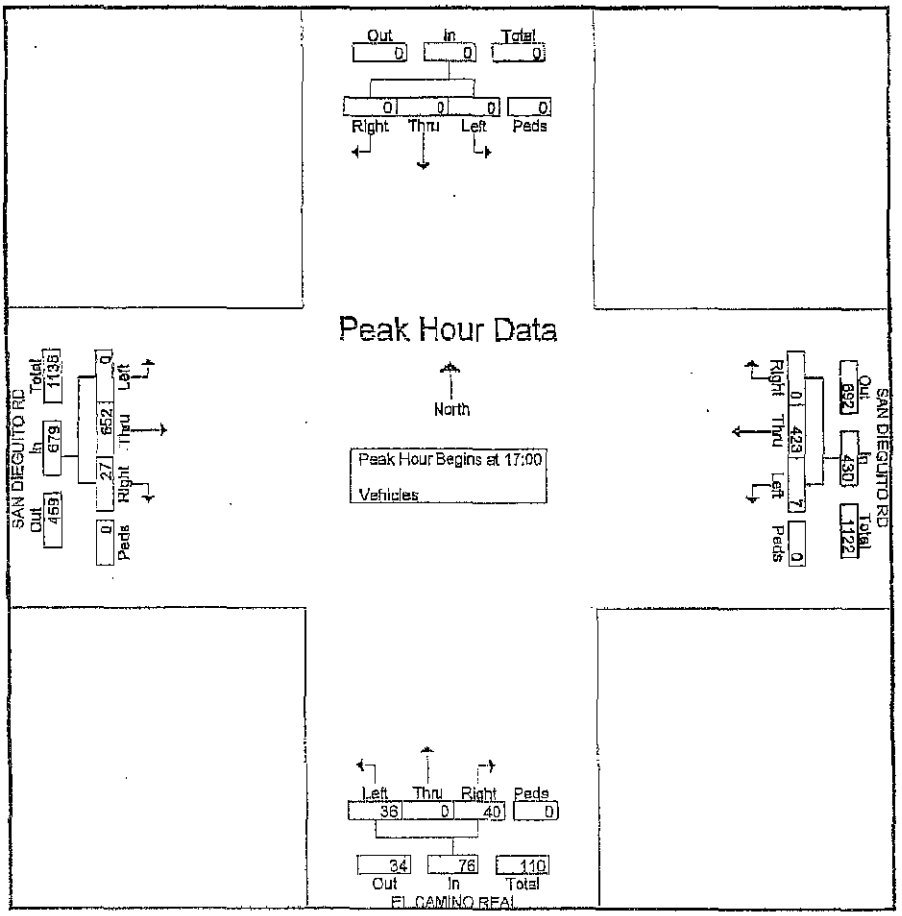


True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.06.SAN DIEGUITO RD.OLD EL CAMINO REAL
Site Code : 00000000
Start Date : 11/8/2011
Page No : 3

	Southbound					SAN DIEGUITO RD Westbound					EL CAMINO REAL Northbound					SAN DIEGUITO RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	2	108	0	0	110	17	0	7	0	24	0	156	9	0	165	299
17:15	0	0	0	0	0	2	114	0	0	116	3	0	9	0	12	0	152	3	0	155	283
17:30	0	0	0	0	0	3	98	0	0	101	6	0	10	0	16	0	163	10	0	173	290
17:45	0	0	0	0	0	0	103	0	0	103	10	0	14	0	24	0	181	5	0	186	313
Total Volume	0	0	0	0	0	7	423	0	0	430	36	0	40	0	76	0	652	27	0	679	1185
% App. Total	0	0	0	0		1.6	98.4	0	0		47.4	0	52.6	0		0	96	4	0		
PHF	.000	.000	.000	.000	.000	.583	.928	.000	.000	.927	.529	.000	.714	.000	.792	.000	.901	.675	.000	.913	.946



True Count

4401 Twain Ave, Suite 27
San Diego, CA 92120

File Name : 11109.05.SAN DIEGUITO RD.OLD EL CAMINO REAL
Site Code : 00000000
Start Date : 11/8/2011
Page No : 1

Groups Printed- Vehicles

	Southbound				SAN DIEGUITO RD Westbound				EL CAMINO REAL Northbound				SAN DIEGUITO RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00	0	0	0	0	1	106	0	0	6	0	1	0	0	58	2	0	174
07:15	0	0	0	0	1	187	0	0	4	0	2	0	0	77	3	0	274
07:30	0	0	0	0	1	213	0	0	2	0	1	0	0	105	1	0	323
07:45	0	0	0	0	1	214	0	0	6	0	5	0	0	132	6	0	364
Total	0	0	0	0	4	720	0	0	18	0	9	0	0	372	12	0	1135
08:00	0	0	0	0	0	198	0	0	2	0	4	0	0	150	1	0	355
08:15	0	0	0	0	4	206	0	0	5	0	5	0	0	127	9	0	356
08:30	0	0	0	0	1	228	0	0	3	0	4	0	0	116	3	0	355
08:45	0	0	0	0	3	151	0	0	3	0	2	0	0	127	3	0	289
Total	0	0	0	0	8	783	0	0	13	0	15	0	0	520	16	0	1355
*** BREAK ***																	
16:00	0	0	0	0	6	129	0	0	14	0	5	0	0	126	7	0	287
16:15	0	0	0	0	3	125	0	0	7	0	6	0	0	136	10	0	287
16:30	0	0	0	0	2	109	0	0	8	0	4	0	0	142	5	0	270
16:45	0	0	0	0	2	105	0	0	12	0	6	0	0	149	5	0	279
Total	0	0	0	0	13	468	0	0	41	0	21	0	0	553	27	0	1123
17:00	0	0	0	0	2	108	0	0	17	0	7	0	0	156	9	0	299
17:15	0	0	0	0	2	114	0	0	3	0	9	0	0	152	3	0	283
17:30	0	0	0	0	3	98	0	0	6	0	10	0	0	163	10	0	290
17:45	0	0	0	0	0	103	0	0	10	0	14	0	0	181	5	0	313
Total	0	0	0	0	7	423	0	0	36	0	40	0	0	652	27	0	1185
Grand Total	0	0	0	0	32	2394	0	0	108	0	85	0	0	2097	82	0	4798
Apprch %	0	0	0	0	1.3	98.7	0	0	56	0	44	0	0	96.2	3.8	0	
Total %	0	0	0	0	0.7	49.9	0	0	2.3	0	1.8	0	0	43.7	1.7	0	

MetroCount Traffic Executive
Event Counts

1859 -- English (ENU)

Datasets:

Site:	**[11109.01] VIA DE LA VALLE (WEST OF EL CAMINO REAL) WESTBOUND**
Input A:	4 - West bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	13:40 Wednesday, November 02, 2011 => 9:39 Friday, November 04, 2011
File:	11109.01.W04Nov2011.EC0 (Base)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011**

* **Thursday, November 03, 2011=11226, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
12	14	6	12	40	96	364	725	1026	778	691	769	777	740	905	946	808	879	716	352	217	161	130	66	
4	3	0	5	9	11	56	115	261	209	174	195	186	190	195	257	170	225	151	114	57	39	36	28	-
5	5	3	3	6	18	75	175	246	186	176	222	194	177	202	250	210	236	183	105	56	55	36	15	-
0	4	1	1	12	24	111	236	278	198	177	188	196	199	222	222	223	216	222	84	47	35	32	20	-
3	2	2	3	19	43	122	200	242	185	165	164	202	175	287	217	206	202	160	49	58	32	26	5	-

AM Peak 0800 - 0900 (1026), AM PHF=0.92

MetroCount Traffic Executive
Event Counts

1858 -- English (ENU)

Datasets:

Site:	[11109.01] VIA DE LA VALLE (WEST OF EL CAMINO REAL) EASTBOUND
Input A:	2 - East bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	13:38 Wednesday, November 02, 2011 => 9:37 Friday, November 04, 2011
File:	11109.01.E04Nov2011.EC0 (Regular)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time: **0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011**

* Thursday, November 03, 2011=11678, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
36	18	11	13	20	101	383	807	714	723	611	688	775	752	874	1080	933	997	784	470	332	322	179	62	
17	4	4	2	3	15	48	162	182	183	154	152	192	209	211	258	204	268	215	149	82	92	54	14	-
9	2	1	5	3	12	59	249	191	193	151	157	196	186	226	277	203	250	226	96	83	98	51	23	-
9	6	2	3	3	34	110	203	162	145	139	175	205	174	210	271	283	214	209	114	87	69	41	7	-
1	6	5	4	11	41	168	193	180	202	170	205	182	184	227	274	244	266	134	112	81	64	33	18	-

AM Peak 0715 - 0815 (826), AM PHF=0.83

22,901 ADT

MetroCount Traffic Executive
Event Counts

1861 -- English (ENU)

Datasets:

Site:	[11109.02] VIA DE LA VALLE (EAST OF EL CAMINO REAL) WESTBOUND
Input A:	4 - West bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	14:00 Wednesday, November 02, 2011 => 9:47 Friday, November 04, 2011
File:	11109.02.W04Nov2011.EC0 (Base)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* Thursday, November 03, 2011=8137, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
9	10	4	7	37	79	311	846	891	598	493	579	513	503	620	630	541	549	391	178	155	99	69	33	
3	1	0	1	8	9	45	141	225	145	138	133	124	130	136	165	118	180	115	42	36	23	23	9	-
3	1	2	2	2	19	62	237	218	148	127	181	123	131	147	167	136	138	94	49	45	36	18	9	-
1	4	0	1	9	19	108	231	240	162	118	147	145	121	145	152	178	120	101	52	39	22	16	9	-
2	4	2	3	18	32	97	238	209	144	110	119	122	114	193	147	111	106	82	36	35	18	12	6	-

AM Peak 0715 - 0815 (929), AM PHF=0.96

MetroCount Traffic Executive
Event Counts

1860 -- English (ENU)

Datasets:

Site:	**[11109.02] VIA DE LA VALLE (EAST OF EL CAMINO REAL) EASTBOUND**
Input A:	2 - East bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	13:58 Wednesday, November 02, 2011 => 9:47 Friday, November 04, 2011
File:	11109.02.E04Nov2011.EC0 (Base)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011**

* Thursday, November 03, 2011=7874, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
26	12	5	5	11	59	192	365	417	388	399	456	496	549	638	746	690	755	650	350	246	233	135	55	
15	3	2	0	2	9	22	81	101	94	104	93	121	140	172	176	160	199	161	119	62	64	43	12	-
5	2	1	3	2	8	31	102	112	96	102	96	128	124	144	182	154	193	177	86	64	66	38	18	-
6	5	1	0	1	23	59	92	101	83	87	117	127	125	139	202	183	189	169	74	66	51	27	10	-
0	2	1	2	6	19	81	90	103	115	107	151	121	161	184	187	193	174	144	71	54	52	27	15	-

AM Peak 1145 - 1245 (527), AM PHF=0.87

16,011 ADT

MetroCount Traffic Executive
Event Counts

1865 -- English (ENU)

Datasets:

Site:	[11109.04] VIA DE LA VALLE (EAST OF EL CAMINO REAL NORTH) EASTBOUND
Input A:	2 - East bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	14:24 Wednesday, November 02, 2011 => 9:56 Friday, November 04, 2011
File:	11109.04.E04Nov2011.EC0 (Regular)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* Thursday, November 03, 2011=6609, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
21	9	5	6	8	54	173	334	363	324	337	401	480	469	516	628	552	565	496	279	211	208	124	49	
12	2	2	0	0	8	22	80	88	75	88	84	108	120	141	148	132	148	132	87	50	59	43	10	-
3	2	1	3	1	8	26	88	90	86	79	86	119	105	123	145	118	155	145	70	58	60	33	16	-
6	5	1	1	1	21	54	95	95	71	78	97	112	112	108	175	156	134	130	59	55	44	24	11	-
0	0	1	2	6	17	71	82	91	93	92	134	143	134	145	161	146	128	89	63	48	45	24	12	-

AM Peak 1145 - 1245 (472), AM PHF=0.88

MetroCount Traffic Executive
Event Counts

1866 -- English (ENU)

Datasets:

Site:	[11109.04] VIA DE LA VALLE (EAST OF EL CAMINO REAL NORTH) WESTBOUND
Input A:	4 - West bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	14:22 Wednesday, November 02, 2011 => 9:56 Friday, November 04, 2011
File:	11109.04.W04Nov2011.EC0 (Base)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* Thursday, November 03, 2011=6540, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
9	9	5	4	35	80	310	564	563	506	418	464	424	426	510	497	445	411	334	144	129	75	55	28	
2	2	0	0	5	9	43	114	172	118	121	111	102	113	118	140	94	111	101	28	27	17	22	8	-
3	2	2	1	2	18	64	151	163	129	110	138	103	107	124	127	122	114	74	43	34	25	13	9	-
2	4	0	1	11	17	109	158	183	139	106	119	121	107	124	123	120	104	90	42	35	18	9	6	-
2	1	3	2	17	37	94	142	145	121	82	96	98	100	146	108	110	83	70	31	33	15	11	5	-

AM Peak 0800 - 0900 (683), AM PHF=0.91

15,149 ADT

MetroCount Traffic Executive
Event Counts

1864 -- English (ENU)

Datasets:

Site:	[11109.03] EL CAMINO REAL NORTH (NORTH OF VIA DE LA VALLE) NORTHBOUND
Input A:	1 - North bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	14:48 Wednesday, November 02, 2011 => 10:02 Friday, November 04, 2011
File:	11109.03.N04Nov2011.EC0 (Regular)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* Thursday, November 03, 2011=1787, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
9	5	0	0	8	11	29	72	107	81	82	76	87	107	155	166	184	238	193	77	40	29	22	13	
4	2	0	0	3	3	1	10	24	33	29	16	29	29	39	33	38	47	31	32	13	12	6	3	-
3	0	0	0	1	2	6	13	33	17	24	21	20	21	30	44	49	69	53	23	11	7	8	5	-
2	0	0	0	3	3	9	29	38	14	14	23	18	30	34	39	39	67	50	15	12	9	6	3	-
0	3	0	0	1	3	13	20	13	19	16	17	21	27	52	51	59	55	59	8	4	2	3	2	-

AM Peak 0815 - 0915 (116), AM PHF=0.77

3,664 ADT

MetroCount Traffic Executive
Event Counts

1863 -- English (ENU)

Datasets:

Site:	[11109.03] EL CAMINO REAL NORTH (NORTH OF VIA DE LA VALLE) SOUTHBOUND
Input A:	3 - South bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	14:47 Wednesday, November 02, 2011 => 10:02 Friday, November 04, 2011
File:	11109.03.S04Nov2011.EC0 (Regular)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* **Thursday, November 03, 2011=1877, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
1	4	1	3	6	9	41	307	226	122	87	125	136	112	113	145	134	103	76	35	33	31	20	10	
1	0	0	0	3	0	5	44	52	44	15	30	20	32	33	35	28	40	22	13	11	7	3	2	-
0	0	0	1	0	5	5	89	64	29	18	42	21	31	23	32	23	23	23	10	12	17	7	3	-
0	0	0	1	1	3	12	77	59	24	23	30	33	26	32	27	55	20	20	8	6	4	8	5	-
0	4	1	1	2	1	19	97	51	26	27	24	63	23	25	51	28	21	11	5	4	3	2	0	-

AM Peak 0715 - 0815 (315), AM PHF=0.81

MetroCount Traffic Executive
Event Counts

1868 -- English (ENU)

Datasets:

Site:	[11109.05] EL CAMINO REAL (NORTH OF SAN DIEGUITO RD) SOUTHBOUND
Input A:	3 - South bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	15:11 Wednesday, November 02, 2011 => 10:09 Friday, November 04, 2011
File:	11109.05.S04Nov2011.EC0 (Regular)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* Thursday, November 03, 2011=6959, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
10	10	6	9	12	50	178	709	546	460	374	401	446	421	493	544	518	607	481	254	184	143	80	27	
3	2	2	2	2	5	18	108	133	137	94	101	104	119	106	131	123	162	118	84	47	46	23	7	-
3	0	1	3	1	9	27	222	149	106	94	109	110	104	138	125	125	146	119	58	46	42	24	9	-
3	2	0	2	1	14	58	169	124	102	85	98	116	88	123	142	152	149	168	56	45	34	16	1	-
1	6	3	2	8	22	75	212	141	116	101	94	117	111	127	146	118	150	76	56	46	21	17	10	-

AM Peak 0715 - 0815 (734), AM PHF=0.83

14,659 ADT

MetroCount Traffic Executive
Event Counts

1867 – English (ENU)

Datasets:

Site:	**[11109.05] EL CAMINO REAL (NORTH OF SAN DIEGUITO RD) NORTHBOUND**
Input A:	1 - North bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	15:13 Wednesday, November 02, 2011 => 10:09 Friday, November 04, 2011
File:	11109.05.N04Nov2011.EC0 (Regular)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011**

* **Thursday, November 03, 2011=7600, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
9	6	4	3	10	45	147	453	591	435	375	415	455	472	630	727	778	765	578	341	141	117	72	35	
4	2	0	0	0	5	21	61	155	130	86	96	104	103	145	175	150	188	138	126	34	36	21	8	-
4	2	3	2	1	6	36	121	145	98	99	127	126	100	116	199	191	239	149	110	33	30	22	7	-
1	1	1	0	3	13	42	149	161	84	99	91	135	130	152	190	206	176	132	50	37	27	15	16	-
0	1	0	1	6	21	48	122	131	124	91	102	120	139	219	164	231	163	159	45	37	24	14	4	-

AM Peak 0800 - 0900 (591), AM PHF=0.92

MetroCount Traffic Executive
Event Counts

1872 -- English (ENU)

Datasets:

Site:	[11109.07] EL CAMINO REAL (SOUTH OF SAN DIEGUITO RD) SOUTHBOUND
Input A:	4 - South bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	15:51 Wednesday, November 02, 2011 => 10:25 Friday, November 04, 2011
File:	11109.07.W04Nov2011.EC0 (Base)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* Thursday, November 03, 2011=6762, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
9	4	4	3	9	43	152	850	735	465	351	396	450	449	475	468	455	490	392	185	165	113	86	19	
1	0	0	0	3	9	15	109	196	141	93	96	107	114	108	127	119	131	107	57	36	26	30	7	-
4	0	1	2	0	9	28	254	177	124	91	101	118	117	129	114	115	117	98	57	51	27	17	7	-
4	2	0	1	2	11	46	224	185	96	82	97	124	104	112	119	125	128	123	40	43	25	18	2	-
0	2	3	0	4	14	63	264	179	104	86	103	101	115	127	105	97	114	65	31	35	35	21	3	-

AM Peak 0715 - 0815 (937), AM PHF=0.89

MetroCount Traffic Executive
Event Counts

1871 -- English (ENU)

Datasets:

Site:	[11109.07] EL CAMINO REAL (SOUTH OF SAN DIEGUITO RD) NORTHBOUND
Input A:	2 - North bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	15:53 Wednesday, November 02, 2011 => 10:26 Friday, November 04, 2011
File:	11109.07.E04Nov2011.EC0 (Base)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* Thursday, November 03, 2011=7140, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
12	9	2	4	5	52	105	364	460	345	317	335	411	440	599	633	733	854	631	370	186	153	91	34	
5	5	0	1	1	7	11	49	125	79	66	85	96	109	121	145	151	220	162	139	46	47	45	8	-
4	0	0	1	1	9	27	91	115	87	94	82	101	94	126	189	164	252	160	108	47	27	20	7	-
2	1	1	1	2	16	26	108	122	90	66	78	105	98	137	164	192	203	145	70	52	37	13	13	-
1	3	1	1	1	20	41	116	99	89	92	91	110	139	215	136	227	180	164	53	41	42	13	6	-

AM Peak 0745 - 0845 (477), AM PHF=0.86

13,902 ADT

MetroCount Traffic Executive
Event Counts

1870 -- English (ENU)

Datasets:

Site:	**[11109.06] SAN DIEGUITO RD (EL CAMINO REAL-OLD EL CAMINO REAL) EASTBOUND**
Input A:	2 - East bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	15:35 Wednesday, November 02, 2011 => 10:16 Friday, November 04, 2011
File:	11109.06.E04Nov2011.EC0 (Regular)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	**0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011**

* **Thursday, November 03, 2011=7106, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
14	14	7	14	12	92	221	480	558	459	380	396	436	437	530	569	532	671	501	302	197	172	103	36	
5	7	2	4	1	9	28	72	144	100	93	103	96	116	105	157	128	174	148	86	53	55	37	12	-
5	0	0	4	3	15	36	131	137	128	91	104	106	109	146	148	118	170	129	75	50	47	30	8	-
2	1	1	3	3	32	58	131	126	111	95	95	113	89	134	135	142	153	125	75	51	42	19	7	-
2	7	4	4	5	36	99	146	131	121	103	95	121	124	146	129	144	175	100	66	44	29	18	9	-

AM Peak 0730 - 0830 (558), AM PHF=0.96

MetroCount Traffic Executive
Event Counts

1869 -- English (ENU)

Datasets:

Site:	[11109.06] SAN DIEGUITO RD (EL CAMINO REAL-OLD EL CAMINO REAL) WESTBOUND
Input A:	4 - West bound. - Lane= 0, Added to totals. (/2.000)
Input B:	0 - Unused or unknown. - Lane= 0, Excluded from totals.
Survey Duration:	15:37 Wednesday, November 02, 2011 => 10:17 Friday, November 04, 2011
File:	11109.06.W04Nov2011.EC0 (Regular)
Data type:	Axle sensors - Separate (Count)

Profile:

Filter time:	0:00 Thursday, November 03, 2011 => 0:00 Friday, November 04, 2011

* Thursday, November 03, 2011=7458, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
10	7	8	11	14	71	206	644	834	569	415	492	519	516	557	611	535	474	371	206	149	122	92	31	
1	0	0	1	1	11	32	85	212	171	110	128	119	111	130	191	132	115	110	57	33	32	19	11	-
7	4	4	5	1	11	39	170	202	145	94	135	144	125	138	149	150	132	101	64	45	36	27	6	-
1	1	0	3	6	20	60	199	222	116	123	112	133	153	142	149	141	103	76	50	35	24	24	11	-
1	2	4	3	7	29	75	191	198	137	89	118	124	128	148	123	112	124	84	36	37	31	24	3	-

AM Peak 0800 - 0900 (834), AM PHF=0.94

14,564 ADT

APPENDIX B

EXISTING AM / PM PEAK INTERSECTION LEVELS OF SERVICE WORKSHETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	319	324	348	528	1	506	1	118	0	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1862			1774	1583		1863	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1862			1774	1583		1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	354	360	387	587	1	562	1	131	0	3	0
RTOR Reduction (vph)	0	0	275	0	0	0	0	0	66	0	0	0
Lane Group Flow (vph)	3	354	85	387	588	0	0	563	65	0	3	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.8	24.2	24.2	23.0	46.4			34.0	34.0		5.8	
Effective Green, g (s)	0.8	24.2	24.2	23.0	46.4			34.0	34.0		5.8	
Actuated g/C Ratio	0.01	0.23	0.23	0.22	0.45			0.33	0.33		0.06	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	14	438	372	395	839			586	523		105	
v/s Ratio Prot	0.00	c0.19		c0.22	0.32			c0.32			c0.00	
v/s Ratio Perm			0.05						0.04			
v/c Ratio	0.21	0.81	0.23	0.98	0.70			0.96	0.12		0.03	
Uniform Delay, d1	50.8	37.2	31.8	39.8	22.7			33.8	24.1		45.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	7.6	10.6	0.3	39.4	2.7			27.5	0.1		0.1	
Delay (s)	58.3	47.7	32.2	79.2	25.4			61.4	24.2		46.0	
Level of Service	E	D	C	E	C			E	C		D	
Approach Delay (s)		39.9			46.7			54.3			46.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	63	350	648	33	14	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	70	389	720	37	16	247
RTOR Reduction (vph)	0	0	0	14	0	214
Lane Group Flow (vph)	70	389	720	23	16	33
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	6.9	42.6	31.7	31.7	7.7	7.7
Effective Green, g (s)	6.9	42.6	31.7	31.7	7.7	7.7
Actuated g/C Ratio	0.12	0.73	0.54	0.54	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	1361	1013	861	234	209
v/s Ratio Prot	0.04	c0.21	c0.39		0.01	
v/s Ratio Perm				0.01		c0.02
v/c Ratio	0.33	0.29	0.71	0.03	0.07	0.16
Uniform Delay, d1	23.6	2.7	9.9	6.2	22.2	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.1	2.4	0.0	0.1	0.4
Delay (s)	24.5	2.8	12.3	6.2	22.3	22.8
Level of Service	C	A	B	A	C	C
Approach Delay (s)		6.1	12.0		22.7	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	1	0	0	0	5	534	0	0	728	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	1	0	0	0	5	580	0	0	791	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											671	
pX, platoon unblocked												
vC, conflicting volume	1390	1390	799	1391	1398	580	807			580		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1390	1390	799	1391	1398	580	807			580		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	100	99			100		
cM capacity (veh/h)	119	141	386	119	140	514	818			994		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	3	0	586	807
Volume Left	2	0	5	0
Volume Right	1	0	0	15
cSH	155	1700	818	994
Volume to Capacity	0.02	0.00	0.01	0.00
Queue Length 95th (ft)	2	0	1	0
Control Delay (s)	28.8	0.0	0.2	0.0
Lane LOS	D	A	A	
Approach Delay (s)	28.8	0.0	0.2	0.0
Approach LOS	D	A		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	216	247	235	505	495	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0
Lane Util. Factor		0.95		1.00	0.95	0.97	1.00
Frt		0.92		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		3256		1770	3539	3433	1583
Flt Permitted		1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)		3256		1770	3539	3433	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	240	274	261	561	550	360
RTOR Reduction (vph)	0	206	0	0	0	0	254
Lane Group Flow (vph)	0	308	0	261	561	550	106
Turn Type	Prot			Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases							6
Actuated Green, G (s)		11.9		14.7	30.6	16.2	16.2
Effective Green, g (s)		11.9		14.7	30.6	16.2	16.2
Actuated g/C Ratio		0.22		0.27	0.56	0.30	0.30
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		707		475	1976	1015	468
v/s Ratio Prot		c0.09		c0.15	0.16	c0.16	
v/s Ratio Perm							0.07
v/c Ratio		0.44		0.55	0.28	0.54	0.23
Uniform Delay, d1		18.5		17.2	6.4	16.2	14.6
Progression Factor		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4		1.3	0.1	0.6	0.2
Delay (s)		19.0		18.5	6.4	16.8	14.8
Level of Service		B		B	A	B	B
Approach Delay (s)		19.0			10.3	16.0	
Approach LOS		B			B	B	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WB	NBL	NBR
Lane Configurations						
Volume (veh/h)	525	19	6	846	16	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	583	21	7	940	18	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			604		1547	594
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			604		1547	594
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		86	98
cM capacity (veh/h)			973		125	505

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	604	947	38
Volume Left	0	7	18
Volume Right	21	0	20
cSH	1700	973	208
Volume to Capacity	0.36	0.01	0.18
Queue Length 95th (ft)	0	1	16
Control Delay (s)	0.0	0.2	26.2
Lane LOS		A	D
Approach Delay (s)	0.0	0.2	26.2
Approach LOS			D

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	376	397	150	372	7	565	6	465	0	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1857			1775	1583		1812	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1857			1775	1583		1812	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	418	441	167	413	8	628	7	517	0	4	1
RTOR Reduction (vph)	0	0	308	0	1	0	0	0	211	0	1	0
Lane Group Flow (vph)	12	418	133	167	420	0	0	635	306	0	4	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.8	32.4	32.4	10.1	41.7			43.0	43.0		5.9	
Effective Green, g (s)	0.8	32.4	32.4	10.1	41.7			43.0	43.0		5.9	
Actuated g/C Ratio	0.01	0.30	0.30	0.09	0.39			0.40	0.40		0.05	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	13	562	478	166	721			711	634		100	
v/s Ratio Prot	0.01	c0.22		c0.09	0.23			c0.36			c0.00	
v/s Ratio Perm			0.08						0.19			
v/c Ratio	0.92	0.74	0.28	1.01	0.58			0.89	0.48		0.04	
Uniform Delay, d1	53.3	33.8	28.6	48.7	26.0			30.1	23.9		48.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	207.3	5.3	0.3	71.4	1.2			13.6	0.6		0.2	
Delay (s)	260.6	39.1	28.9	120.1	27.2			43.6	24.5		48.2	
Level of Service	F	D	C	F	C			D	C		D	
Approach Delay (s)		37.0			53.6			35.1			48.2	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	39.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	107.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SB	SBR
Lane Configurations						
Volume (vph)	216	559	372	13	22	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	240	621	413	14	24	92
RTOR Reduction (vph)	0	0	0	9	0	81
Lane Group Flow (vph)	240	621	413	5	24	11
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	18.1	39.6	17.5	17.5	6.4	6.4
Effective Green, g (s)	18.1	39.6	17.5	17.5	6.4	6.4
Actuated g/C Ratio	0.34	0.73	0.32	0.32	0.12	0.12
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	593	1366	604	513	210	188
v/s Ratio Prot	0.14	c0.33	c0.22		c0.01	
v/s Ratio Perm				0.00		0.01
v/c Ratio	0.40	0.45	0.68	0.01	0.11	0.06
Uniform Delay, d1	13.8	2.9	15.8	12.4	21.3	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	3.2	0.0	0.2	0.1
Delay (s)	14.3	3.1	19.0	12.4	21.5	21.3
Level of Service	B	A	B	B	C	C
Approach Delay (s)		6.2	18.8		21.3	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	0	29	23	0	278	12	726	15	22	548	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	32	25	0	302	13	789	16	24	596	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											671	
pX, platoon unblocked												
vC, conflicting volume	1778	1484	604	1507	1484	797	613			805		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1778	1484	604	1507	1484	797	613			805		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	94	72	100	22	99			97		
cM capacity (veh/h)	14	120	498	90	119	386	966			819		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	64	327	818	637
Volume Left	33	25	13	24
Volume Right	32	302	16	17
cSH	26	309	966	819
Volume to Capacity	2.47	1.06	0.01	0.03
Queue Length 95th (ft)	196	307	1	2
Control Delay (s)	990.4	105.9	0.4	0.8
Lane LOS	F	F	A	A
Approach Delay (s)	990.4	105.9	0.4	0.8
Approach LOS	F	F		

Intersection Summary			
Average Delay	53.6		
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	546	375	309	307	208	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0
Lane Util. Factor		0.95		1.00	0.95	0.97	1.00
Frt		0.94		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		3323		1770	3539	3433	1553
Flt Permitted		1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)		3325		1770	3539	3433	1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	607	417	343	341	231	304
RTOR Reduction (vph)	0	93	0	0	0	0	258
Lane Group Flow (vph)	0	931	0	343	341	231	46
Turn Type	Prot			Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases							6
Actuated Green, G (s)		29.4		19.5	52.9	10.9	10.9
Effective Green, g (s)		29.4		19.5	52.9	10.9	10.9
Actuated g/C Ratio		0.41		0.27	0.74	0.15	0.15
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1361		481	2607	521	240
v/s Ratio Prot		c0.28		c0.19	0.10	c0.07	
v/s Ratio Perm							0.03
v/c Ratio		0.68		0.71	0.13	0.44	0.19
Uniform Delay, d1		17.4		23.6	2.8	27.7	26.6
Progression Factor		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		1.4		5.0	0.0	0.6	0.4
Delay (s)		18.8		28.6	2.8	28.3	27.0
Level of Service		B		C	A	C	C
Approach Delay (s)		18.8			15.7	27.6	
Approach LOS		B			B	C	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	652	27	7	423	36	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	724	30	8	470	40	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			754		1225	739
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			754		1225	739
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		80	89
cM capacity (veh/h)			856		196	417

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	754	478	84
Volume Left	0	8	40
Volume Right	30	0	44
cSH	1700	856	272
Volume to Capacity	0.44	0.01	0.31
Queue Length 95th (ft)	0	1	32
Control Delay (s)	0.0	0.3	24.1
Lane LOS		A	C
Approach Delay (s)	0.0	0.3	24.1
Approach LOS			C

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C

ARTERIAL CORRIDOR ANALYSIS WORKSHEETS

Arterial Level of Service: NB El Camino Real

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Dieguito Rd.	III	30	45.7	13.5	59.2	0.36	21.9	C
Via de la Valle	III	30	61.5	0.0	61.5	0.48	28.3	B
Total	III		107.2	13.5	120.7	0.84	25.2	B

Arterial Level of Service: WB El Camino Real

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Via de la Valle	III	30	3.0	49.0	52.0	0.02	1.3	F
San Dieguito Rd.	III	30	61.5	5.4	66.9	0.48	26.1	B
Total	III		64.5	54.4	118.9	0.50	15.2	D

Arterial Level of Service: NB El Camino Real

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Dieguito Rd.	III	30	45.7	21.9	67.6	0.36	19.2	C
Via de la Valle	III	30	61.5	0.0	61.5	0.48	28.3	B
Total	III		107.2	21.9	129.1	0.84	23.5	C

Arterial Level of Service: WB El Camino Real

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Via de la Valle	III	30	3.0	44.3	47.3	0.02	1.5	F
San Dieguito Rd.	III	30	61.5	3.0	64.5	0.48	27.0	B
Total	III		64.5	47.3	111.8	0.50	16.2	D

Arterial Level of Service: NB El Camino Real

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Dieguito Rd.	II	30	45.7	15.6	61.3	0.36	21.1	C
Via de la Valle	III	30	61.5	0.0	61.5	0.48	28.3	B
Total	II		107.2	15.6	122.8	0.84	24.8	B

Arterial Level of Service: WB El Camino Real

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Via de la Valle	II	30	63.0	60.0	63.0	0.02	1.1	F
San Dieguito Rd.	III	30	61.5	5.5	67.0	0.48	26.0	B
Total	III		64.5	65.5	130.0	0.50	13.9	E

Arterial Level of Service: NB El Camino Real

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
San Dieguito Rd	III	30	45.7	25.2	70.9	0.36	18.3	C
Via de la Valle	III	30	61.5	0.0	61.5	0.48	28.3	B
Total	III		107.2	25.2	132.4	0.84	23.0	C

Arterial Level of Service: WB El Camino Real

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Via de la Valle	III	30	3.0	57.7	60.7	0.02	1.1	F
San Dieguito Rd.	III	30	61.5	3.1	64.6	0.48	27.0	B
Total	III		64.5	60.8	125.3	0.50	14.5	D

APPENDIX D

OTHER PROJECTS ANALYSIS FOR OPENING DAY TRAFFIC

TABLE 6-1

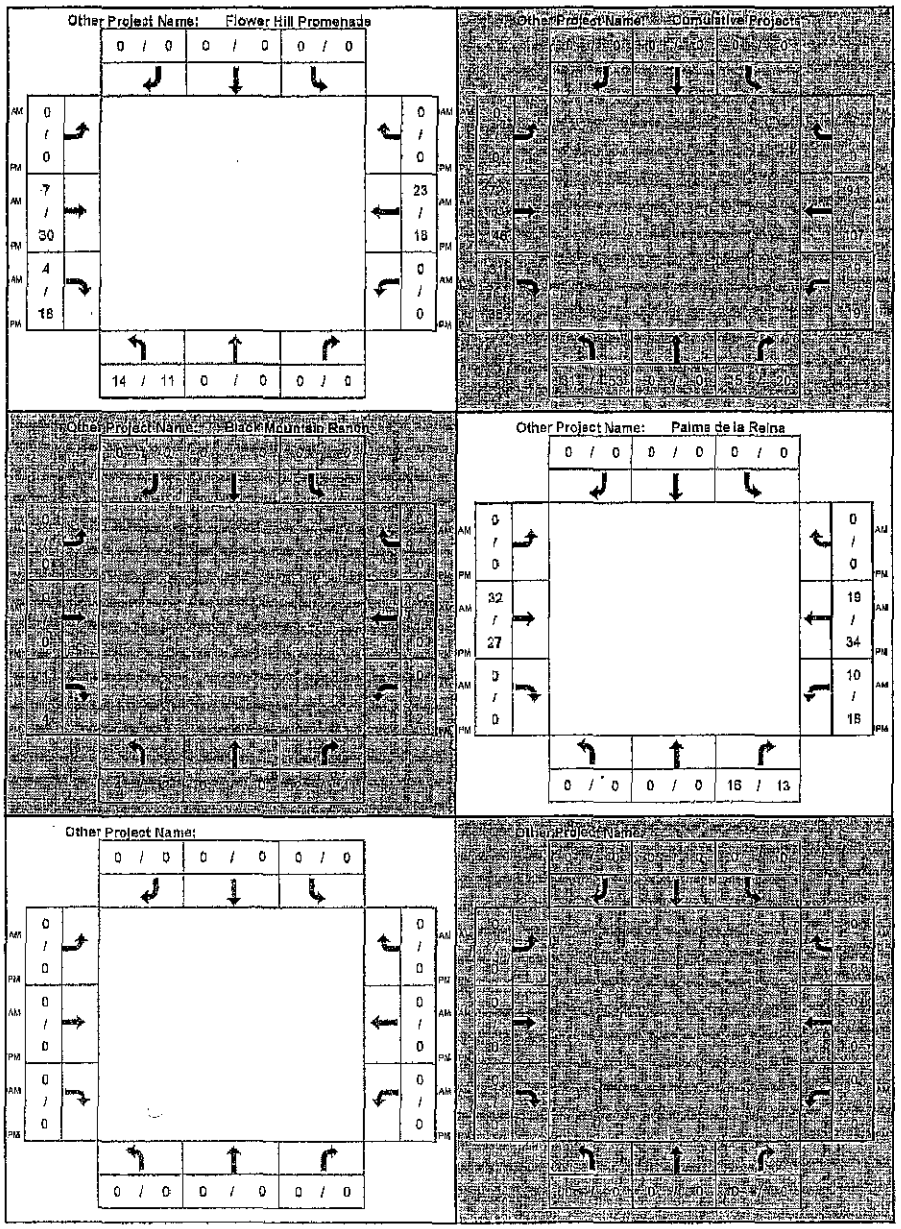
Other Projects List

	Project	Description	Size	Status	Study
1	Flower Hill Promenade	Adding 8,754 SF of Retail; 2,300 SF of Storage; 28,927 SF of Office; 35,000 SF Market	3,179 ADT	Approved	Included
2	22nd District Agricultural Master Plan	Replace Existing Flat Floor Exhibit Bldg. (add 26,220 SF); Pave East Parking Lot; New 60,000 SF Health Club; Solana Gate Improvement; Rooftop Sports Field; Conference Hotel	6,960 ADT	Approved	Included
3	Black Mountain Ranch	The 3,690 acre BMR VTM includes 2 golf courses; 1,212 dwelling units; parks, schools, fire station, etc. An additional 1,408 acres of new development are included in BMR	>20,222 ADT	Approved	Included
4	Morgan Run Country Club	Health Spa: 9,432 SF increase	283 ADT	Approved	Included
5	Palma de la Reina	54 Apt.; 19,500 SF Office; and 9,500 SF Retail	1,202 ADT	Approved	Included
6	Rancho Santa Fe Farms Golf Club	Recreation of 18 hole golf course	700 ADT	Approved	Included
7	Pueblo de la Valle (aka: Via de la Valle Townhomes)	22 Townhomes	220 ADT	Pending	Included
8	Rancho Del Mar	225 Senior Housing Units	900 ADT	Pending	Included
9	One Paseo	245,000 SF Corporate Office; 291,000 SF Multi-tenant Office; 150 room hotel; 220,000 SF Community Shopping Center; 10 screen Cinema; 608 MF DU	26,961 ADT	Pending	Included
10	Riverview Project	23,120 SF Office	560 ADT	Pending	Included
11	Sillstrop Single Family Homes	3 Apartments & 22 homes	244 ADT	Pending	Included
12	Solana Beach Towne Center	Office Alternative: 133,047 SF	3,310 ADT	Pending	Included
13	Solana Beach Mixed-Use Project	Mixed Use	630 ADT	Pending	Included
14	NCTD Mixed-Use	Mixed Use	3,585 ADT	Pending	Included
15	Stevens Avenue Office Bldg.	18,905 SF Office	380 ADT	Pending	Included
16	Shepard Medical Center	Medical Office: -4,394 SF	220 ADT	Pending	Included
17	Solana Gateway	Mixed Use: Hotel, restaurant, residential	1,760 ADT	Pending	Included
18	Helen Woodward Animal Center	Building Expansion: 41,600 SF	594 ADT	Pending	Included
19	Del Mar Country Estates	Residential: 14 estate homes	168 ADT	Pending	Included
20	Ranch Santa Fe	Included in Appendices to Flower Hill Promenade Traffic Study	Peak Hour Volumes provided	Pending	Included

Other Projects

Analyst: Jacob Swim
Intersection: Via de la Valle at El Camino Real
Future Condition: Other Projects
Date: 7/22/2011
Company: Urban Systems Associates, Inc.
Project Number: 000810

Intersection 1
E/W Street Name: Via de la Valle
N/S Street Name: El Camino Real



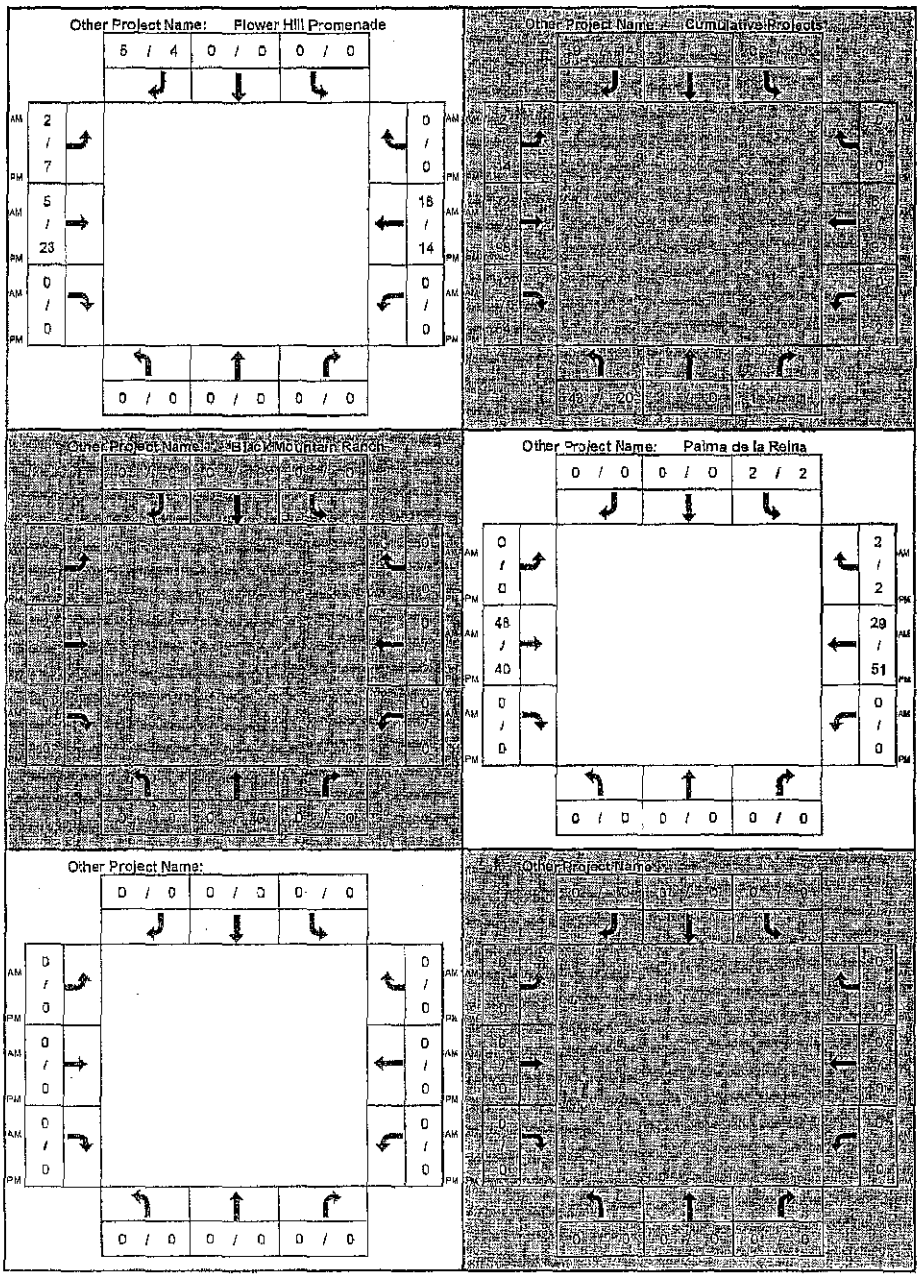
Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	48	66
NTH	0	0
NRT	33	34
SLT	0	0
STH	0	0
SRT	0	0
ELT	0	0
ETH	111	203
ERT	36	60
WLT	29	39
WTH	136	159
WRT	0	0

* Cumulative Projects from Flower Hill Appendices include:
1.) 22nd District Agricultural Master Plan
2.) Morgan Run Country Club
3.) Rancho Santa Fe Farms Golf Club
4.) Pueblo de la Valle Townhomes
5.) Rancho Del Mar
6.) One Paseo
7.) Riverview Project
8.) Siltstrap Apt.
9.) Solana Beach Towne Center
10.) Solana Beach Mixed Use Project
11.) NCTD Mixed Use
12.) Stevens Avenue Office Bldg.
13.) Shepard Medical Center
14.) Solana Gateway
15.) Helen Woodward Animal Center
16.) Del Mar Country Estates
17.) Rancho Santa Fe

Other Projects

Intersection 2

Analyst:	Jacob Swim	E/W Street Name:	Via de la Valle
Intersection:	Via de la Valle at El Camino Real (N)	N/S Street Name:	El Camino Real (N)
Future Condition:	Other Projects		
Date:	7/22/2011		
Company:	Urban Systems Associates, Inc.		
Project Number:	000810		



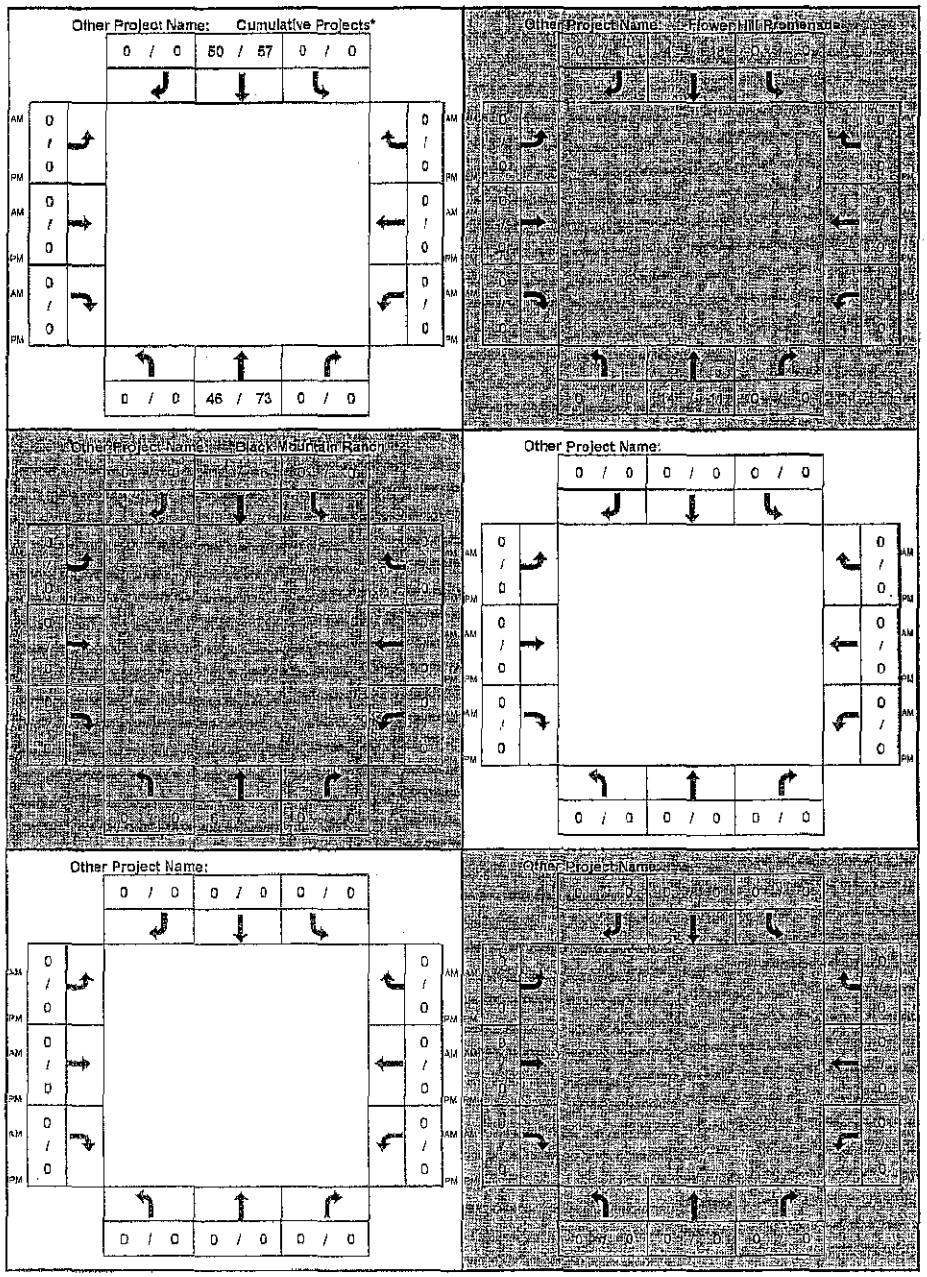
Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	43	20
NTH	1	0
NRT	1	1
SLT	2	2
STH	1	0
SRT	14	18
ELT	4	21
ETH	127	162
ERT	12	54
WLT	0	2
WTH	108	169
WRT	2	2

* See Intersection #1 for details

Other Projects

Intersection 3

Analyst:	Jacob Swim	E/W Street Name:	Horse Park/Polo
Intersection:	El Camino Real at Horse Park / Polo	N/S Street Name:	El Camino Real
Future Condition:	Other Projects		
Date:	7/22/2011		
Company:	Urban Systems Associates, Inc.		
Project Number:	000810		



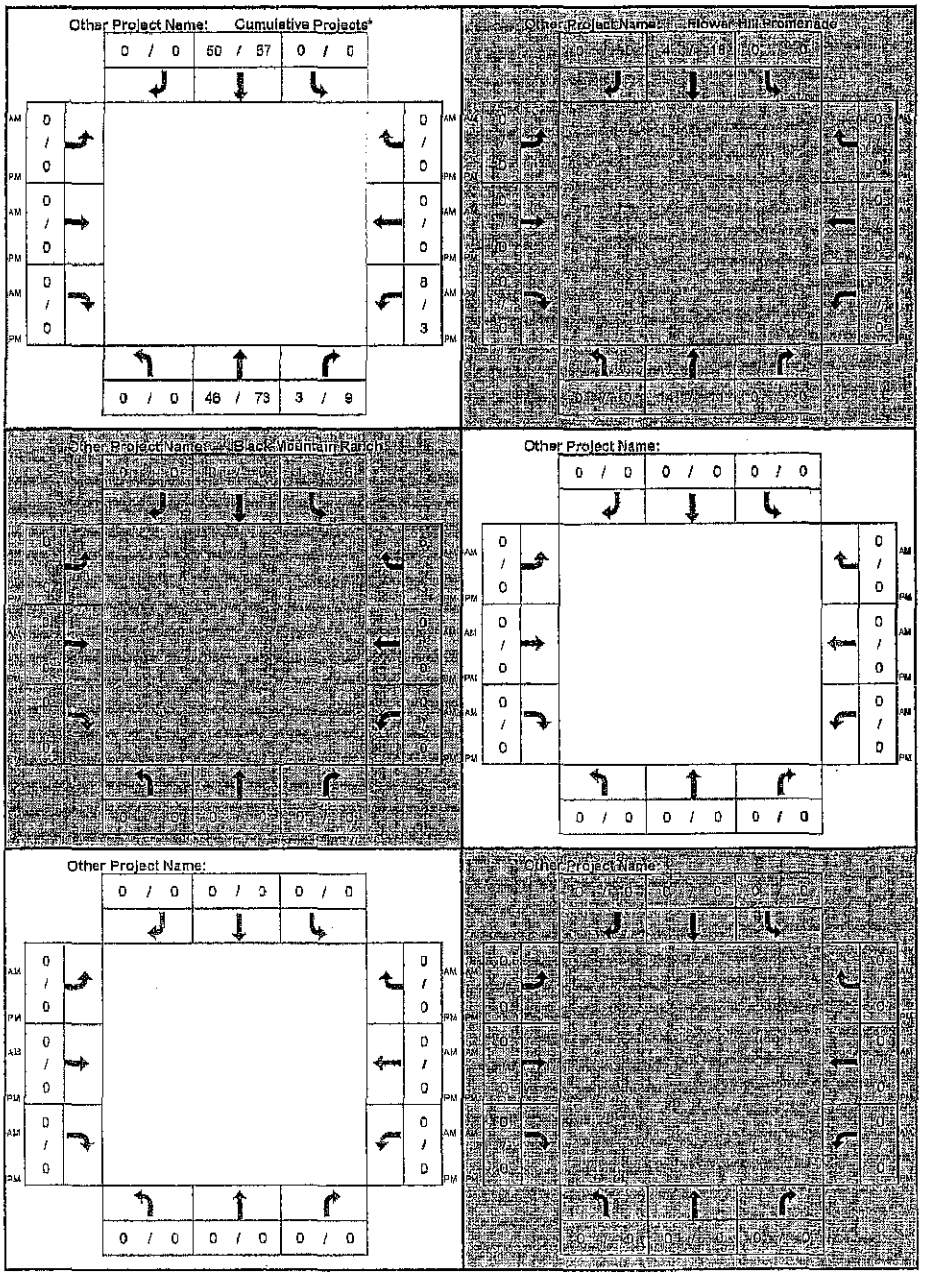
Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	66	87
NRT	0	0
SLT	0	0
STH	55	81
SRT	0	0
ELT	0	0
ETH	0	0
ERT	0	0
WLT	0	0
WTH	0	0
WRT	0	0

* See Intersection #1 for details

Other Projects

Intersection 4

Analyst:	Jacob Swim	E/W Street Name:	San Dieguito Rd.
Intersection:	El Camino Real at San Dieguito Road	N/S Street Name:	El Camino Real
Future Condition:	Other Projects		
Date:	7/22/2011		
Company:	Urban Systems Associates, Inc.		
Project Number:	000810		



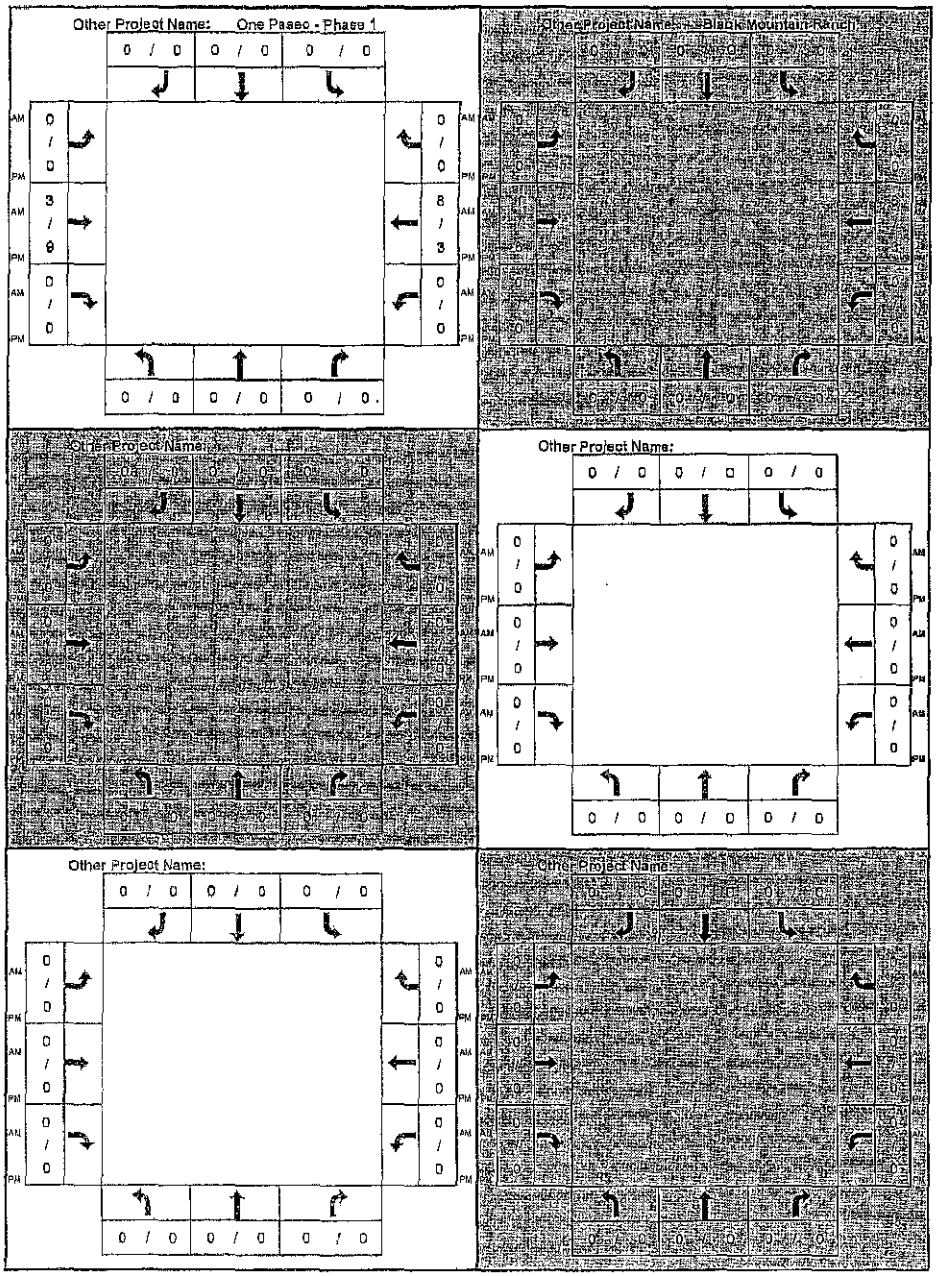
Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	50	84
NRT	3	9
SLT	1	6
STH	54	75
SRT	0	0
ELT	0	0
ETH	0	0
ERT	0	0
WLT	8	3
WTH	0	0
WRT	8	3

* See Intersection #1 for details

Other Projects

Intersection 5

Analyst:	Jacob Swim	E/W Street Name:	San Dieguito Rd.
Intersection:	Old El Camino Real at San Dieguito	N/S Street Name:	Old El Camino Real
Future Condition:	Other Projects		
Date:	7/22/2011		
Company:	Urban Systems Associates, Inc.		
Project Number:	000810		



Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	0	0
NRT	0	0
SLT	0	0
STH	0	0
SRT	0	0
ELT	0	0
ETH	4	15
ERT	0	0
WLT	0	0
WTH	14	6
WRT	0	0

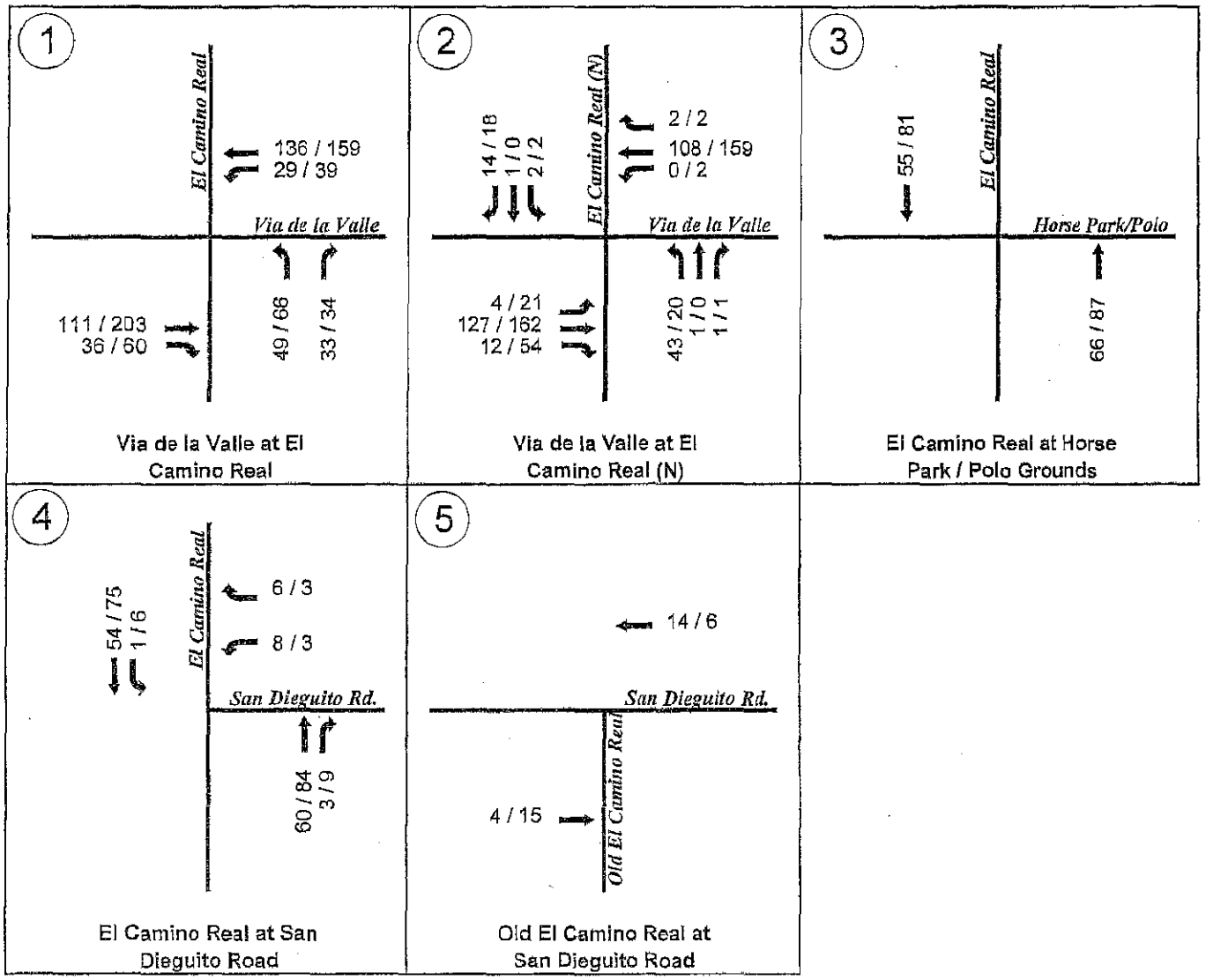


FIGURE X-X

Cumulative Project Only AM/PM Peak Hour Traffic

Jake Swim

From: Gonsalves, Ann [AGonsalves@sandiego.gov]
Sent: Friday, August 05, 2011 4:02 PM
To: 'Jake Swim'
Cc: usal@urbansystems.net; andy@urbansystems.net; 'Edgar Camerino'; Marsden, Dean; Mahzari, Farah
Subject: RE: El Camino Real volumes

Sounds like we are good --thx!

From: Jake Swim [mailto:jake@urbansystems.net]
Sent: Friday, August 05, 2011 10:40 AM
To: Gonsalves, Ann
Cc: usal@urbansystems.net; andy@urbansystems.net; 'Edgar Camerino'; Marsden, Dean; Mahzari, Farah
Subject: RE: El Camino Real volumes

Hi Ann,

The only ADT volume for the "combined cumulative volumes" provided by the Flower Hill traffic study was on Via De La Valle west of El Camino Real, see attached Figure 7-1. As shown on Figure 7-1 from the Flower Hill traffic study, the 3,330 ADT for the "combined cumulative volume" was used in the El Camino Real Widening near term volumes. However, the ADT for other segments further east are not provided. The other street segments on Via De La Valle and El Camino Real that are to be evaluated in the El Camino Real Widening project are NOT evaluated in the Flower Hill traffic study since they are not part of the Flower Hill study area. Further, the ADT volumes are not broken out in the Flower Hill traffic study appendices either. Therefore, we derived the ADT volumes for the "combined cumulative projects" based on the peak hour volumes as described in the previous email.

Please let us know if you have any questions.

Jacob Swim
Project Manager
Urban Systems & Associates, Inc.
4540 Kearny Villa Road, Suite 106
San Diego, CA 92123-1573
(858) 560-4911 x 306

From: Gonsalves, Ann [mailto:AGonsalves@sandiego.gov]
Sent: Friday, August 05, 2011 9:12 AM
To: 'Jake Swim'; Mahzari, Farah
Cc: usal@urbansystems.net; andy@urbansystems.net; 'Edgar Camerino'; Marsden, Dean
Subject: RE: El Camino Real volumes

Jake,

Why couldn't you take the "combined cumulative volumes " directly from the Flower Hill study? They should have had both ADT volumes and turning movement volumes broken out.

Thanks,
Ann

From: Jake Swim [mailto:jake@urbansystems.net]
Sent: Thursday, August 04, 2011 4:24 PM

To: Mahzari, Farah
Cc: usai@urbansystems.net; andy@urbansystems.net; Gonsalves, Ann; 'Edgar Camerino'; Marsden, Dean
Subject: RE: El Camino Real volumes

Hi Farah,

Figure 4-1 (Cumulative Projects Only ADT) matches the first sheet on Attachment B, see attached. As you can see in the first sheet of Attachment B, the Cumulative Projects Only ADT is derived by combining the following projects: Flower Hill Promenade, Black Mountain Ranch, Palma De La Reina, and Combined Cumulative Projects. Please note the "Combined Cumulative Projects" are based on the Flower Hill Traffic Study appendices. Also note the "Combined Cumulative Projects" do NOT include Flower Hill Promenade, Black Mountain Ranch, and Palma De La Reina project only average daily traffic volumes or peak hour traffic volumes.

In Attachment B, the four worksheets labeled "Other Projects" includes hand written notes and calculations that show how the ADT's for the Combined Cumulative Projects were derived since these ADT volumes were not provided. These volumes were revised based on our last meeting and comments provided by Ann Gonsalves regarding the traffic being calculated by direction. The results of this effort are shown in Attachment B. Please note the Palma De La Reina peak hour traffic volumes are not shown on these figures, but have been included in our latest worksheets and analysis.

For these reasons, the ADT volumes on Figure 4-1 would not double from the previous volumes because the only ADT's that were updated were the "Combined Cumulative Project" average daily traffic volumes. The average daily traffic volumes based on the various projects can be identified in the first sheet of Attachment B.

Please let us know if you have any further questions.

Jacob Swim
Project Manager
Urban Systems & Associates, Inc.
4540 Kearny Villa Road, Suite 106
San Diego, CA 92123-1573
(858) 560-4911 x 306

From: Mahzari, Farah [mailto:FMahzari@sandiego.gov]
Sent: Thursday, August 04, 2011 1:35 PM
To: 'Jake Swim'; Gonsalves, Ann
Cc: 'usai@urbansystems.net'; 'andy@urbansystems.net'; 'Edgar Camerino'; Marsden, Dean
Subject: RE: El Camino Real volumes

Hi Jake,

As I mentioned earlier today we are fine with all the revisions except the explanation of which methodology was used on Figure 4-1. Can you please explain that?

Thanks, Farah

From: Jake Swim [mailto:jake@urbansystems.net]
Sent: Tuesday, August 02, 2011 3:14 PM
To: Gonsalves, Ann; Mahzari, Farah
Cc: usai@urbansystems.net; andy@urbansystems.net; 'Edgar Camerino'; Marsden, Dean

Subject: RE: El Camino Real volumes

Hi Farah/Ann,

We have reviewed your comments and have the following responses:

On Figure 3-1 (Existing ADT), Old El Camino Real has been included in the graphic (and all other graphics) per your request. The note on Figure 3-1 has been revised to state "counted" rather than "obtained" as requested. Existing ADT volumes in Figure 3-1 have not been rounded to the nearest ten because this would change all of the Near Term ADT volumes which would then change all of the Year 2035 ADT volumes and peak hour volumes. Changing the near term and future volumes for rounding does not seem reasonable since they were actually reported and recorded numbers, would create a lot of unnecessary new work, and would not change any analysis results.

On Figure 4-1 (Cumulative Projects Only ADT), the daily volumes have been checked for each study segment and are correct. Please note that only the peak hour volumes (in each direction) were converted into daily volumes based on the Cumulative Projects in the Flower Hill Promenade traffic study. Not all of the cumulative projects ADT volumes were derived using this methodology.

On Figure 5-1 (Near Term ADT), the daily volumes have been revised on Via de la Valle and San Dieguito Road as requested to reflect the revised existing volume added to the cumulative project volume.

On Figure 6-1 (Year 2035 ADT), the daily volumes have been revised to show a higher volume then the previous Year 2030 volume on El Camino Real North and San Dieguito Road as requested.

On Figure 9-4 (Year 2035 AM/PM Peak Hour Traffic), the peak hour volumes have been checked and are correct. A factoring methodology has been used to derive the Year 2035 peak volumes based on Near Term peak and daily volumes as shown in the attached sheets. Please note the peak hour volumes will need to be balanced between intersections in Year 2035 for Ourston's roundabout analysis.

Please let us know if you concur with the latest revisions so we can proceed with our analysis.

Jacob Swim
Project Manager
Urban Systems & Associates, Inc.
4540 Kearny Villa Road, Suite 106
San Diego, CA 92123-1573
(858) 560-4911 x 306

From: Gonsalves, Ann [mailto:AGonsalves@sandiego.gov]
Sent: Tuesday, August 02, 2011 9:06 AM
To: 'Jake Swim'
Cc: 'Andy'; Marsden, Dean; Johnson, Brad; Mahzari, Farah
Subject: El Camino Real volumes

Jake,

Attached please find some remaining questions on the volumes. Can you please take another look? (Farah has the originals if writing is too light to be clear.)

Thank you,
Ann

From: ncc5_c452@sandiego.gov [mailto:ncc5_c452@sandiego.gov]
Sent: Tuesday, August 02, 2011 8:56 AM
To: Gonsalves, Ann

Cumulative Projects Only

Road	Segment	#	
Via de la Valle	West of El Camino Real	4,609	FH (670) + BMR (59) + CC (3,330) + PR (550)
	El Camino Real to El Camino Real (N)	3,849	FH (0) + BMR (29) + CC (2,920) + PR (900)
	East of El Camino Real (N)	2,859	FH (0) + BMR (29) + CC (1,930) + PR (900)
El Camino Real (N)	North of Via de la Valle	280	FH (0) + BMR (0) + CC (280)
El Camino Real	Via de la Valle to San Dieguito Road	1,768	FH (0) + BMR (88) + CC (1,330) + PR (350)
	South of San Dieguito Road	1,746	FH (0) + BMR (6) + CC (1,390) + PR (350)
San Dieguito Road	El Camino Real to Old El Camino Real	208	FH (0) + BMR (88) + CC (120)

Notes

BMR = Black Mountain Ranch

FH = Flower Hill Promenade

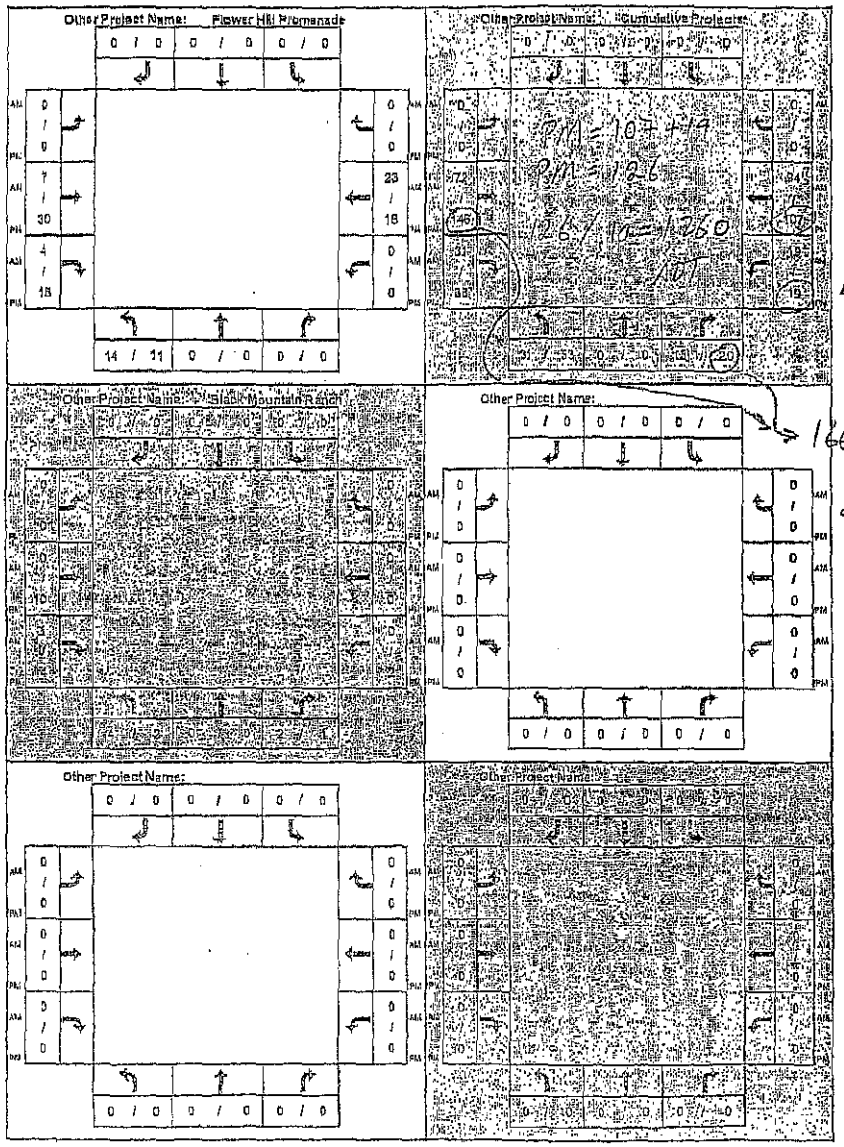
CC = Combined Cumulative Projects based on Flower Hill TIA appendices

PR = Palma De La Reina

Attachment B

Other Projects

Analyst:	Jacob Swim	Intersection 1	
Intersection:	Via de la Valle at El Camino Real	E/W Street Name:	Via de la Valle
Future Condition:	Other Projects	N/S Street Name:	El Camino Real
Date:	7/21/2011		
Company:	Urban Systems Associates, Inc.		
Project Number:	000810		



El Camino Real
~~[illegible]~~
to
El Camino Real (N)

166 X 1 = 1,660 ADT

So 1,260
+ 1,660
2,920 ADT

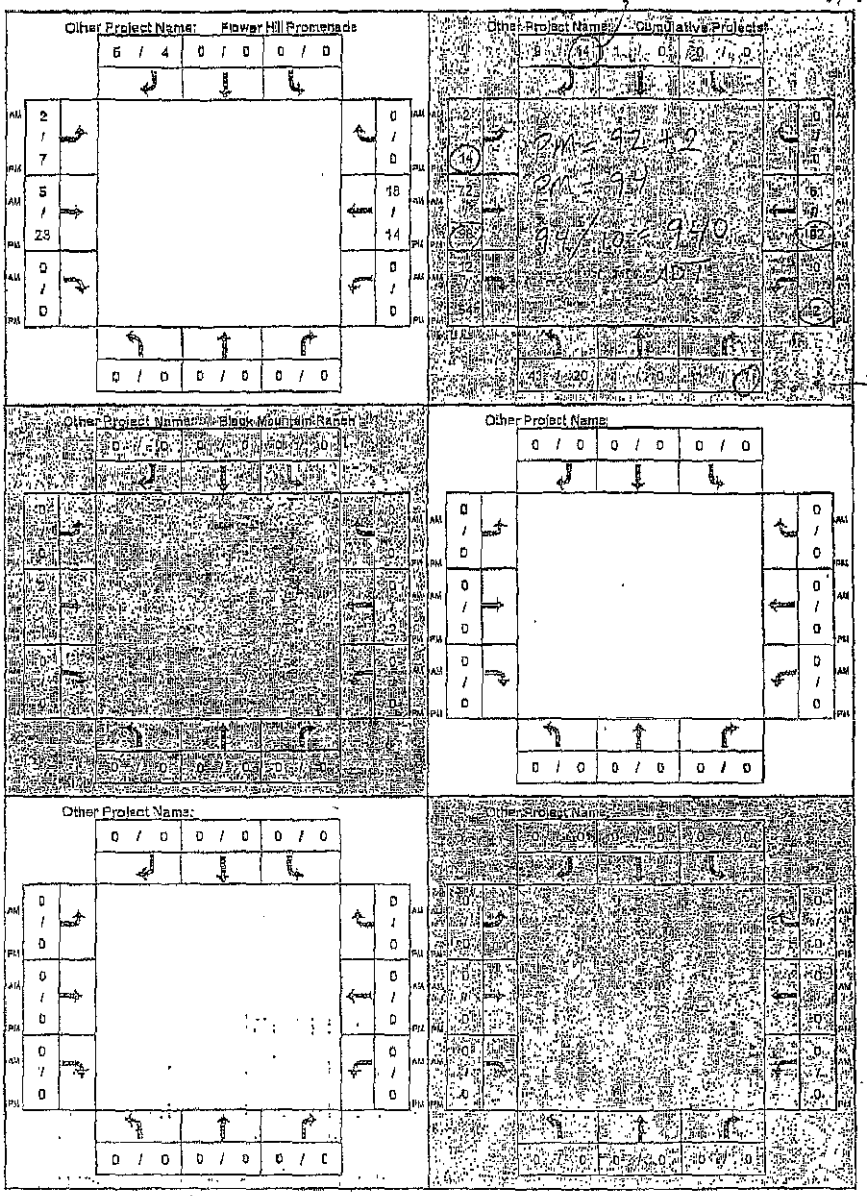
Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	49	65
NTH	0	0
NRT	17	21
SLT	0	0
STH	0	0
SRT	0	0
ELT	0	0
ETH	79	175
ERT	35	80
WLT	19	21
WTH	117	125
WRT	0	0

* Cumulative Projects from Flower Hill Appendices include:
1.) 22nd District Agricultural Master Plan
2.) Morgan Run Country Club
3.) Palma de la Reina
4.) Rancho Santa Fe Farms Golf Club
5.) Pueblo de la Valle Townhomes
6.) Rancho Del Mar
7.) One Paseo
8.) Riverview Project
9.) Sliistrap Apt.
10.) Solana Beach Towne Center
11.) Solana Beach Mixed Use Project
12.) NCTD Mixed Use
13.) Stevens Avenue Office Bldg.
14.) Shepard Medical Center
15.) Solana Gateway
16.) Helen Woodward Animal Center
17.) Del Mar Country Estates
18.) Ranch Santa Fe

Other Projects

Analyst:	Jacob Swim	Intersection 2	
Intersection:	Via de la Valle at El Camino Real (N)	E/W Street Name:	Via de la Valle
Future Condition:	Other Projects	N/S Street Name:	El Camino Real (N)
Date:	7/21/2011		
Company:	Urban Systems Associates, Inc.		
Project Number:	000810		

PM = 14 ⇒ 14/.1 = 140 ADT x2 = 280 ADT
El Camino Real (N) just North of Via de la Valle



East of El Camino Real (N)

990 ADT
+ 940 ADT
1,930 ADT

Turn Movement	Project Only turn (V) AM	Project Only turn (V) PM
NLT	48	20
NTH	1	0
NRT	1	1
SLT	0	0
STH	1	0
SRT	14	18
ELT	4	21
ETH	79	122
ERT	12	54
WLT	0	2
WTH	75	108
WRT	0	0

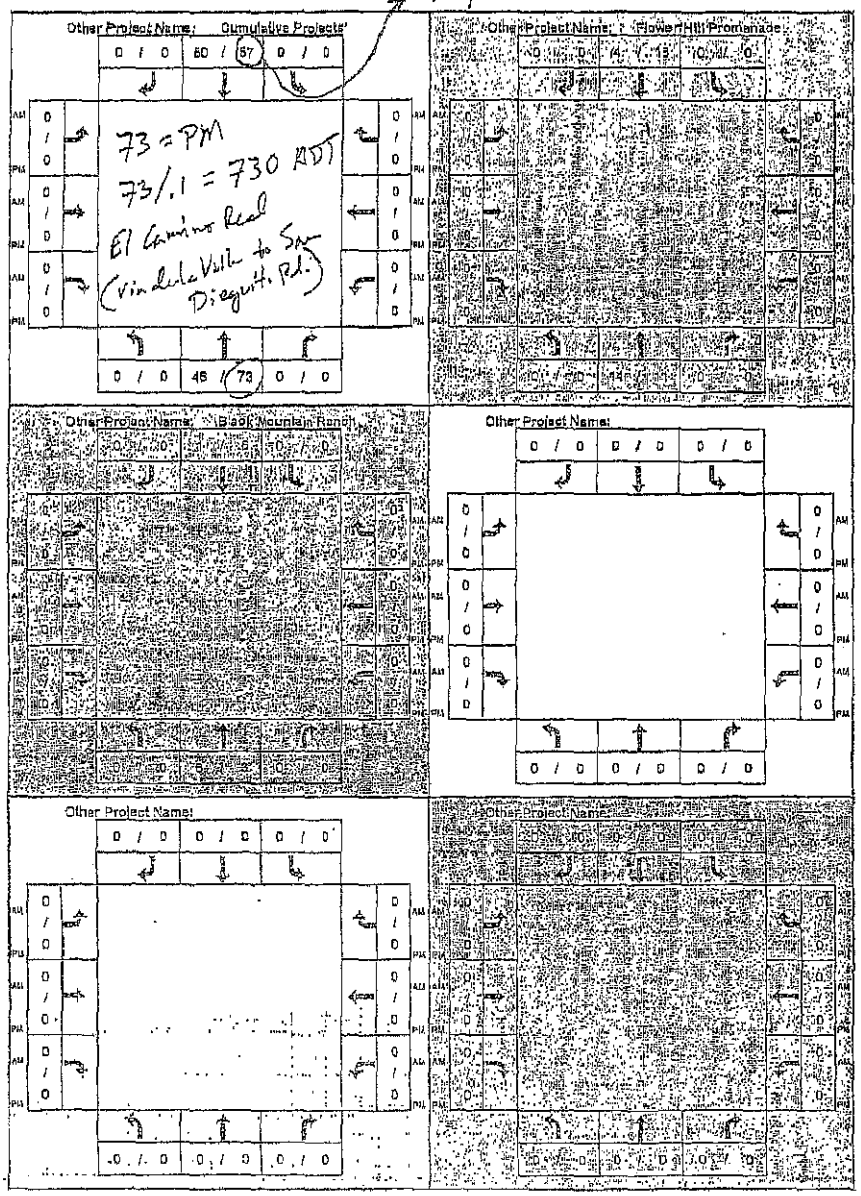
* See intersection #1 for details

Other Projects

Intersection 3

Analyst:	Jacob Swim	E/W Street Name:	Horse Park/Polo
Intersection:	El Camino Real at Horse Park / Polo	N/S Street Name:	El Camino Real
Future Condition:	Other Projects		
Date:	7/21/2011		
Company:	Urban Systems Associates, Inc.		
Project Number:	000810		

57/.1 = 570 ADT



570
+730
1300 ADT

Turn movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	66	87
NRT	0	0
SLT	0	0
STH	55	81
SRT	0	0
ELT	0	0
ETH	0	0
ERT	0	0
WLT	0	0
WTH	0	0
WRT	0	0

* See Intersection #1 for details

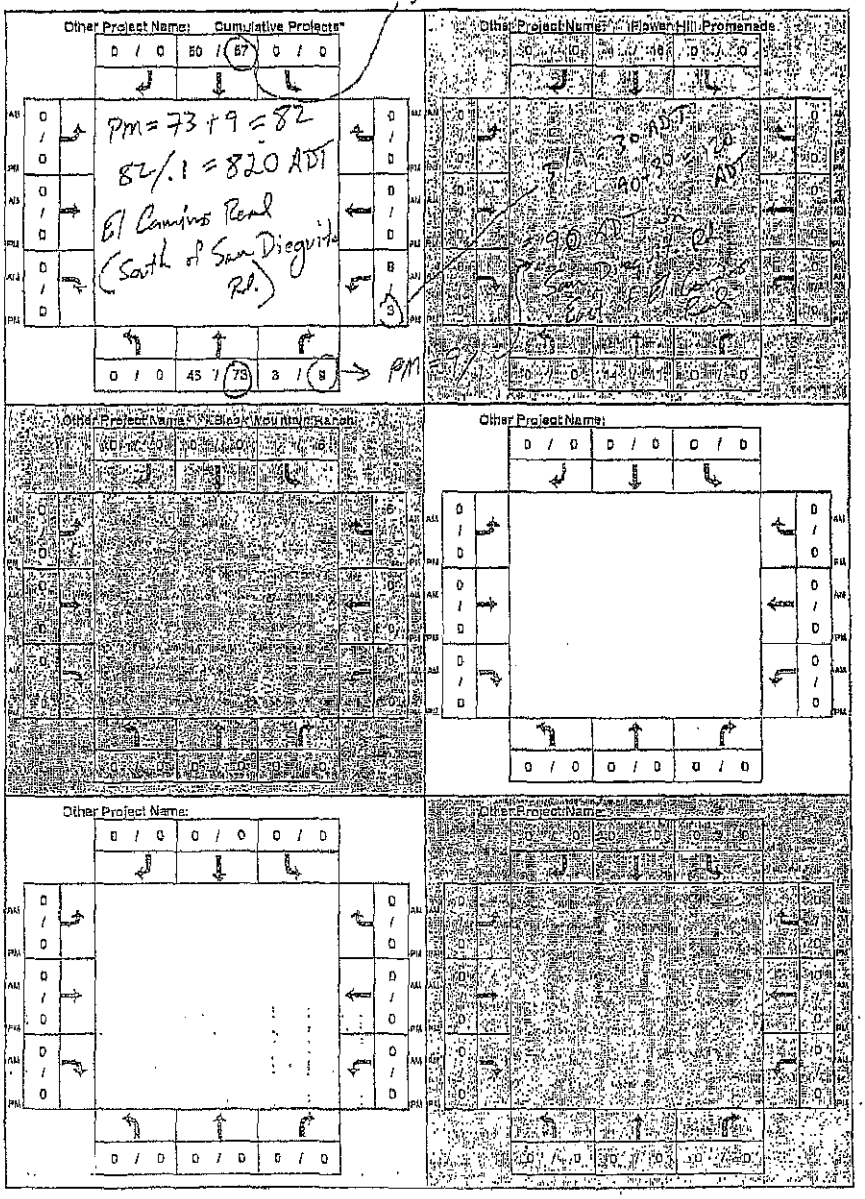
Other Projects

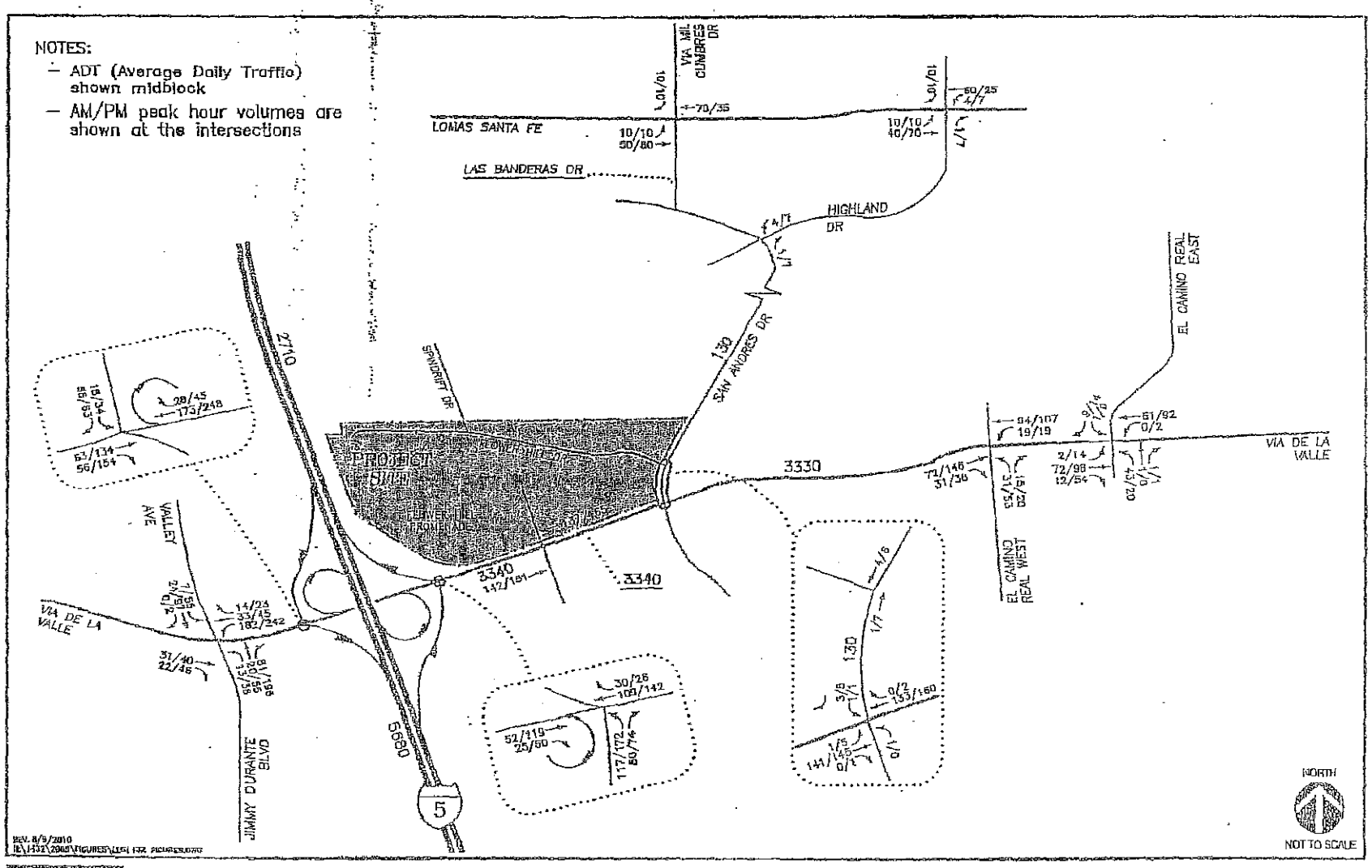
Intersection 4

Analyst:	Jacob Swim	E/W Street Name:	San Dieguito Rd.
Intersection:	El Camino Real at San Dieguito Road	N/S Street Name:	El Camino Real
Future Condition:	Other Projects		
Date:	7/21/2011		
Company:	Urban Systems Associates, Inc.		
Project Number:	000810		

57/.10 = 570 ADT

820
+ 570
1,390 ADT


Other Project Name: Cumulative Projects*
0 / 0
50 / 67
0 / 0
0 / 0
0 / 0

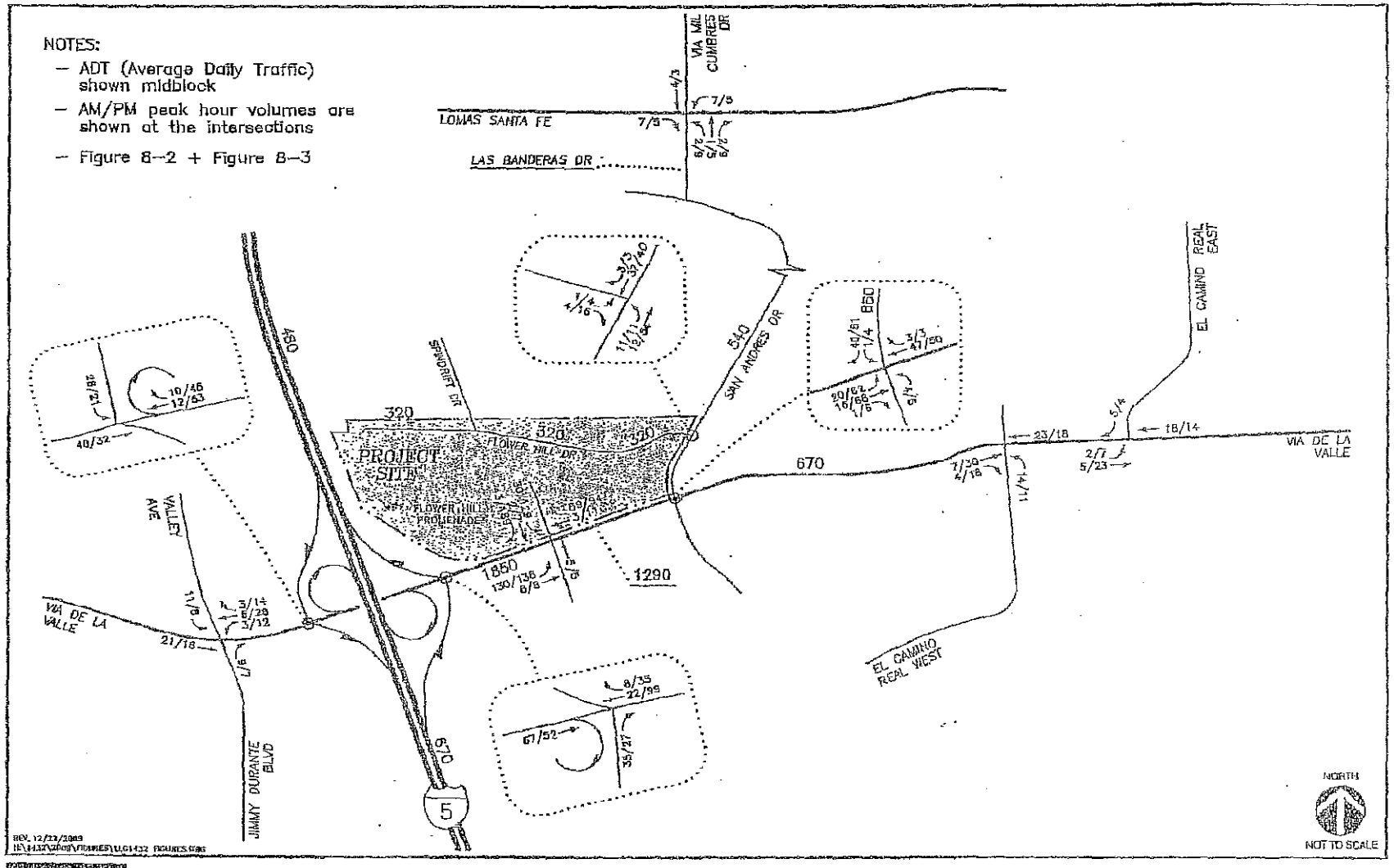


LinScott, Law & Greenspan, engineers

Figure 7-1

Cumulative Projects Traffic Volumes AM/PM Peak Hours & ADT

FLOWER HILL PROMENADE



LINSCOTT LAW & GREENSPAN

Figure 8-4

Total Project Traffic Volumes AM/PM Peak Hours & ADT

FLOWER HILL PROMENADE

4.0 Project Traffic

4.1 Project Traffic Generation

Trip rates from the SANDAG 'Brief Guide of Vehicular Traffic Generation Rates', April 2002, were utilized to determine the traffic generated by the project. *Table 2* shows the forecast trip generation for the project. It should be noted that the actual trip generation rates are likely to be lower than the SANDAG rates because the retail commercial will cater to the local residents, many of whom can walk to the site. In addition, it is expected that some existing trips will be avoided once the project is built, and local residents will no longer have to drive out of the community for some basic services. These trip reductions are not accounted for in this analysis; therefore, this study represents a "worst case" scenario.

As seen in *Table 2*, it is calculated that the proposed project will generate 1,202 ADT, with 64 inbound and 39 outbound trips during the AM peak hour, and 57 inbound and 71 outbound trips during the PM peak hour.

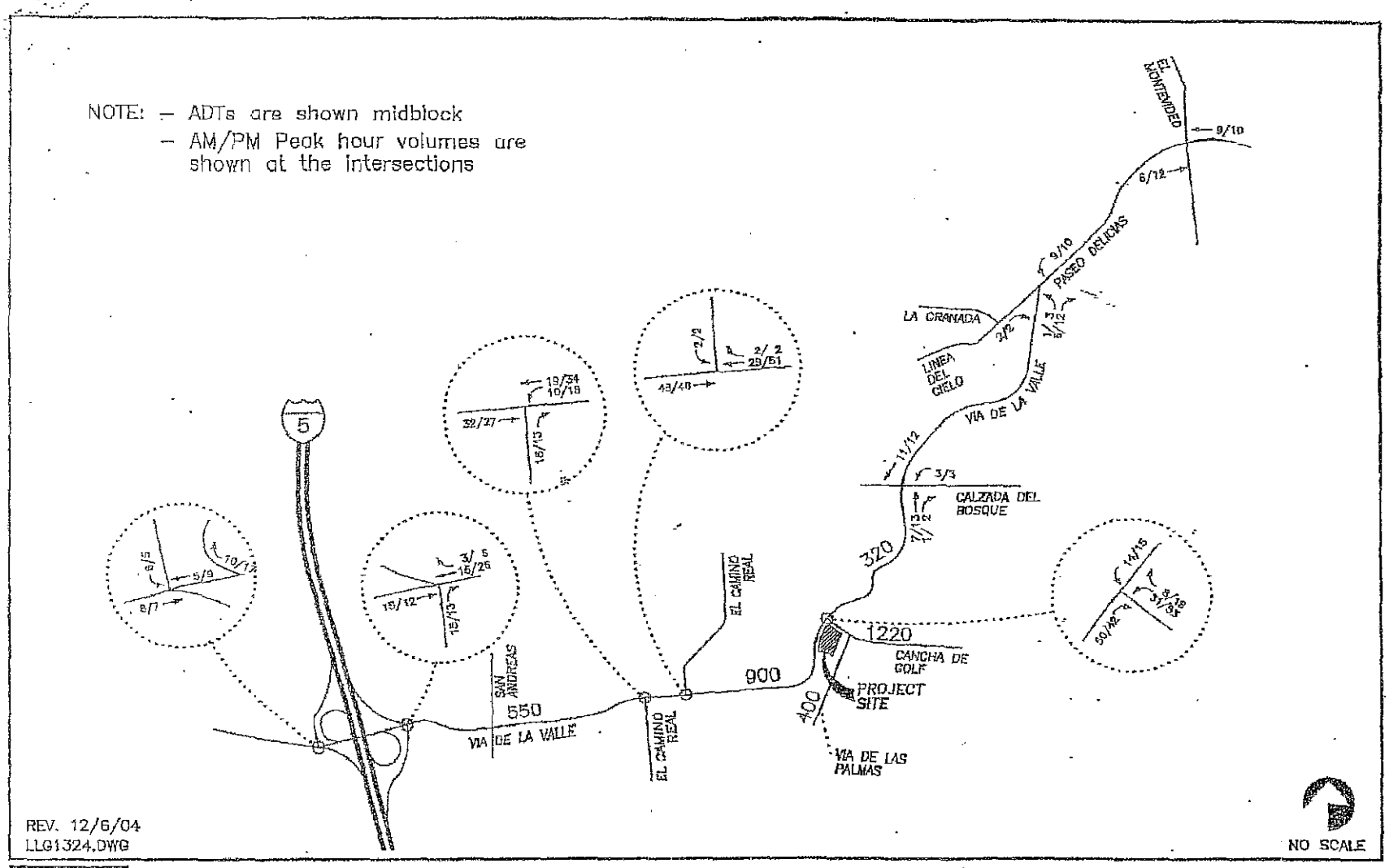
TABLE 2

PROJECT TRAFFIC GENERATION

USE		DAILY TRIP ENDS (ADT)		AM PEAK HOUR				PM PEAK HOUR			
		RATE	VOLUME	% OF ADT	IN:OUT SPLIT	VOLUME IN	VOLUME OUT	% OF ADT	IN:OUT SPLIT	VOLUME IN	VOLUME OUT
Apartment	54 U	8 / U	432	8%	2:8	8	28	9%	7:3	30	13
Retail	9,500 SF	40 / KSF	380	3%	6:4	7	5	9%	5:5	17	17
Office	19,500 SF	20 / KSF	390	14%	9:1	49	6	13%	2:8	10	41
TOTAL		-	1,202	-	-	64	39	-	-	57	71

Footnotes:
1. Generation rates obtained from the SANDAG Brief Guide (April 2002).
2. U – Unit
3. SF – Square Feet
4. KSF – 1,000 Square Feet.
5. Rate is a trip-end per unit or 1,000 square feet.

It should be noted that if the project makes any changes to the site uses as identified above, the project will be conditioned to provide an updated traffic impact study.



REV. 12/6/04
LLG1324.DWG

NO SCALE

LINSCOTT LAW & GREENSPAN
engineers

Figure 7C

TOTAL PROJECT TRAFFIC VOLUMES
AM/PM PEAK HOURS & ADTs

PALMA DE LA REINA

Black Mountain Ranch Project Trip Generation

Use	Amount	Trip	ADT	AM Peak Hour					PM Peak Hour				
				%*	#	In : Out	In	Out	%*	#	In : Out	In	Out
Mixed Uses	VTM + Phase 1-3		2,934	8%	235	2 : 8	47	188	10%	293	7 : 3	205	88
TOTAL			2,934		235		47	188		293		205	88

Notes:

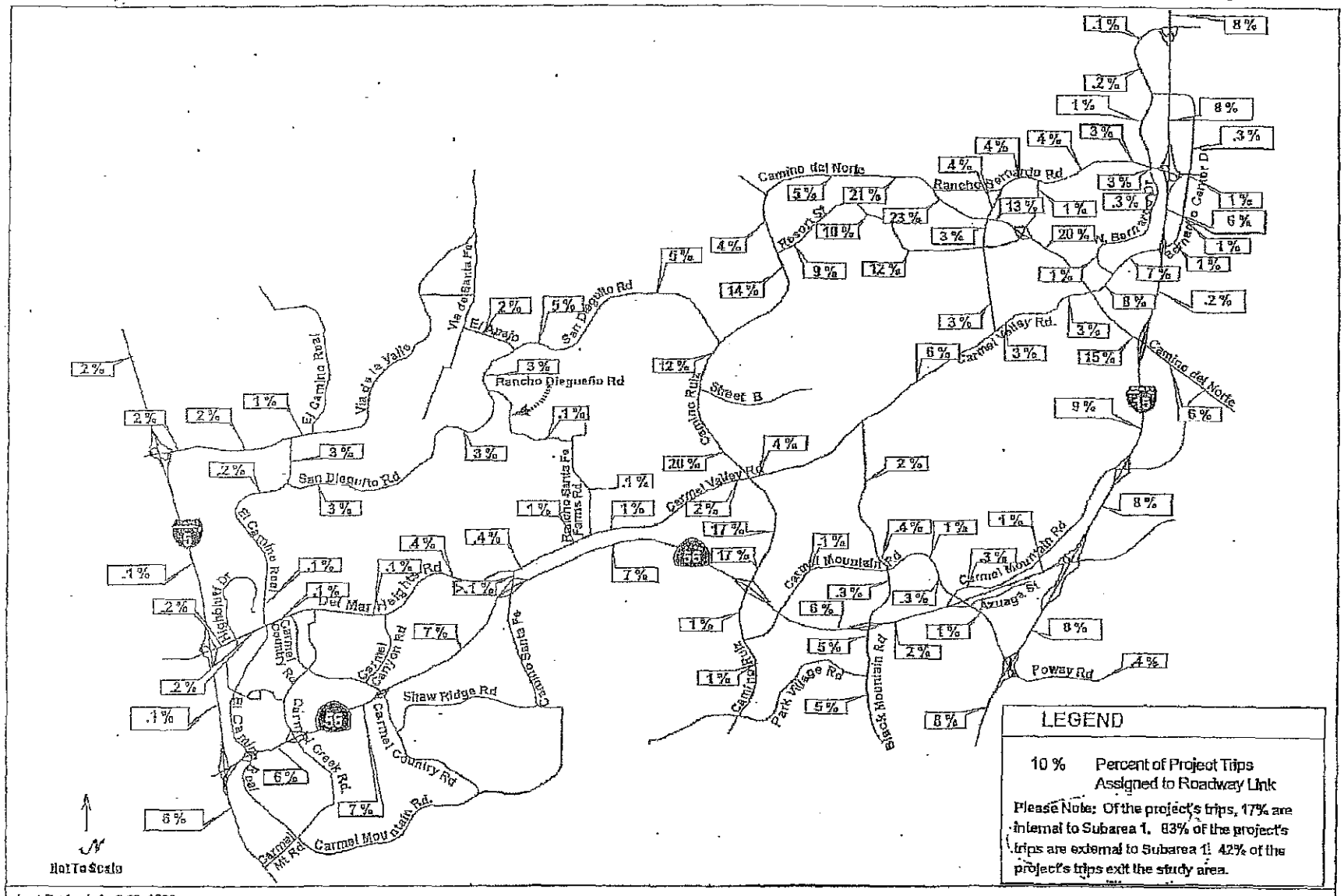
* = Source: City of San Diego Trip Generation Manual, May 2003

Assumed all remaining ADT in the Vesting Tentative Map (VTM) not yet built (1,220 ADT), see attached table

Assumed 10% of the remaining Phase 1-3 land uses that have started constuction (1,714 ADT), see attached table

Therefore, 1,220 ADT + 1,714 ADT = 2,934 ADT

Assumed Residential Peak Hour and In/Out Ratios in the trip generation table.



Last Revised: April 13, 1998.

Kelz, Olgiso & Associates

Figure 6a

Distribution of Project Trips

Black Mountain Ranch Subarea Plan
Circulation Impact Analysis

Black Mountain Ranch Land Uses

ESTIMATED % COMPLETE

Land Use	Units	Intensity	Daily Trip Rate (Vehicle Trips)	Total Daily Trips (Vehicle Trips)	Remaining ADT
VTM PHASE					
Black Mountain Ranch Land Uses Under VTM 95-0173					
Estate Residential	Dwelling Units	71	12	852 90	→ 85
Single Family Residential	Dwelling Units	871	10	8,710 100	
Affordable Housing	Dwelling Units	179	8	1,432 100	
Middle School	Acres	17	40	680 0	→ 680
Elementary School	Acres	10	60	600 100	
Church (2)	Acres (Total)	6	60	360 50	→ 180
Golf Course	Courses (Total)	1	600	600 100	
Neighborhood Park (2)	Acres (Total)	10	10	100 50	→ 50
Community Park	Acres	30	10	300 25	→ 225
Subtotals:	Dwelling Units:	1,121	Trips:	13,634	1,220 ADT
Black Mountain Ranch Land Uses Under Proposition C 1996 and VTM 99-1161					
Neighborhood Commercial	Thousand Sq. Feet	16	120	1,920 100	
Single Family Residential	Dwelling Units	218	10	2,180 100	Ø
Multi-Family Residential	Dwelling Units	42	8	336 100	
Subtotals:	Dwelling Units:	260	Trips:	4,436	
Perimeter Ownership Land Uses					
Single Family Residential	Dwelling Units	190	10	1,900 100	Ø
Affordable Housing	Dwelling Units	36	7	252 100	
Subtotals:	Dwelling Units:	226	Trips:	2,152	
VTM PHASE TOTALS:	**Dwelling Units:**	1,607	**Trips:**	20,222	1,220 ADT
PHASE I, II & III					
Phase I, II & III Black Mountain Ranch Ownership Land Uses					
Estate Residential	Dwelling Units	120	12	1,440 20	→ 1,152
Single Family Residential	Dwelling Units	1,600	10	16,000 30	→ 11,200
Multi-Family Residential	Dwelling Units	830	8	6,640 20	→ 4,648
Age Restricted Residential	Dwelling Units	500	4	2,000 0	
High School (portion)	Acres	40	50	2,000 100	
Middle School	Acres	20	40	800 0	
Elementary School	Acres	10	60	600 100	
Employment Center	Thousand Sq. Feet	450	16	7,200 0	
Neighborhood/ Community Shopping	Thousand Sq. Feet	225	70	15,750 0	
Office	Thousand Sq. Feet	65	20	1,300 0	
Hotel	Rooms	300	8	2,400 0	
Neighborhood Park	Acres	7	40	280 50	→ 140
Subtotals:	Dwelling Units:	3,050	Trips:	56,410	17,140 ADT
Phase I, II & III Perimeter Ownership Land Uses					
SW Perimeter – Single Family	Dwelling Units	79	10	790 0	
SW Perimeter - Affordable	Dwelling Units	15	8	120 0	
SE Perimeter – Single Family	Dwelling Units	293	10	2,930 0	
SE Perimeter - Affordable	Dwelling Units	56	8	448 0	Ø
NE Perimeter – Multi- Family	Dwelling Units	252	8	2,016 0	
NE Perimeter - Affordable	Dwelling Units	48	8	384 0	
Subtotals:	Dwelling Units:	743	Trips:	6,688	
PHASE I, II & III TOTALS:	Dwelling Units:	3,793	Trips:	63,098	
TOTAL DWELLING UNITS BLACK MOUNTAIN RANCH SUBAREA I		5,400			
TOTAL TRIPS BLACK MOUNTAIN RANCH SUBAREA I				83,320*	

* Note: Original Subarea Plan EIR, Table 4B-6, shows the total approved trips as 84,206. The difference is mainly due to the deletion of the south High School and other small changes over time.

Assumptions:
VTM = 1,220 ADT
10% of Phase I, II, III = 1,714 ⇒ Total Assumed for 2016 = 1,220 + 1,714 = 2,934 ADT

Project Only

Intersection 1

Analyst: Jacob Swim
Intersection: Via de la Valle at El Camino Real
Future Condition: Project Only
Date: 7/21/2011
Company: Urban Systems Associates, Inc.
Project Number: 000810

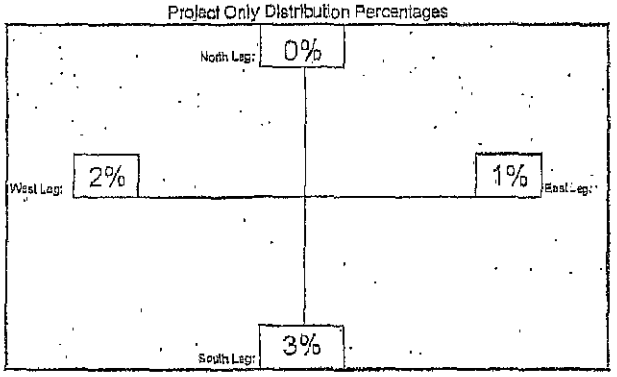
E/W Street Name: Via de la Valle
N/S Street Name: El Camino Real

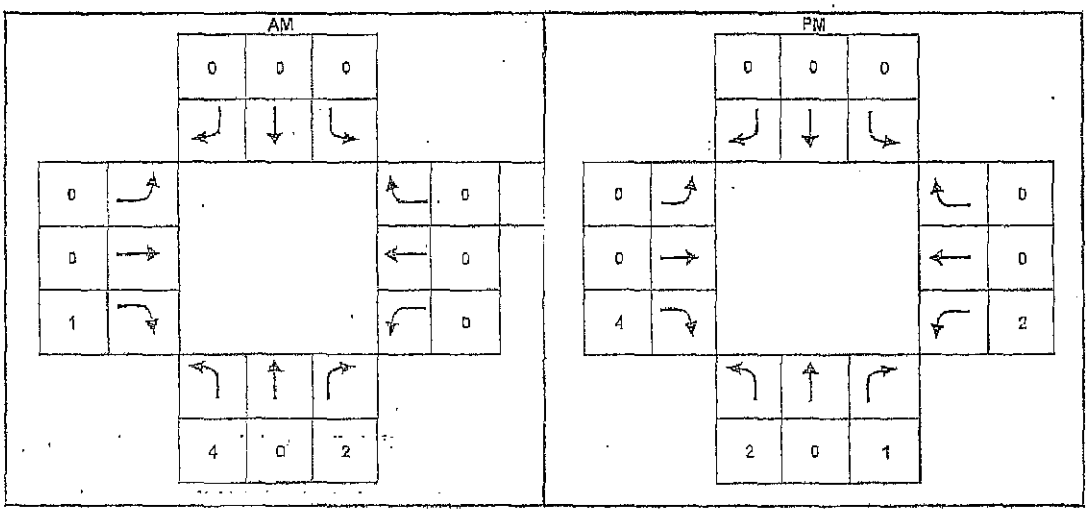
Direction of Project

Black Mountain Ranch

	ADT	AM Peak			PM Peak		
		#	In	Out	#	In	Out
Total	2,934	235	47	188	293	205	88

Project Only Distribution Percentages





Turn Movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	4	2
NTH	0	0
NRT	2	1
SLT	0	0
STH	0	0
SRT	0	0
ELT	0	0
ETH	0	0
ERT	1	4
WLT	0	2
WTH	0	0
WRT	0	0

Project Only

Intersection 2

Analyst: Jacob Swim
Intersection: Via de la Valle at El Camino Real (N)
Future Condition: Project Only
Date: 7/21/2011
Company: Urban Systems Associates, Inc.
Project Number: 000810

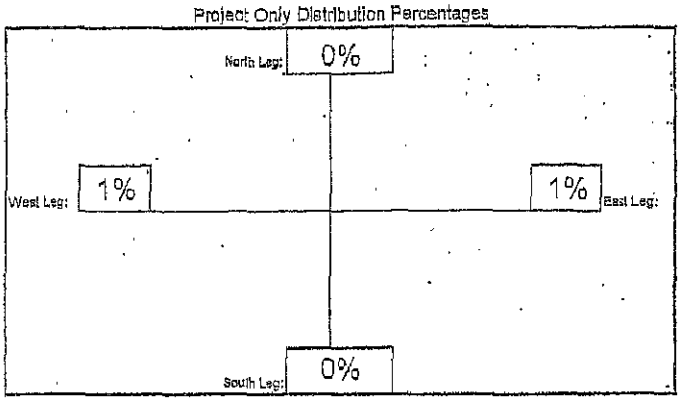
E/W Street Name: Via de la Valle
N/S Street Name: El Camino Real (N)

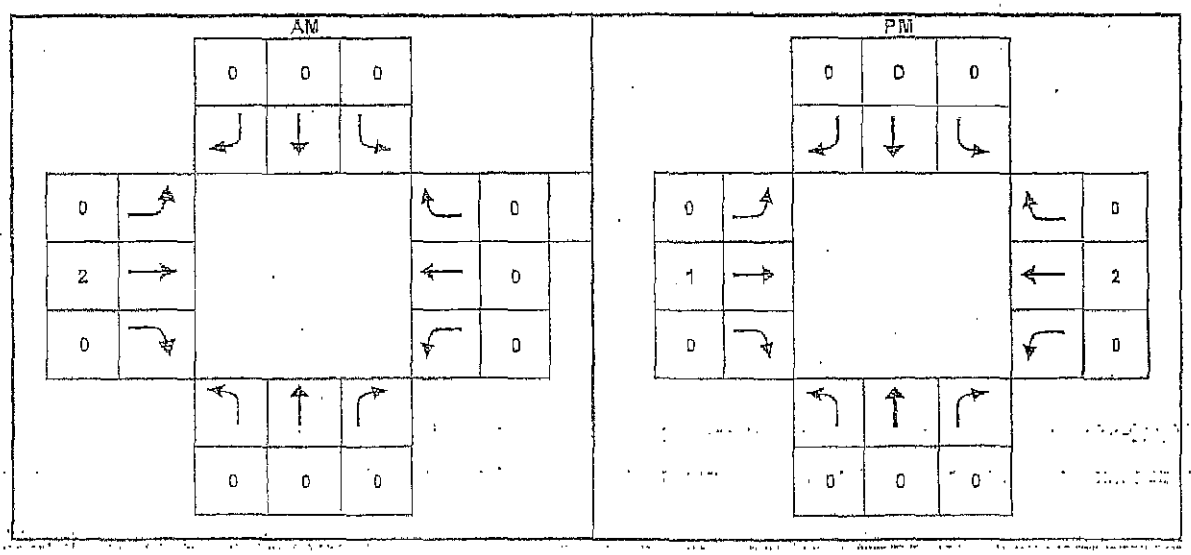
Direction of Project

Black Mountain Ranch

	ADT	AM Peak			PM Peak		
		#	In	Out	#	In	Out
Total	2,934	235	47	188	293	205	88

Project Only Distribution Percentages





Turn Movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	0	0
NRT	0	0
SLT	0	0
STH	0	0
SRT	0	0
ELT	0	0
ETH	2	1
ERT	0	0
WLT	0	0
WTH	0	2
WRT	0	0

Project Only

Intersection 3

Analyst: Jacob Swim
Intersection: El Camino Real at Horse Park / Polo Grounds
Future Condition: Project Only
Date: 7/21/2011
Company: Urban Systems Associates, Inc.
Project Number: 000810

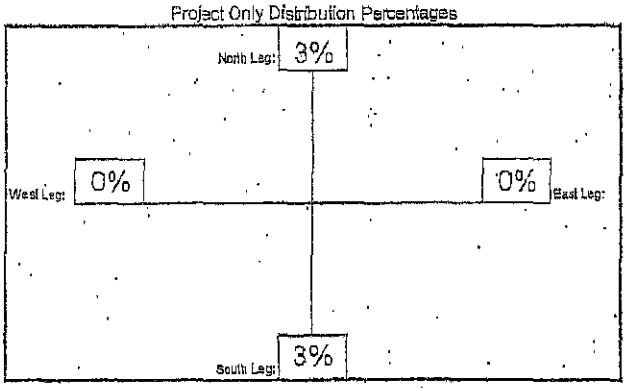
E/W Street Name: Horse Park/Polo
N/S Street Name: El Camino Real

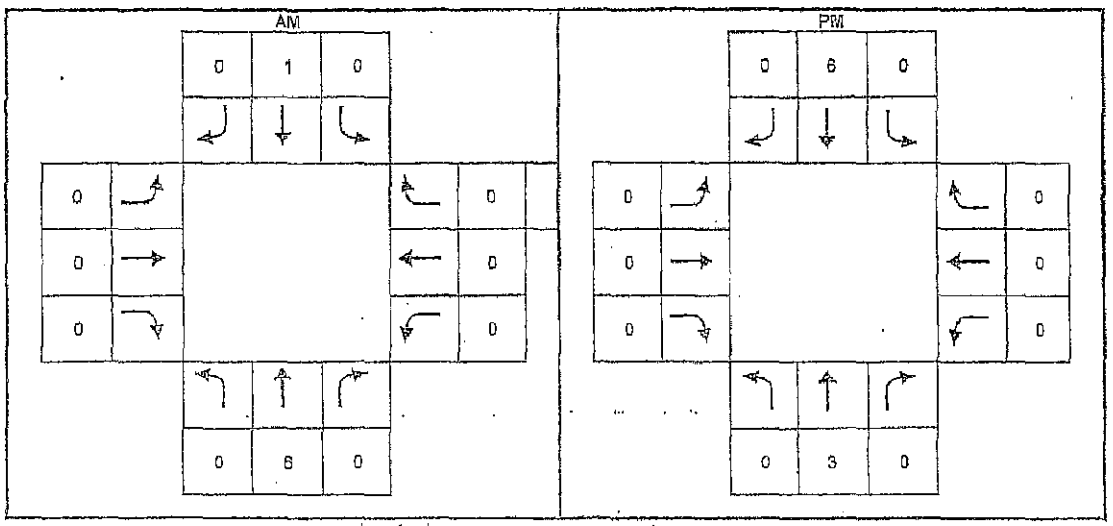
Direction of Project

Black Mountain Ranch

	ADT	AM Peak			PM Peak		
		#	In	Out	#	In	Out
Total	2,934	235	47	188	293	205	88

Project Only Distribution Percentages





Turn Movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	6	3
NRT	0	0
SLT	0	0
STH	1	6
SRT	0	0
ELT	0	0
ETH	0	0
ERT	0	0
WLT	0	0
WTH	0	0
WRT	0	0

Signalized

Project Only

Intersection 4

Analyst: Jacob Swim
Intersection: El Camino Real at San Dieguito Road
Future Condition: Project Only
Date: 7/21/2011
Company: Urban Systems Associates, Inc.
Project Number: 000810

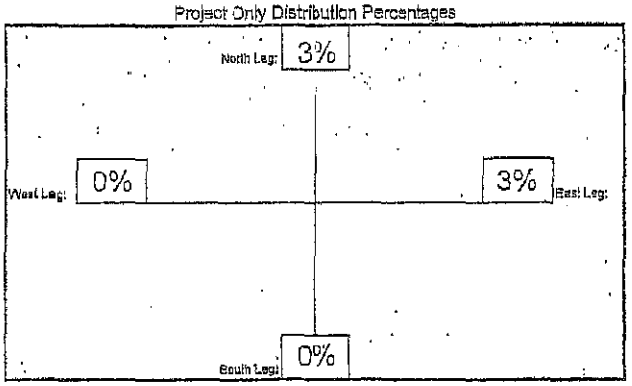
E/W Street Name: San Dieguito Rd.
N/S Street Name: El Camino Real

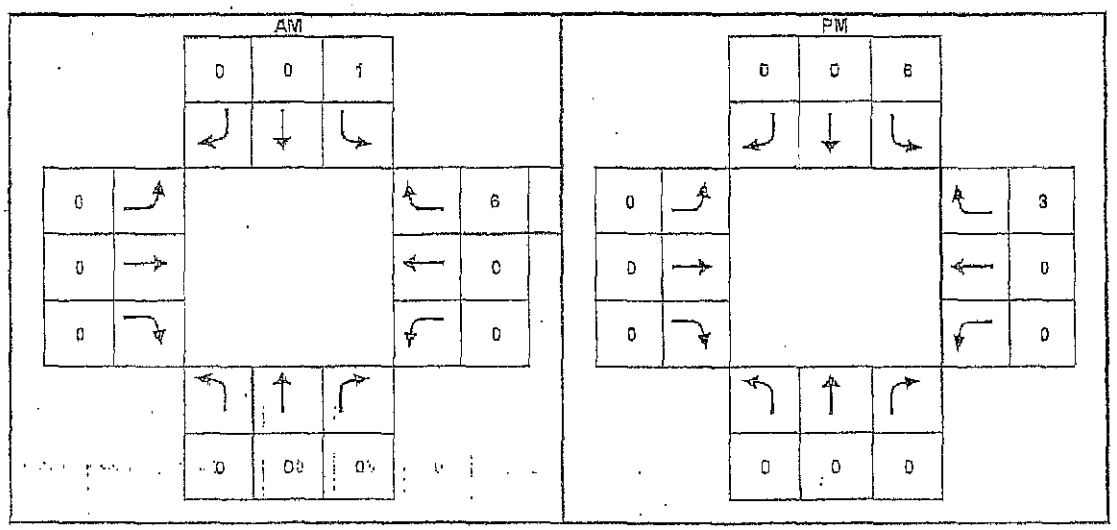
Direction of Project

Black Mountain Ranch

	ADT	AM Peak			PM Peak		
		#	In	Out	#	In	Out
Total	2,934	235	47	188	293	205	88

Project Only Distribution Percentages





Turn Movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	0	0
NRT	0	0
SLT	1	6
STH	0	0
SRT	0	0
ELT	0	0
ETH	0	0
ERT	0	0
WLT	0	0
WTH	0	0
WRT	6	3

Signalized

Project Only

Intersection 5

Analyst: Jacob Swim
Intersection: Old El Camino Real at San Dieguito Road
Future Condition: Project Only
Date: 7/21/2011
Company: Urban Systems Associates, Inc.
Project Number: 000810

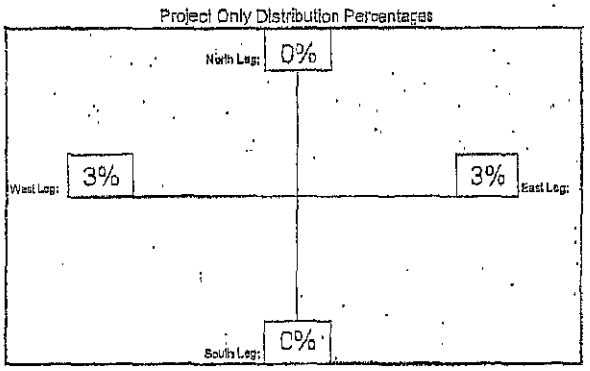
E/W Street Name: San Dieguito Rd.
N/S Street Name: Old El Camino Real

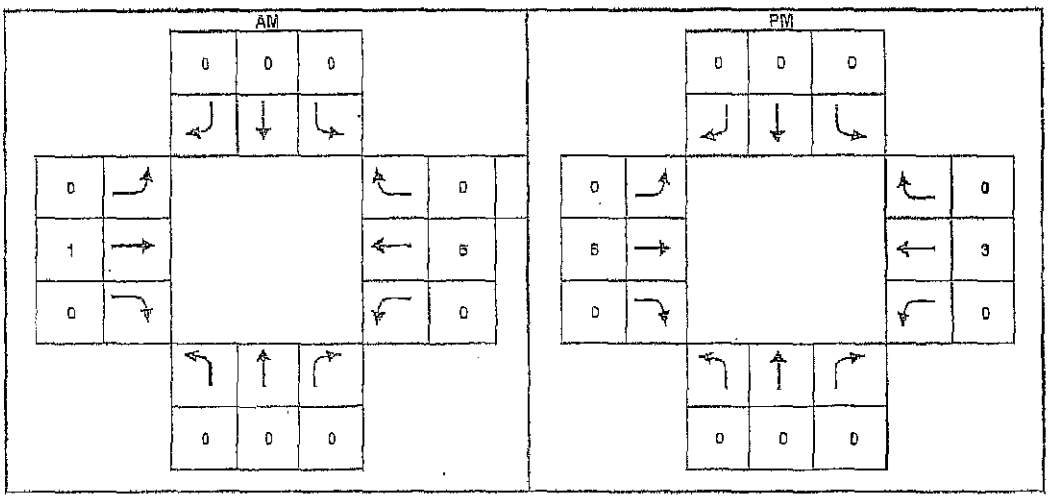
Direction of Project

Black Mountain Ranch

	ADT	AM Peak			PM Peak		
		#	In	Out	#	In	Out
Total	2,934	235	47	188	293	205	88

Project Only Distribution Percentages





Turn Movement	Project Only turn (v) AM	Project Only turn (v) PM
NLT	0	0
NTH	0	0
NRT	0	0
SLT	0	0
STH	0	0
SRT	0	0
ELT	0	0
ETH	1	6
ERT	0	0
WLT	0	0
WTH	6	3
WRT	0	0

Signalized

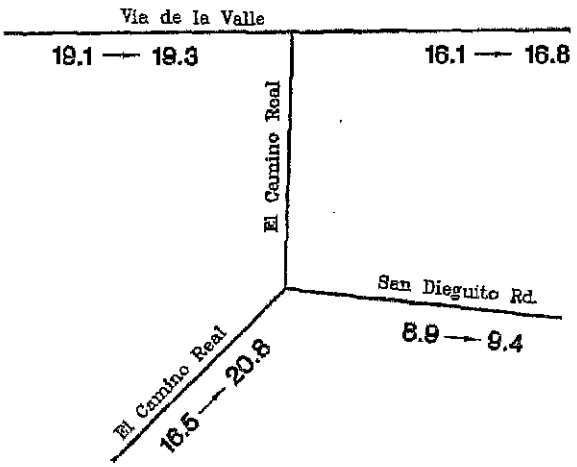
APPENDIX E

(EXISTING PLUS PROJECT ANALYSIS)

A. REDISTRIBUTION TRAFFIC MODELING

B. HCS ANALYSIS WORSHEETS

REASSIGNMENT MODELING RESULTS (2 LANE VS. 4 LANE)



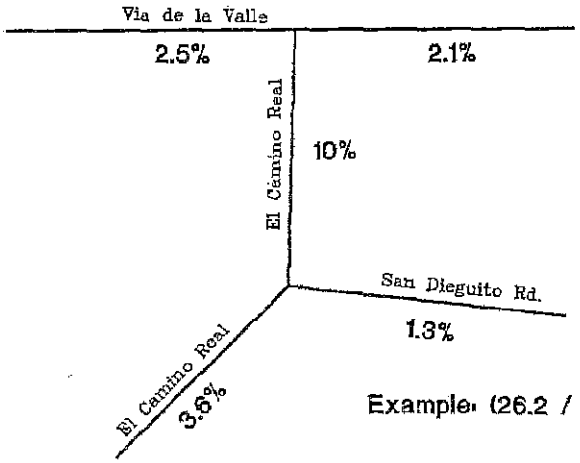
CORDON CHECK - CHANGE DUE TO REDISTRIBUTION

Unadjusted Before (2 lns)	Unadjusted After (4 lns)
19.1	19.3
16.1	16.8
8.9	9.4
16.5	20.8
60.6	66.3

Change = (66.3-60.6)/60.6 = 9.4%

Use 10%

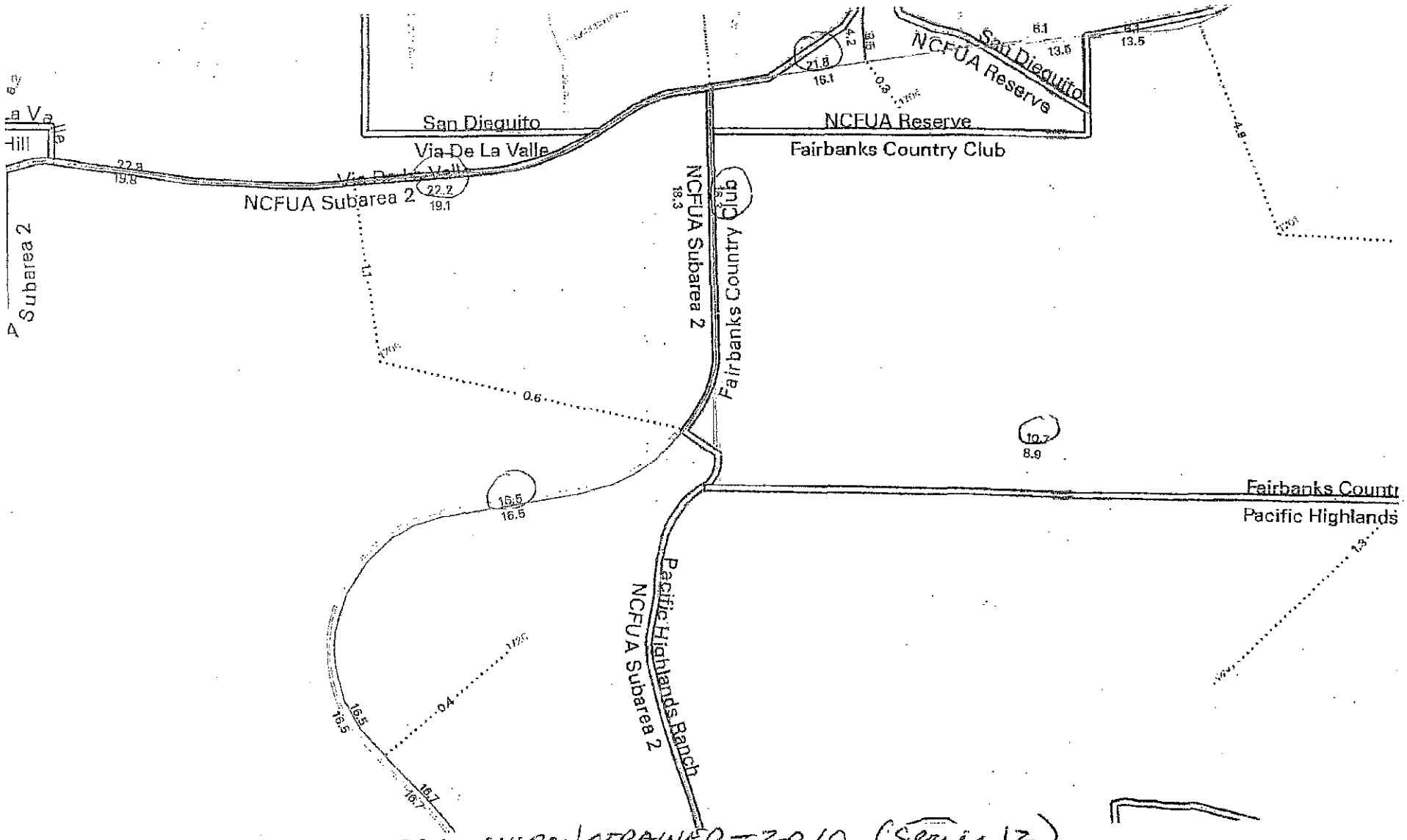
PERCENT CHANGE - DUE TO PROJECT



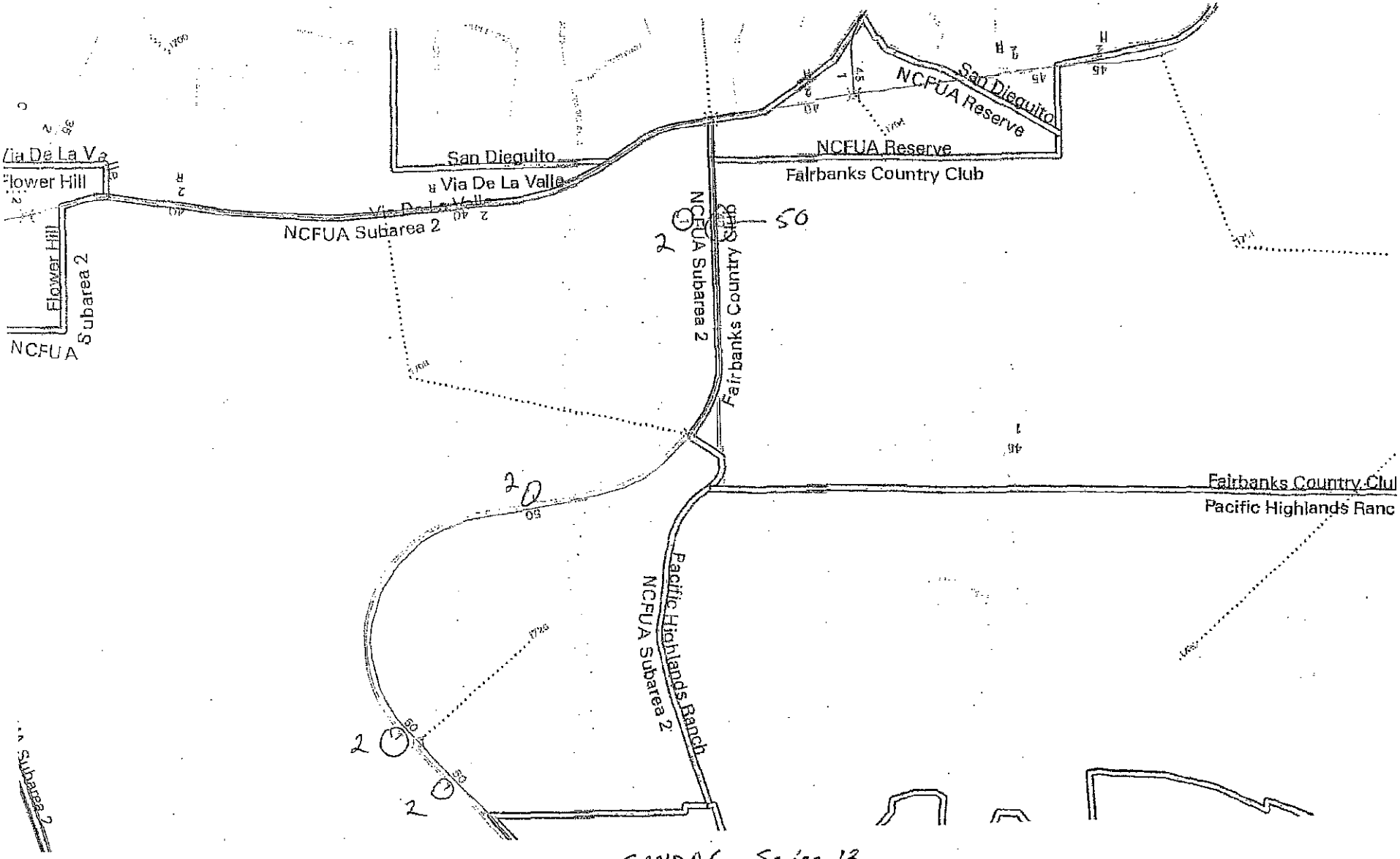
SUM

2.5
2.1
1.3
3.6
9.5
+2 Centriod Loads

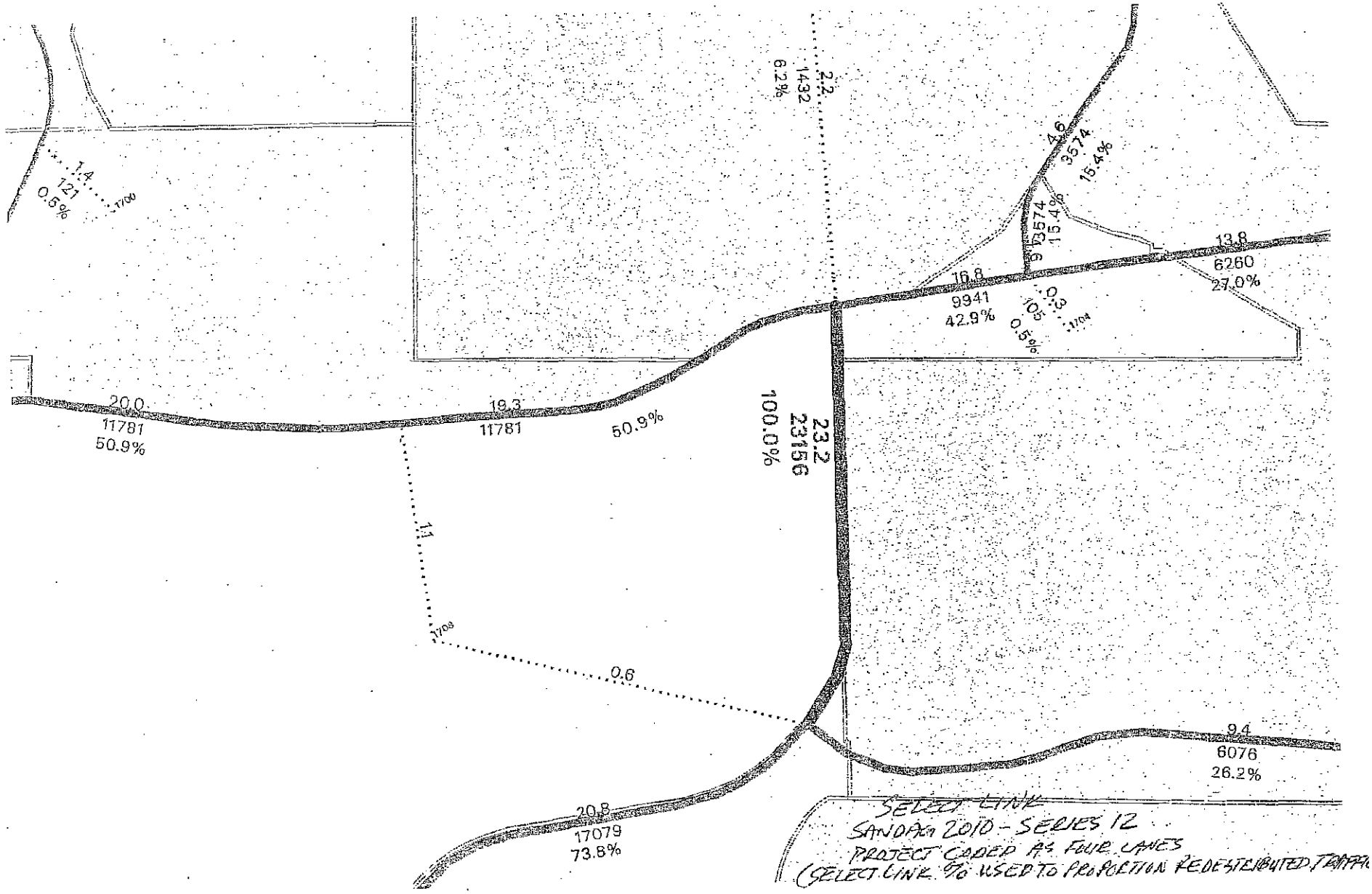
Example: (26.2 / 2) x 0.10 = 1.3%



SANDAG - UNCONSTRAINED - 2010 (Series 12)
ADJUSTED VOLUMES IN BLACK (CIRCLED)



SANDAG Series 12
2010 Unconstrained
Highway Network


1.4
121
0.5%
1/100
2.2
1432
6.2%
4.6
3574
15.4%
1.6
3574
15.4%
13.8
6260
27.0%
16.8
9941
42.9%
0.3
10.5
0.5%
1/104
20.0
11781
50.9%
19.3
11781
50.9%
23.2
23156
100.0%
1.1
1/108
0.6
9.4
6076
26.2%
20.8
17079
73.8%
SELECT LINK
SANDAG 2010 - SERIES 12
PROJECT CODED AS FOUR LANES
(SELECT LINK % USED TO PROPORTION REDISTRIBUTED TRAFFIC

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	326	340	365	541	1	519	1	120	0	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3538		1681	1686	1583		1863	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3538		1681	1686	1583		1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	362	378	406	601	1	577	1	133	0	3	0
RTOR Reduction (vph)	0	0	284	0	0	0	0	0	99	0	0	0
Lane Group Flow (vph)	3	362	94	406	602	0	288	290	34	0	3	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.6	18.4	18.4	14.3	32.1		19.1	19.1	19.1		5.9	
Effective Green, g (s)	0.6	18.4	18.4	14.3	32.1		19.1	19.1	19.1		5.9	
Actuated g/C Ratio	0.01	0.25	0.25	0.19	0.44		0.26	0.26	0.26		0.08	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	14	884	395	666	1541		436	437	410		149	
v/s Ratio Prot	0.00	0.10		c0.12	c0.17		0.17	c0.17			c0.00	
v/s Ratio Perm			0.06						0.02			
v/c Ratio	0.21	0.41	0.24	0.61	0.39		0.66	0.66	0.08		0.02	
Uniform Delay, d1	36.3	23.1	22.1	27.1	14.1		24.4	24.4	20.7		31.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	7.6	0.3	0.3	1.5	0.2		3.7	3.8	0.1		0.1	
Delay (s)	43.9	23.4	22.4	28.7	14.3		28.1	28.2	20.8		31.3	
Level of Service	D	C	C	C	B		C	C	C		C	
Approach Delay (s)		23.0			20.1			26.8			31.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	63	356	662	33	14	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	70	396	736	37	16	252
RTOR Reduction (vph)	0	0	0	24	0	209
Lane Group Flow (vph)	70	396	736	13	16	43
Turn Type	Prot			Perm		custom
Protected Phases	5	2	6		4	
Permitted Phases				6		7
Actuated Green, G (s)	2.6	21.7	15.1	15.1	0.9	7.1
Effective Green, g (s)	2.6	21.7	15.1	15.1	0.9	7.1
Actuated g/C Ratio	0.06	0.52	0.36	0.36	0.02	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	110	1842	1282	573	38	270
v/s Ratio Prot	c0.04	0.11	c0.21		c0.01	
v/s Ratio Perm				0.01		c0.03
v/c Ratio	0.64	0.21	0.57	0.02	0.42	0.16
Uniform Delay, d1	19.1	5.4	10.7	8.6	20.1	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5	0.1	0.6	0.0	7.4	0.3
Delay (s)	30.5	5.5	11.3	8.6	27.5	15.0
Level of Service	C	A	B	A	C	B
Approach Delay (s)		8.2	11.2		15.8	
Approach LOS		A	B		B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	41.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	1	0	0	0	5	561	0	0	764	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0					4.0	4.0			4.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frt		0.96					1.00	1.00			1.00	
Flt Protected		0.97					0.95	1.00			1.00	
Satd. Flow (prot)		1722					1770	3539			3530	
Flt Permitted		0.97					0.95	1.00			1.00	
Satd. Flow (perm)		1722					1770	3539			3530	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	1	0	0	0	5	610	0	0	830	15
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	0	0	5	610	0	0	844	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)		5.8					0.9	22.3			17.4	
Effective Green, g (s)		5.8					0.9	22.3			17.4	
Actuated g/C Ratio		0.13					0.02	0.49			0.38	
Clearance Time (s)		4.0					4.0	4.0			4.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		218					35	1723			1341	
v/s Ratio Prot		c0.00					0.00	c0.17			c0.24	
v/s Ratio Perm												
v/c Ratio		0.01					0.14	0.35			0.63	
Uniform Delay, d1		17.5					22.1	7.3			11.6	
Progression Factor		1.00					1.00	1.00			1.00	
Incremental Delay, d2		0.0					1.9	0.1			0.9	
Delay (s)		17.5					23.9	7.4			12.5	
Level of Service		B					C	A			B	
Approach Delay (s)		17.5			0.0			7.5			12.5	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	45.8	Sum of lost time (s)	21.7
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	227	250	238	523	513	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95	0.97	0.91
Frt		1.00	0.85	1.00	1.00	0.98	0.85
Flt Protected		1.00	1.00	0.95	1.00	0.96	1.00
Satd. Flow (prot)		3539	1583	3433	3539	3397	1441
Flt Permitted		1.00	1.00	0.95	1.00	0.96	1.00
Satd. Flow (perm)		3539	1583	3433	3539	3397	1441
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	252	278	264	581	570	378
RTOR Reduction (vph)	0	0	218	0	0	10	197
Lane Group Flow (vph)	0	252	60	264	581	643	98
Turn Type	Prot		Perm	Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases			8				6
Actuated Green, G (s)		10.5	10.5	10.0	24.5	16.1	16.1
Effective Green, g (s)		10.5	10.5	10.0	24.5	16.1	16.1
Actuated g/C Ratio		0.22	0.22	0.21	0.50	0.33	0.33
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		765	342	706	1784	1125	477
v/s Ratio Prot		0.07		0.06	c0.16	c0.19	
v/s Ratio Perm			0.04				0.07
v/c Ratio		0.33	0.18	0.37	0.33	0.57	0.20
Uniform Delay, d1		16.1	15.5	16.6	7.1	13.4	11.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3	0.2	0.3	0.1	0.7	0.2
Delay (s)		16.3	15.8	16.9	7.3	14.1	11.9
Level of Service		B	B	B	A	B	B
Approach Delay (s)		16.0			10.3	13.4	
Approach LOS		B			B	B	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	48.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	532	19	6	857	16	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	591	21	7	952	18	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			612		1091	306
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			612		1091	306
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		91	97
cM capacity (veh/h)			963		208	690

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	394	218	324	635	18	20
Volume Left	0	0	7	0	18	0
Volume Right	0	21	0	0	0	20
cSH	1700	1700	963	1700	208	690
Volume to Capacity	0.23	0.13	0.01	0.37	0.09	0.03
Queue Length 95th (ft)	0	0	1	0	7	2
Control Delay (s)	0.0	0.0	0.3	0.0	23.9	10.4
Lane LOS			A		C	B
Approach Delay (s)	0.0		0.1		16.8	
Approach LOS					C	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	384	417	158	381	7	579	6	475	0	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3529		1681	1687	1583		1812	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3529		1681	1687	1583		1812	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	427	463	176	423	8	643	7	528	0	4	1
RTOR Reduction (vph)	0	0	335	0	1	0	0	0	340	0	1	0
Lane Group Flow (vph)	12	427	128	176	430	0	328	322	188	0	4	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.6	22.9	22.9	10.3	32.6		27.4	27.4	27.4		6.1	
Effective Green, g (s)	0.6	22.9	22.9	10.3	32.6		27.4	27.4	27.4		6.1	
Actuated g/C Ratio	0.01	0.28	0.28	0.12	0.39		0.33	0.33	0.33		0.07	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	13	980	438	428	1391		557	559	524		134	
v/s Ratio Prot	0.01	c0.12		c0.05	0.12		c0.20	0.19			c0.00	
v/s Ratio Perm			0.08						0.12			
v/c Ratio	0.92	0.44	0.29	0.41	0.31		0.59	0.58	0.36		0.03	
Uniform Delay, d1	41.0	24.6	23.5	33.4	17.3		23.0	22.8	21.0		35.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	207.3	0.3	0.4	0.6	0.1		1.6	1.4	0.4		0.1	
Delay (s)	248.3	24.9	23.9	34.0	17.4		24.6	24.3	21.4		35.6	
Level of Service	F	C	C	C	B		C	C	C		D	
Approach Delay (s)		27.4			22.2			23.1			35.6	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	82.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	217	569	380	13	22	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	241	632	422	14	24	94
RTOR Reduction (vph)	0	0	0	10	0	79
Lane Group Flow (vph)	241	632	422	4	24	15
Turn Type	Prot			Perm		custom
Protected Phases	5	2	6		4	
Permitted Phases				6		7
Actuated Green, G (s)	6.2	21.0	10.8	10.8	1.0	6.3
Effective Green, g (s)	6.2	21.0	10.8	10.8	1.0	6.3
Actuated g/C Ratio	0.15	0.52	0.27	0.27	0.02	0.16
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	272	1844	948	424	44	247
v/s Ratio Prot	c0.14	0.18	c0.12		c0.01	
v/s Ratio Perm				0.00		c0.01
v/c Ratio	0.89	0.34	0.45	0.01	0.55	0.06
Uniform Delay, d1	16.7	5.6	12.3	10.8	19.4	14.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.2	0.1	0.3	0.0	13.1	0.1
Delay (s)	43.9	5.7	12.6	10.8	32.5	14.6
Level of Service	D	A	B	B	C	B
Approach Delay (s)		16.3	12.5		18.2	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	40.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	32	0	30	24	0	292	12	762	15	22	575	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frt		0.94			0.87	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1698			1533	1504	1770	3529		1770	3525	
Flt Permitted		0.97			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1698			1533	1504	1770	3529		1770	3525	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	36	0	33	27	0	324	13	847	17	24	639	18
RTOR Reduction (vph)	0	29	0	0	128	175	0	2	0	0	2	0
Lane Group Flow (vph)	0	40	0	0	48	0	13	862	0	24	655	0
Turn Type	Split			Split		NA	Prot			Prot		
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)		7.3			7.6	0.0	0.7	21.8		1.2	22.3	
Effective Green, g (s)		7.3			7.6	0.0	0.7	21.8		1.2	22.3	
Actuated g/C Ratio		0.14			0.14	0.00	0.01	0.40		0.02	0.41	
Clearance Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		230			216	0	23	1427		39	1458	
v/s Ratio Prot		c0.02			c0.03		0.01	c0.24		c0.01	0.19	
v/s Ratio Perm												
v/c Ratio		0.18			0.22	0.00	0.57	0.60		0.62	0.45	
Uniform Delay, d1		20.6			20.5	27.0	26.4	12.6		26.1	11.4	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.5	0.0	28.1	0.7		25.5	0.2	
Delay (s)		21.0			21.1	27.0	54.6	13.4		51.6	11.6	
Level of Service		C			C	C	D	B		D	B	
Approach Delay (s)		21.0			24.0			14.0			13.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	53.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	573	380	313	318	215	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95	0.97	0.91
Frt		1.00	0.85	1.00	1.00	0.94	0.85
Flt Protected		1.00	1.00	0.95	1.00	0.97	1.00
Satd. Flow (prot)		3539	1583	3433	3539	3307	1441
Flt Permitted		1.00	1.00	0.95	1.00	0.97	1.00
Satd. Flow (perm)		3539	1583	3433	3539	3307	1441
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	637	422	348	353	239	320
RTOR Reduction (vph)	0	0	266	0	0	102	142
Lane Group Flow (vph)	0	637	156	348	353	281	34
Turn Type	Prot		Perm	Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases			8				6
Actuated Green, G (s)		20.4	20.4	11.9	36.3	10.8	10.8
Effective Green, g (s)		20.4	20.4	11.9	36.3	10.8	10.8
Actuated g/C Ratio		0.37	0.37	0.22	0.66	0.20	0.20
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1310	586	741	2332	648	282
v/s Ratio Prot		c0.18		c0.10	0.10	c0.08	
v/s Ratio Perm			0.10				0.02
v/c Ratio		0.49	0.27	0.47	0.15	0.43	0.12
Uniform Delay, d1		13.3	12.1	18.8	3.6	19.5	18.2
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3	0.2	0.5	0.0	0.5	0.2
Delay (s)		13.6	12.4	19.3	3.6	19.9	18.4
Level of Service		B	B	B	A	B	B
Approach Delay (s)		13.1			11.4	19.5	
Approach LOS		B			B	B	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	660	27	7	428	36	41
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	733	30	8	476	40	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			763		1002	382
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			763		1002	382
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		83	93
cM capacity (veh/h)			845		237	616

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	489	274	166	317	86
Volume Left	0	0	8	0	40
Volume Right	0	30	0	0	46
cSH	1700	1700	845	1700	352
Volume to Capacity	0.29	0.16	0.01	0.19	0.24
Queue Length 95th (ft)	0	0	1	0	23
Control Delay (s)	0.0	0.0	0.5	0.0	18.5
Lane LOS			A		C
Approach Delay (s)	0.0		0.2		18.5
Approach LOS					C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX F

OPENING DAY ANALYSIS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	430	360	377	664	1	555	1	151	0	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1862			1774	1583		1863	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1862			1774	1583		1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	478	400	419	738	1	617	1	168	0	3	0
RTOR Reduction (vph)	0	0	211	0	0	0	0	0	70	0	0	0
Lane Group Flow (vph)	3	478	189	419	739	0	0	618	98	0	3	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.8	40.2	40.2	33.0	72.4			48.0	48.0		5.8	
Effective Green, g (s)	0.8	40.2	40.2	33.0	72.4			48.0	48.0		5.8	
Actuated g/C Ratio	0.01	0.28	0.28	0.23	0.51			0.34	0.34		0.04	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	10	524	445	408	943			595	531		76	
v/s Ratio Prot	0.00	c0.26		c0.24	0.40			c0.35			c0.00	
v/s Ratio Perm			0.12						0.06			
v/c Ratio	0.30	0.91	0.43	1.03	0.78			1.04	0.18		0.04	
Uniform Delay, d1	70.8	49.7	42.0	55.0	28.9			47.5	33.6		65.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	16.1	20.2	0.7	51.6	4.3			47.3	0.2		0.2	
Delay (s)	87.0	69.9	42.6	106.6	33.2			94.8	33.8		66.1	
Level of Service	F	E	D	F	C			F	C		E	
Approach Delay (s)		57.6			59.8			81.8			66.1	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM Average Control Delay	65.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	143.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WB	WBR	NBL	NBT	NBR	SBL	SB	SBR
Lane Configurations												
Volume (vph)	67	477	12	0	756	35	43	1	1	16	1	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00			1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00		0.95			0.95	1.00
Satd. Flow (prot)	1770	1856			1863	1583		1773			1779	1583
Flt Permitted	0.95	1.00			1.00	1.00		0.95			0.95	1.00
Satd. Flow (perm)	1770	1856			1863	1583		1773			1779	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	74	530	13	0	840	39	48	1	1	18	1	262
RTOR Reduction (vph)	0	0	0	0	0	11	0	1	0	0	0	241
Lane Group Flow (vph)	74	543	0	0	840	28	0	49	0	0	19	21
Turn Type	Prot			Prot		Perm	Split			Split		custom
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						7
Actuated Green, G (s)	5.1	64.9			55.8	55.8		6.8			2.7	7.8
Effective Green, g (s)	5.1	64.9			55.8	55.8		6.8			2.7	7.8
Actuated g/C Ratio	0.05	0.66			0.57	0.57		0.07			0.03	0.08
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	92	1227			1059	900		123			49	126
v/s Ratio Prot	c0.04	0.29			c0.45			c0.03			c0.01	
v/s Ratio Perm						0.02						c0.01
v/c Ratio	0.80	0.44			0.79	0.03		0.40			0.39	0.17
Uniform Delay, d1	46.1	8.0			16.7	9.3		43.7			46.9	42.2
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	38.2	0.3			4.2	0.0		2.1			5.0	0.6
Delay (s)	84.2	8.2			20.8	9.3		45.9			52.0	42.8
Level of Service	F	A			C	A		D			D	D
Approach Delay (s)		17.3			20.3			45.9			43.4	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	1	0	0	0	5	600	0	0	783	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	1	0	0	0	5	652	0	0	851	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											671	
pX, platoon unblocked												
vC, conflicting volume	1522	1522	859	1523	1529	652	866			652		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1522	1522	859	1523	1529	652	866			652		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	100	99			100		
cM capacity (veh/h)	96	118	356	96	116	468	777			934		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	3	0	658	866
Volume Left	2	0	5	0
Volume Right	1	0	0	15
cSH	127	1700	777	934
Volume to Capacity	0.03	0.00	0.01	0.00
Queue Length 95th (ft)	2	0	1	0
Control Delay (s)	34.0	0.0	0.2	0.0
Lane LOS	D	A	A	
Approach Delay (s)	34.0	0.0	0.2	0.0
Approach LOS	D	A		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	276	250	236	559	503	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0
Lane Util. Factor		0.95		1.00	0.95	0.97	1.00
Frt		0.93		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		3287		1770	3539	3433	1583
Flt Permitted		1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)		3287		1770	3539	3433	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	307	278	262	621	559	367
RTOR Reduction (vph)	0	157	0	0	0	0	261
Lane Group Flow (vph)	0	428	0	262	621	559	106
Turn Type	Prot			Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases							6
Actuated Green, G (s)		15.1		15.5	34.6	17.3	17.3
Effective Green, g (s)		15.1		15.5	34.6	17.3	17.3
Actuated g/C Ratio		0.25		0.26	0.58	0.29	0.29
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		829		458	2044	992	457
v/s Ratio Prot		c0.13		c0.15	0.18	c0.16	
v/s Ratio Perm							0.07
v/c Ratio		0.52		0.57	0.30	0.56	0.23
Uniform Delay, d1		19.3		19.3	6.5	18.1	16.2
Progression Factor		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5		1.7	0.1	0.7	0.3
Delay (s)		19.8		21.0	6.5	18.8	16.5
Level of Service		B		C	A	B	B
Approach Delay (s)		19.8			10.9	17.9	
Approach LOS		B			B	B	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	529	19	6	860	16	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	588	21	7	956	18	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			609		1567	598
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			609		1567	598
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		85	96
cM capacity (veh/h)			970		121	502

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	609	962	38
Volume Left	0	7	18
Volume Right	21	0	20
cSH	1700	970	203
Volume to Capacity	0.36	0.01	0.19
Queue Length 95th (ft)	0	1	17
Control Delay (s)	0.0	0.2	26.8
Lane LOS		A	D
Approach Delay (s)	0.0	0.2	26.8
Approach LOS			D

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	579	457	189	531	7	631	6	499	0	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1859			1775	1583		1812	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1859			1775	1583		1812	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	643	508	210	590	8	701	7	554	0	4	1
RTOR Reduction (vph)	0	0	199	0	1	0	0	0	201	0	1	0
Lane Group Flow (vph)	12	643	309	210	597	0	0	708	353	0	4	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	1.6	49.4	49.4	17.0	64.8			54.0	54.0		6.0	
Effective Green, g (s)	1.6	49.4	49.4	17.0	64.8			54.0	54.0		6.0	
Actuated g/C Ratio	0.01	0.35	0.35	0.12	0.46			0.38	0.38		0.04	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	20	646	549	211	846			673	600		76	
v/s Ratio Prot	0.01	c0.35		c0.12	0.32			c0.40			c0.00	
v/s Ratio Perm			0.20						0.22			
v/c Ratio	0.60	1.00	0.56	1.00	0.71			1.05	0.59		0.05	
Uniform Delay, d1	70.1	46.4	37.8	62.7	31.2			44.2	35.3		65.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	41.7	34.0	1.3	60.3	2.7			49.2	1.5		0.3	
Delay (s)	111.7	80.4	39.1	122.9	33.9			93.4	36.8		65.8	
Level of Service	F	F	D	F	C			F	D		E	
Approach Delay (s)		62.7			57.0			68.5			65.8	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM Average Control Delay	63.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	142.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	237	721	54	2	531	15	20	0	1	24	0	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95			0.95	1.00
Satd. Flow (prot)	1770	1843		1770	1863	1583		1767			1770	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95			0.95	1.00
Satd. Flow (perm)	1770	1843		1770	1863	1583		1767			1770	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	263	801	60	2	590	17	22	0	1	27	0	112
RTOR Reduction (vph)	0	1	0	0	0	7	0	1	0	0	0	103
Lane Group Flow (vph)	263	860	0	2	590	10	0	22	0	0	27	9
Turn Type	Prot			Prot		Perm	Split			Split		custom
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						7
Actuated Green, G (s)	21.8	63.3		0.6	42.1	42.1		3.7			3.9	7.6
Effective Green, g (s)	21.8	63.3		0.6	42.1	42.1		3.7			3.9	7.6
Actuated g/C Ratio	0.22	0.64		0.01	0.42	0.42		0.04			0.04	0.08
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	389	1177		11	791	672		66			70	121
v/s Ratio Prot	c0.15	c0.47		0.00	0.32			c0.01			c0.02	
v/s Ratio Perm						0.01						c0.01
v/c Ratio	0.68	0.73		0.18	0.75	0.02		0.33			0.39	0.07
Uniform Delay, d1	35.4	12.1		49.0	24.0	16.5		46.5			46.4	42.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	4.6	2.4		7.8	3.9	0.0		3.0			3.5	0.2
Delay (s)	40.0	14.5		56.8	27.8	16.5		49.5			49.9	42.7
Level of Service	D	B		E	C	B		D			D	D
Approach Delay (s)		20.5			27.6			49.5			44.1	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	0	29	23	0	278	12	813	15	22	629	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	32	25	0	302	13	884	16	24	684	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											671	
pX, platoon unblocked												
vC, conflicting volume	1960	1666	692	1690	1667	892	701			900		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1960	1666	692	1690	1667	892	701			900		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	93	62	100	11	99			97		
cM capacity (veh/h)	5	92	444	66	92	341	896			755		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	64	327	913	725
Volume Left	33	25	13	24
Volume Right	32	302	16	17
cSH	10	259	896	755
Volume to Capacity	6.33	1.26	0.01	0.03
Queue Length 95th (ft)	Err	403	1	2
Control Delay (s)	Err	185.1	0.4	0.8
Lane LOS	F	F	A	A
Approach Delay (s)	Err	185.1	0.4	0.8
Approach LOS	F	F		

Intersection Summary			
Average Delay	346.3		
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	630	384	315	382	211	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0
Lane Util. Factor		0.95		1.00	0.95	0.97	1.00
Frt		0.94		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		3338		1770	3539	3433	1583
Flt Permitted		1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)		3338		1770	3539	3433	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	700	427	350	424	234	308
RTOR Reduction (vph)	0	68	0	0	0	0	263
Lane Group Flow (vph)	0	1059	0	350	424	234	45
Turn Type	Prot			Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases							6
Actuated Green, G (s)		32.4		19.9	56.3	11.0	11.0
Effective Green, g (s)		32.4		19.9	56.3	11.0	11.0
Actuated g/C Ratio		0.43		0.26	0.75	0.15	0.15
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1436		468	2646	502	231
v/s Ratio Prot		c0.32		c0.20	0.12	c0.07	
v/s Ratio Perm							0.03
v/c Ratio		0.74		0.75	0.16	0.47	0.19
Uniform Delay, d1		17.9		25.4	2.7	29.5	28.3
Progression Factor		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		2.0		6.4	0.0	0.7	0.4
Delay (s)		19.9		31.8	2.8	30.1	28.7
Level of Service		B		C	A	C	C
Approach Delay (s)		19.9			15.9	29.3	
Approach LOS		B			B	C	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	667	27	7	429	36	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	741	30	8	477	40	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			771		1248	756
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			771		1248	756
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		79	89
cM capacity (veh/h)			844		189	408

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	771	484	84
Volume Left	0	8	40
Volume Right	30	0	44
cSH	1700	844	264
Volume to Capacity	0.45	0.01	0.32
Queue Length 95th (ft)	0	1	33
Control Delay (s)	0.0	0.3	24.9
Lane LOS		A	C
Approach Delay (s)	0.0	0.3	24.9
Approach LOS			C

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	430	360	377	684	1	555	1	151	0	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3538		1681	1686	1583		1863	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3538		1681	1686	1583		1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	478	400	419	738	1	617	1	168	0	3	0
RTOR Reduction (vph)	0	0	288	0	0	0	0	0	125	0	0	0
Lane Group Flow (vph)	3	478	112	419	739	0	308	310	43	0	3	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.6	22.7	22.7	15.3	37.4		20.9	20.9	20.9		5.9	
Effective Green, g (s)	0.6	22.7	22.7	15.3	37.4		20.9	20.9	20.9		5.9	
Actuated g/C Ratio	0.01	0.28	0.28	0.19	0.46		0.26	0.26	0.26		0.07	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	13	994	445	650	1638		435	436	409		136	
v/s Ratio Prot	0.00	0.14		c0.12	c0.21		0.18	c0.18			c0.00	
v/s Ratio Perm			0.07						0.03			
v/c Ratio	0.23	0.48	0.25	0.64	0.45		0.71	0.71	0.11		0.02	
Uniform Delay, d1	39.9	24.2	22.5	30.2	14.7		27.2	27.2	22.8		34.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	8.9	0.4	0.3	2.2	0.2		5.2	5.4	0.1		0.1	
Delay (s)	48.8	24.5	22.8	32.4	14.9		32.4	32.6	22.9		34.8	
Level of Service	D	C	C	C	B		C	C	C		C	
Approach Delay (s)		23.8			21.3			30.5			34.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	477	12	0	756	35	43	1	1	16	1	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	0.95			0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00			1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00		0.95			0.95	1.00
Satd. Flow (prot)	1770	3527			3539	1583		1773			1779	1583
Flt Permitted	0.95	1.00			1.00	1.00		0.95			0.95	1.00
Satd. Flow (perm)	1770	3527			3539	1583		1773			1779	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	74	530	13	0	840	39	48	1	1	18	1	262
RTOR Reduction (vph)	0	1	0	0	0	24	0	1	0	0	0	230
Lane Group Flow (vph)	74	542	0	0	840	15	0	49	0	0	19	32
Turn Type	Prot			Prot		Perm	Split			Split		custom
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						7
Actuated Green, G (s)	5.7	34.1			24.4	24.4		4.4			2.1	7.8
Effective Green, g (s)	5.7	34.1			24.4	24.4		4.4			2.1	7.8
Actuated g/C Ratio	0.09	0.53			0.38	0.38		0.07			0.03	0.12
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	157	1868			1341	600		121			58	192
v/s Ratio Prot	c0.04	0.15			c0.24			c0.03			c0.01	
v/s Ratio Perm						0.01						c0.02
v/c Ratio	0.47	0.29			0.63	0.02		0.41			0.33	0.17
Uniform Delay, d1	27.9	8.4			16.3	12.5		28.7			30.5	25.4
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	2.2	0.1			0.9	0.0		2.2			3.3	0.4
Delay (s)	30.1	8.5			17.2	12.6		31.0			33.8	25.8
Level of Service	C	A			B	B		C			C	C
Approach Delay (s)		11.1			17.0			31.0			26.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	1	0	0	0	5	600	0	0	783	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0					4.0	4.0			4.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frt		0.96					1.00	1.00			1.00	
Flt Protected		0.97					0.95	1.00			1.00	
Satd. Flow (prot)		1722					1770	3539			3530	
Flt Permitted		0.97					0.95	1.00			1.00	
Satd. Flow (perm)		1722					1770	3539			3530	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	1	0	0	0	5	652	0	0	851	15
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	0	0	5	652	0	0	865	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)		5.8					0.9	23.0			18.1	
Effective Green, g (s)		5.8					0.9	23.0			18.1	
Actuated g/C Ratio		0.12					0.02	0.49			0.39	
Clearance Time (s)		4.0					4.0	4.0			4.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		215					34	1750			1374	
v/s Ratio Prot		c0.00					0.00	c0.18			c0.24	
v/s Ratio Perm												
v/c Ratio		0.01					0.15	0.37			0.63	
Uniform Delay, d1		17.8					22.4	7.3			11.5	
Progression Factor		1.00					1.00	1.00			1.00	
Incremental Delay, d2		0.0					2.0	0.1			0.9	
Delay (s)		17.9					24.4	7.4			12.4	
Level of Service		B					C	A			B	
Approach Delay (s)		17.9			0.0			7.5			12.4	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	21.7
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	276	250	236	559	503	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95	0.97	0.91
Frt		1.00	0.85	1.00	1.00	0.98	0.85
Flt Protected		1.00	1.00	0.95	1.00	0.96	1.00
Satd. Flow (prot)		3539	1583	3433	3539	3399	1441
Flt Permitted		1.00	1.00	0.95	1.00	0.96	1.00
Satd. Flow (perm)		3539	1583	3433	3539	3399	1441
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	307	278	262	621	559	367
RTOR Reduction (vph)	0	0	212	0	0	9	196
Lane Group Flow (vph)	0	307	66	262	621	627	94
Turn Type	Prot		Perm	Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases			8				6
Actuated Green, G (s)		12.0	12.0	10.1	26.1	16.3	16.3
Effective Green, g (s)		12.0	12.0	10.1	26.1	16.3	16.3
Actuated g/C Ratio		0.24	0.24	0.20	0.52	0.32	0.32
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		843	377	688	1833	1099	466
v/s Ratio Prot		0.09		0.08	c0.18	c0.18	
v/s Ratio Perm			0.04				0.07
v/c Ratio		0.36	0.18	0.38	0.34	0.57	0.20
Uniform Delay, d1		16.0	15.3	17.4	7.1	14.1	12.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3	0.2	0.4	0.1	0.7	0.2
Delay (s)		16.3	15.5	17.8	7.2	14.9	12.6
Level of Service		B	B	B	A	B	B
Approach Delay (s)		15.9			10.4	14.1	
Approach LOS		B			B	B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	50.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	529	19	6	860	16	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	588	21	7	956	18	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			609		1089	304
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			609		1089	304
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		91	97
cM capacity (veh/h)			966		208	692

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	392	217	325	637	18	20
Volume Left	0	0	7	0	18	0
Volume Right	0	21	0	0	0	20
cSH	1700	1700	966	1700	208	692
Volume to Capacity	0.23	0.13	0.01	0.37	0.09	0.03
Queue Length 95th (ft)	0	0	1	0	7	2
Control Delay (s)	0.0	0.0	0.3	0.0	23.9	10.4
Lane LOS			A		C	B
Approach Delay (s)	0.0		0.1		16.7	
Approach LOS					C	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	579	457	189	531	7	631	6	499	0	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3532		1681	1687	1583		1812	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3532		1681	1687	1583		1812	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	643	508	210	590	8	701	7	554	0	4	1
RTOR Reduction (vph)	0	0	341	0	1	0	0	0	316	0	1	0
Lane Group Flow (vph)	12	643	167	210	597	0	350	358	238	0	4	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.6	31.3	31.3	11.0	41.7		30.9	30.9	30.9		6.1	
Effective Green, g (s)	0.6	31.3	31.3	11.0	41.7		30.9	30.9	30.9		6.1	
Actuated g/C Ratio	0.01	0.33	0.33	0.12	0.44		0.32	0.32	0.32		0.06	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	11	1162	520	396	1545		545	547	513		116	
v/s Ratio Prot	0.01	c0.18		c0.06	0.17		0.21	c0.21			c0.00	
v/s Ratio Perm			0.11						0.15			
v/c Ratio	1.09	0.55	0.32	0.53	0.39		0.64	0.65	0.46		0.04	
Uniform Delay, d1	47.4	26.3	24.0	39.7	18.1		27.5	27.6	25.6		41.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	304.6	0.6	0.4	1.4	0.2		2.6	2.8	0.7		0.1	
Delay (s)	352.0	26.8	24.4	41.1	18.3		30.1	30.4	26.3		42.0	
Level of Service	F	C	C	D	B		C	C	C		D	
Approach Delay (s)		29.1			24.2			28.5			42.0	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	95.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	237	721	54	2	531	15	20	0	1	24	0	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95			0.95	1.00
Satd. Flow (prot)	1770	3502		1770	3539	1583		1767			1770	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95			0.95	1.00
Satd. Flow (perm)	1770	3502		1770	3539	1583		1767			1770	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	263	801	60	2	590	17	22	0	1	27	0	112
RTOR Reduction (vph)	0	4	0	0	0	12	0	1	0	0	0	101
Lane Group Flow (vph)	263	857	0	2	590	5	0	22	0	0	27	11
Turn Type	Prot			Prot		Perm	Split			Split		custom
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						7
Actuated Green, G (s)	16.1	37.1		0.5	21.5	21.5		2.2			2.3	7.1
Effective Green, g (s)	16.1	37.1		0.5	21.5	21.5		2.2			2.3	7.1
Actuated g/C Ratio	0.23	0.54		0.01	0.31	0.31		0.03			0.03	0.10
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	412	1878		13	1100	492		56			59	162
v/s Ratio Prot	c0.15	0.24		0.00	c0.17			c0.01			c0.02	
v/s Ratio Perm						0.00						c0.01
v/c Ratio	0.64	0.46		0.15	0.54	0.01		0.39			0.46	0.07
Uniform Delay, d1	23.9	9.9		34.1	19.7	16.5		32.8			32.8	28.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	3.2	0.2		5.5	0.5	0.0		4.5			5.5	0.2
Delay (s)	27.2	10.0		39.6	20.2	16.5		37.4			38.4	28.3
Level of Service	C	B		D	C	B		D			D	C
Approach Delay (s)		14.0			20.2			37.4			30.2	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	0	29	23	0	278	12	813	15	22	629	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frt		0.93			0.87	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1696			1533	1504	1770	3530		1770	3526	
Flt Permitted		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1696			1533	1504	1770	3530		1770	3526	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	0	32	25	0	302	13	884	16	24	684	17
RTOR Reduction (vph)	0	28	0	0	120	140	0	1	0	0	2	0
Lane Group Flow (vph)	0	37	0	0	44	23	13	899	0	24	699	0
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)		7.4			7.9	7.9	0.7	23.5		2.1	24.9	
Effective Green, g (s)		7.4			7.9	7.9	0.7	23.5		2.1	24.9	
Actuated g/C Ratio		0.13			0.14	0.14	0.01	0.41		0.04	0.44	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		221			213	209	22	1458		65	1543	
v/s Ratio Prot		c0.02			c0.03		0.01	c0.25		c0.01	0.20	
v/s Ratio Perm						0.02						
v/c Ratio		0.17			0.21	0.11	0.59	0.62		0.37	0.45	
Uniform Delay, d1		22.0			21.7	21.4	28.0	13.2		26.8	11.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.5	0.2	36.0	0.8		3.5	0.2	
Delay (s)		22.4			22.2	21.7	63.9	13.9		30.3	11.4	
Level of Service		C			C	C	E	B		C	B	
Approach Delay (s)		22.4			21.9			14.6			12.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	630	384	315	382	211	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95	0.97	0.91
Frt		1.00	0.85	1.00	1.00	0.94	0.85
Flt Protected		1.00	1.00	0.95	1.00	0.97	1.00
Satd. Flow (prot)		3539	1583	3433	3539	3310	1441
Flt Permitted		1.00	1.00	0.95	1.00	0.97	1.00
Satd. Flow (perm)		3539	1583	3433	3539	3310	1441
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	700	427	350	424	234	308
RTOR Reduction (vph)	0	0	258	0	0	89	135
Lane Group Flow (vph)	0	700	169	350	424	281	33
Turn Type	Prot		Perm	Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases			8				6
Actuated Green, G (s)		22.9	22.9	12.1	39.0	11.0	11.0
Effective Green, g (s)		22.9	22.9	12.1	39.0	11.0	11.0
Actuated g/C Ratio		0.39	0.39	0.21	0.67	0.19	0.19
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1397	625	716	2380	628	273
v/s Ratio Prot		c0.20		c0.10	0.12	c0.08	
v/s Ratio Perm			0.11				0.02
v/c Ratio		0.50	0.27	0.49	0.18	0.45	0.12
Uniform Delay, d1		13.2	11.9	20.2	3.5	20.8	19.5
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3	0.2	0.5	0.0	0.5	0.2
Delay (s)		13.5	12.1	20.8	3.6	21.3	19.7
Level of Service		B	B	C	A	C	B
Approach Delay (s)		13.0			11.3	20.8	
Approach LOS		B			B	C	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	667	27	7	429	36	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	741	30	8	477	40	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			771		1010	386
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			771		1010	386
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		83	93
cM capacity (veh/h)			839		234	613

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	494	277	167	318	40	44
Volume Left	0	0	8	0	40	0
Volume Right	0	30	0	0	0	44
cSH	1700	1700	839	1700	234	613
Volume to Capacity	0.29	0.16	0.01	0.19	0.17	0.07
Queue Length 95th (ft)	0	0	1	0	15	6
Control Delay (s)	0.0	0.0	0.5	0.0	23.5	11.3
Lane LOS			A		C	B
Approach Delay (s)	0.0		0.2		17.1	
Approach LOS					C	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

Opening Day With Project

Via de la Valle / El Camino Real

Central & Western Alignment Lane Configuration

Synchro Analysis Worksheets

Lane Configurations												
Volume (vph)	3	430	360	377	664	1	555	1	151	0	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	0.93		1.00	1.00		1.00	1.00	0.85		1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3297		3433	3538		1681	1686	1583		1863	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3297		3433	3538		1681	1686	1583		1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	478	400	419	738	1	617	1	168	0	3	0
RTOR Reduction (vph)	0	131	0	0	0	0	0	0	126	0	0	0
Lane Group Flow (vph)	3	747	0	419	739	0	308	310	42	0	3	0
Turn Type	Prot			Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			
Actuated Green, G (s)	0.7	29.9		15.5	44.7		22.2	22.2	22.2		5.9	
Effective Green, g (s)	0.7	29.9		15.5	44.7		22.2	22.2	22.2		5.9	
Actuated g/C Ratio	0.01	0.33		0.17	0.50		0.25	0.25	0.25		0.07	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	14	1101		595	1767		417	418	393		123	
v/s Ratio Prot	0.00	c0.23		c0.12	0.21		0.18	c0.18			c0.00	
v/s Ratio Perm									0.03			
v/c Ratio	0.21	0.68		0.70	0.42		0.74	0.74	0.11		0.02	
Uniform Delay, d1	44.1	25.7		34.8	14.2		31.0	31.0	26.0		39.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	7.6	1.7		3.8	0.2		6.7	7.0	0.1		0.1	
Delay (s)	51.7	27.3		38.6	14.3		37.7	38.0	26.1		39.2	
Level of Service	D	C		D	B		D	D	C		D	
Approach Delay (s)		27.4			23.1			35.3			39.2	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations												
Volume (vph)	11	573	457	188	531	7	631	6	499	0	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	0.93		1.00	1.00		1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3305		3433	3532		1681	1687	1583		1812	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3305		3433	3532		1681	1687	1583		1812	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	643	508	210	590	8	701	7	554	0	4	1
RTOR Reduction (vph)	0	108	0	0	1	0	0	0	306	0	1	0
Lane Group Flow (vph)	12	1043	0	210	597	0	350	358	248	0	4	0
Turn Type	Prot			Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			
Actuated Green, G (s)	1.4	43.2		10.5	52.3		30.9	30.9	30.9		6.0	
Effective Green, g (s)	1.4	43.2		10.5	52.3		30.9	30.9	30.9		6.0	
Actuated g/C Ratio	0.01	0.41		0.10	0.49		0.29	0.29	0.29		0.06	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	23	1339		338	1733		487	489	459		102	
v/s Ratio Prot	0.01	c0.32		c0.06	0.17		0.21	c0.21			c0.00	
v/s Ratio Perm									0.16			
v/c Ratio	0.52	0.78		0.62	0.34		0.72	0.73	0.54		0.04	
Uniform Delay, d1	52.3	27.6		46.1	16.6		34.0	34.1	31.9		47.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	19.7	2.9		3.5	0.1		5.0	5.6	1.3		0.2	
Delay (s)	72.0	30.5		49.7	16.8		39.0	39.7	33.2		47.7	
Level of Service	E	C		D	B		D	D	C		D	
Approach Delay (s)		30.9			25.3			36.6			47.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	106.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX G

YEAR 2035 AM / PM PEAK INTERSECTION LEVELS OF SERVICE WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	589	728	762	821	1	686	1	198	0	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1862			1774	1583		1863	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1862			1774	1583		1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	654	809	847	912	1	762	1	220	0	7	0
RTOR Reduction (vph)	0	0	312	0	0	0	0	0	75	0	0	0
Lane Group Flow (vph)	3	654	497	847	913	0	0	763	145	0	7	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.8	40.2	40.2	40.0	79.4			41.0	41.0		6.1	
Effective Green, g (s)	0.8	40.2	40.2	40.0	79.4			41.0	41.0		6.1	
Actuated g/C Ratio	0.01	0.28	0.28	0.28	0.55			0.29	0.29		0.04	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	10	523	444	494	1032			508	453		79	
v/s Ratio Prot	0.00	c0.35		c0.48	0.49			c0.43			c0.00	
v/s Ratio Perm			0.31						0.09			
v/c Ratio	0.30	1.25	1.12	1.71	0.88			1.50	0.32		0.09	
Uniform Delay, d1	71.0	51.6	51.6	51.6	27.9			51.2	40.2		65.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	16.1	127.9	79.8	330.1	9.2			236.0	0.4		0.5	
Delay (s)	87.1	179.4	131.4	381.7	37.1			287.2	40.6		66.4	
Level of Service	F	F	F	F	D			F	D		E	
Approach Delay (s)		152.7			203.0			232.0			66.4	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	192.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	143.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	127.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	656	12	0	1219	62	56	2	1	22	1	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00			1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00		0.95			0.95	1.00
Satd. Flow (prot)	1770	1858			1863	1583		1774			1777	1583
Flt Permitted	0.95	1.00			1.00	1.00		0.95			0.95	1.00
Satd. Flow (perm)	1770	1858			1863	1583		1774			1777	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	132	729	13	0	1354	69	62	2	1	24	1	343
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	0	0	0	266
Lane Group Flow (vph)	132	742	0	0	1354	58	0	65	0	0	25	77
Turn Type	Prot			Prot		Perm	Split			Split		custom
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						7
Actuated Green, G (s)	8.1	87.5			75.4	75.4		8.5			4.6	10.9
Effective Green, g (s)	8.1	87.5			75.4	75.4		8.5			4.6	10.9
Actuated g/C Ratio	0.06	0.69			0.59	0.59		0.07			0.04	0.09
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	112	1275			1102	936		118			64	135
v/s Ratio Prot	c0.07	0.40			c0.73			c0.04			c0.01	
v/s Ratio Perm						0.04						c0.05
v/c Ratio	1.18	0.58			1.23	0.06		0.55			0.39	0.57
Uniform Delay, d1	59.7	10.4			26.0	11.0		57.7			60.1	56.0
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	140.9	0.7			111.0	0.0		5.5			3.9	5.4
Delay (s)	200.6	11.1			137.1	11.1		63.1			64.0	61.5
Level of Service	F	B			F	B		E			E	E
Approach Delay (s)		39.7			131.0			63.1			61.6	
Approach LOS		D			F			E			E	

Intersection Summary			
HCM Average Control Delay	90.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	127.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	0	2	0	0	0	5	881	0	0	1482	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	2	0	0	0	5	958	0	0	1611	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											671	
pX, platoon unblocked												
vC, conflicting volume	2587	2587	1618	2589	2595	958	1626			958		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2587	2587	1618	2589	2595	958	1626			958		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	74	100	98	100	100	100	99			100		
cM capacity (veh/h)	17	25	127	16	25	312	400			718		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	7	0	963	1626
Volume Left	4	0	5	0
Volume Right	2	0	0	15
cSH	23	1700	400	718
Volume to Capacity	0.28	0.00	0.01	0.00
Queue Length 95th (ft)	21	0	1	0
Control Delay (s)	209.2	0.0	0.5	0.0
Lane LOS	F	A	A	
Approach Delay (s)	209.2	0.0	0.5	0.0
Approach LOS	F	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	388	330	312	1172	658	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0
Lane Util. Factor		0.95		1.00	0.95	0.97	1.00
Frt		0.93		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		3295		1770	3539	3433	1583
Flt Permitted		1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)		3295		1770	3539	3433	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	431	367	347	1302	731	553
RTOR Reduction (vph)	0	141	0	0	0	0	385
Lane Group Flow (vph)	0	657	0	347	1302	731	168
Turn Type	Prot			Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases							6
Actuated Green, G (s)		24.2		22.7	50.9	25.6	25.6
Effective Green, g (s)		24.2		22.7	50.9	25.6	25.6
Actuated g/C Ratio		0.29		0.27	0.60	0.30	0.30
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		944		475	2132	1040	480
v/s Ratio Prot		c0.20		c0.20	0.37	c0.21	
v/s Ratio Perm							0.11
v/c Ratio		0.70		0.73	0.61	0.70	0.35
Uniform Delay, d1		26.9		28.1	10.6	26.1	23.0
Progression Factor		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		2.3		5.7	0.5	2.2	0.4
Delay (s)		29.1		33.8	11.1	28.3	23.4
Level of Service		C		C	B	C	C
Approach Delay (s)		29.1			15.9	26.2	
Approach LOS		C			B	C	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	84.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	623	19	6	1135	21	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	692	21	7	1261	23	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			713		1977	703
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			713		1977	703
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		65	94
cM capacity (veh/h)			887		88	438

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	713	1268	50
Volume Left	0	7	23
Volume Right	21	0	27
cSH	1700	887	123
Volume to Capacity	0.42	0.01	0.41
Queue Length 95th (ft)	0	1	43
Control Delay (s)	0.0	0.3	53.0
Lane LOS		A	F
Approach Delay (s)	0.0	0.3	53.0
Approach LOS			F

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	813	924	382	656	7	1081	6	934	0	8	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1860			1775	1583		1838	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1860			1775	1583		1838	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	903	1027	424	729	8	1179	7	1038	0	9	1
RTOR Reduction (vph)	0	0	287	0	0	0	0	0	224	0	1	0
Lane Group Flow (vph)	12	903	740	424	737	0	0	1186	814	0	9	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	1.6	46.4	46.4	19.0	63.8			55.0	55.0		6.3	
Effective Green, g (s)	1.6	46.4	46.4	19.0	63.8			55.0	55.0		6.3	
Actuated g/C Ratio	0.01	0.33	0.33	0.13	0.45			0.39	0.39		0.04	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	20	606	515	236	832			684	610		81	
v/s Ratio Prot	0.01	c0.48		c0.24	0.40			c0.67			c0.00	
v/s Ratio Perm			0.47						0.51			
v/c Ratio	0.60	1.49	1.44	1.80	0.89			1.73	1.33		0.11	
Uniform Delay, d1	70.2	48.1	48.1	61.8	36.1			43.8	43.8		65.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	41.7	229.2	207.7	374.9	11.1			336.4	161.2		0.6	
Delay (s)	111.9	277.4	255.8	436.8	47.3			380.2	205.1		66.1	
Level of Service	F	F	F	F	D			F	F		E	
Approach Delay (s)		264.9			189.5			298.5			66.1	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	262.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.57		
Actuated Cycle Length (s)	142.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	139.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	421	1272	54	2	887	27	26	0	1	33	0	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95			0.95	1.00
Satd. Flow (prot)	1770	1851		1770	1863	1583		1769			1770	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95			0.95	1.00
Satd. Flow (perm)	1770	1851		1770	1863	1583		1769			1770	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	468	1413	60	2	986	30	29	0	1	37	0	147
RTOR Reduction (vph)	0	1	0	0	0	6	0	1	0	0	0	138
Lane Group Flow (vph)	468	1472	0	2	986	24	0	29	0	0	37	9
Turn Type	Prot			Prot		Perm	Split			Split		custom
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						7
Actuated Green, G (s)	24.4	86.1		0.7	62.4	62.4		4.7			5.1	7.3
Effective Green, g (s)	24.4	86.1		0.7	62.4	62.4		4.7			5.1	7.3
Actuated g/C Ratio	0.20	0.69		0.01	0.50	0.50		0.04			0.04	0.06
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	349	1286		10	938	797		67			73	93
v/s Ratio Prot	c0.26	c0.80		0.00	0.53			c0.02			c0.02	
v/s Ratio Perm						0.01						c0.01
v/c Ratio	1.34	1.14		0.20	1.05	0.03		0.43			0.51	0.09
Uniform Delay, d1	49.8	18.9		61.3	30.8	15.5		58.3			58.2	55.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	171.6	74.9		9.6	43.8	0.0		4.4			5.4	0.4
Delay (s)	221.3	93.8		71.0	74.5	15.5		62.7			63.6	55.6
Level of Service	F	F		E	E	B		E			E	E
Approach Delay (s)		124.5			72.8			62.7			57.2	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM Average Control Delay	103.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	123.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Jacob Swim*	Intersection	*El Camino Real / Polo Fields*
Agency/Co.	*USAI*	Jurisdiction	*City of San Diego*
Date Performed	*11/19/2012*	Analysis Year	*2035*
Analysis Time Period	*Year 2035 PM*		

Project Description *000810 - El Camino Real Road Widening*	
East/West Street: *Horse Park / Polo Fields*	North/South Street: *El Camino Real*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	12	1378	15	22	1298	16
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	12	1450	15	23	1366	16
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	61	0	59	46	0	562
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	64	0	62	48	0	591
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	12	23		639			126	
C (m) (veh/h)	496	461		41			0	
v/c	0.02	0.05		15.59				
95% queue length	0.07	0.16		77.83				
Control Delay (s/veh)	12.4	13.2		6749				
LOS	B	B		F			F	
Approach Delay (s/veh)	--	--	6749					
Approach LOS	--	--	F					

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Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	1059	507	416	941	368	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0
Lane Util. Factor		0.95		1.00	0.95	0.97	1.00
Frt		0.95		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		3367		1770	3539	3433	1583
Flt Permitted		1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)		3367		1770	3539	3433	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1177	563	462	1046	409	384
RTOR Reduction (vph)	0	52	0	0	0	0	313
Lane Group Flow (vph)	0	1688	0	462	1046	409	71
Turn Type	Prot			Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases							6
Actuated Green, G (s)		53.0		28.0	85.0	16.2	16.2
Effective Green, g (s)		53.0		28.0	85.0	16.2	16.2
Actuated g/C Ratio		0.49		0.26	0.78	0.15	0.15
Clearance Time (s)		4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1634		454	2755	509	235
v/s Ratio Prot		c0.50		c0.26	0.30	c0.12	
v/s Ratio Perm							0.04
v/c Ratio		1.03		1.02	0.38	0.80	0.30
Uniform Delay, d1		28.1		40.6	3.8	45.0	41.4
Progression Factor		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		31.3		46.8	0.1	8.9	0.7
Delay (s)		59.4		87.4	3.9	53.9	42.2
Level of Service		E		F	A	D	D
Approach Delay (s)		59.4			29.5	48.2	
Approach LOS		E			C	D	

Intersection Summary			
HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	109.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	896	27	7	666	48	53
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	996	30	8	740	53	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			1026		1766	1011
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1026		1766	1011
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		41	80
cM capacity (veh/h)			677		91	291

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1026	748	112
Volume Left	0	8	53
Volume Right	30	0	59
cSH	1700	677	142
Volume to Capacity	0.60	0.01	0.79
Queue Length 95th (ft)	0	1	122
Control Delay (s)	0.0	0.3	88.6
Lane LOS		A	F
Approach Delay (s)	0.0	0.3	88.6
Approach LOS			F

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	589	728	762	821	1	686	1	198	0	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3539		1681	1686	1583		1863	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3539		1681	1686	1583		1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	654	809	847	912	1	762	1	220	0	7	0
RTOR Reduction (vph)	0	0	564	0	0	0	0	0	164	0	0	0
Lane Group Flow (vph)	3	654	245	847	913	0	381	382	56	0	7	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	0.8	19.2	19.2	21.0	39.4		21.0	21.0	21.0		5.9	
Effective Green, g (s)	0.8	19.2	19.2	21.0	39.4		21.0	21.0	21.0		5.9	
Actuated g/C Ratio	0.01	0.23	0.23	0.25	0.47		0.25	0.25	0.25		0.07	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	17	818	366	868	1678		425	426	400		132	
v/s Ratio Prot	0.00	c0.18		c0.25	0.26		c0.23	0.23			c0.00	
v/s Ratio Perm			0.15						0.04			
v/c Ratio	0.18	0.80	0.67	0.98	0.54		0.90	0.90	0.14		0.05	
Uniform Delay, d1	40.8	30.1	29.1	30.8	15.5		30.0	30.0	24.0		36.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	4.9	5.5	4.6	24.5	0.4		20.9	20.9	0.2		0.2	
Delay (s)	45.7	35.6	33.6	55.3	15.8		50.9	50.9	24.2		36.2	
Level of Service	D	D	C	E	B		D	D	C		D	
Approach Delay (s)		34.6			34.8			44.9			36.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	83.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	656	12	0	1219	62	56	2	1	22	1	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	0.95			0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00			1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00		0.95			0.95	1.00
Satd. Flow (prot)	1770	3530			3539	1583		1774			1777	1583
Flt Permitted	0.95	1.00			1.00	1.00		0.95			0.95	1.00
Satd. Flow (perm)	1770	3530			3539	1583		1774			1777	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	132	729	13	0	1354	69	62	2	1	24	1	343
RTOR Reduction (vph)	0	1	0	0	0	28	0	1	0	0	0	309
Lane Group Flow (vph)	132	741	0	0	1354	41	0	64	0	0	25	34
Turn Type	Prot			Prot		Perm	Split			Split		custom
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						7
Actuated Green, G (s)	6.2	47.5			37.3	37.3		6.9			2.7	8.0
Effective Green, g (s)	6.2	47.5			37.3	37.3		6.9			2.7	8.0
Actuated g/C Ratio	0.08	0.59			0.46	0.46		0.09			0.03	0.10
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	135	2068			1628	728		151			59	156
v/s Ratio Prot	c0.07	0.21			c0.38			c0.04			c0.01	
v/s Ratio Perm						0.03						c0.02
v/c Ratio	0.98	0.36			0.83	0.06		0.42			0.42	0.22
Uniform Delay, d1	37.4	8.8			19.2	12.1		35.2			38.4	33.7
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	69.9	0.1			3.8	0.0		1.9			4.8	0.7
Delay (s)	107.3	8.9			22.9	12.2		37.1			43.3	34.4
Level of Service	F	A			C	B		D			D	C
Approach Delay (s)		23.8			22.4			37.1			35.0	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	81.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	0	2	0	0	0	5	881	0	0	1482	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0					4.0	4.0			4.0	
Lane Util. Factor		1.00					1.00	0.95			0.95	
Frt		0.96					1.00	1.00			1.00	
Flt Protected		0.97					0.95	1.00			1.00	
Satd. Flow (prot)		1722					1770	3539			3534	
Flt Permitted		0.97					0.95	1.00			1.00	
Satd. Flow (perm)		1722					1770	3539			3534	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	0	2	0	0	0	6	979	0	0	1647	16
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	4	0	0	0	0	6	979	0	0	1663	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)		5.9					0.6	49.8			45.2	
Effective Green, g (s)		5.9					0.6	49.8			45.2	
Actuated g/C Ratio		0.08					0.01	0.68			0.62	
Clearance Time (s)		4.0					4.0	4.0			4.0	
Vehicle Extension (s)		3.0					3.0	3.0			3.0	
Lane Grp Cap (vph)		138					14	2401			2176	
v/s Ratio Prot		c0.00					0.00	c0.28			c0.47	
v/s Ratio Perm												
v/c Ratio		0.03					0.43	0.41			0.76	
Uniform Delay, d1		31.1					36.2	5.2			10.2	
Progression Factor		1.00					1.00	1.00			1.00	
Incremental Delay, d2		0.1					19.7	0.1			1.6	
Delay (s)		31.2					55.9	5.4			11.9	
Level of Service		C					E	A			B	
Approach Delay (s)		31.2			0.0			5.7			11.9	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	21.7
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	388	330	312	1172	658	498
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95	0.97	0.91
Frt		1.00	0.85	1.00	1.00	0.97	0.85
Flt Protected		1.00	1.00	0.95	1.00	0.96	1.00
Satd. Flow (prot)		3539	1583	3433	3539	3381	1441
Flt Permitted		1.00	1.00	0.95	1.00	0.96	1.00
Satd. Flow (perm)		3539	1583	3433	3539	3381	1441
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	431	367	347	1302	731	553
RTOR Reduction (vph)	0	0	259	0	0	13	257
Lane Group Flow (vph)	0	431	108	347	1302	867	147
Turn Type	Prot		Perm	Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases			8				6
Actuated Green, G (s)		22.4	22.4	14.1	40.5	27.7	27.7
Effective Green, g (s)		22.4	22.4	14.1	40.5	27.7	27.7
Actuated g/C Ratio		0.29	0.29	0.19	0.53	0.36	0.36
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1040	465	635	1881	1229	524
v/s Ratio Prot		0.12		0.10	c0.37	c0.26	
v/s Ratio Perm			0.07				0.10
v/c Ratio		0.41	0.23	0.55	0.69	0.71	0.28
Uniform Delay, d1		21.6	20.4	28.2	13.2	20.8	17.2
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3	0.3	1.0	1.1	1.9	0.3
Delay (s)		21.9	20.6	29.1	14.3	22.6	17.5
Level of Service		C	C	C	B	C	B
Approach Delay (s)		21.3			17.5	21.0	
Approach LOS		C			B	C	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	76.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	623	19	6	1135	21	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	692	21	7	1261	23	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			713		1347	357
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			713		1347	357
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		83	96
cM capacity (veh/h)			882		141	640

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	461	252	427	841	23	27
Volume Left	0	0	7	0	23	0
Volume Right	0	21	0	0	0	27
cSH	1700	1700	882	1700	141	640
Volume to Capacity	0.27	0.15	0.01	0.49	0.17	0.04
Queue Length 95th (ft)	0	0	1	0	14	3
Control Delay (s)	0.0	0.0	0.2	0.0	35.4	10.9
Lane LOS			A		E	B
Approach Delay (s)	0.0		0.1		22.3	
Approach LOS					C	

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	813	924	382	656	7	1061	6	934	0	8	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	14	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3539	1583	3433	3534		1681	1686	1689		1835	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583	3433	3534		1681	1686	1689		1835	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	12	856	973	402	691	7	1117	6	983	0	8	1
RTOR Reduction (vph)	0	0	621	0	1	0	0	0	319	0	1	0
Lane Group Flow (vph)	12	856	352	402	697	0	558	565	664	0	8	0
Turn Type	Prot		Perm	Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	1.6	34.4	34.4	15.0	47.8		48.0	48.0	48.0		6.1	
Effective Green, g (s)	1.6	34.4	34.4	15.0	47.8		48.0	48.0	48.0		6.1	
Actuated g/C Ratio	0.01	0.29	0.29	0.13	0.40		0.40	0.40	0.40		0.05	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	24	1019	456	431	1414		675	677	678		94	
v/s Ratio Prot	0.01	c0.24		c0.12	0.20		0.33	0.34			c0.00	
v/s Ratio Perm			0.22						c0.39			
v/c Ratio	0.50	0.84	0.77	0.93	0.49		0.83	0.83	0.98		0.09	
Uniform Delay, d1	58.6	40.0	39.0	51.8	26.8		32.0	32.2	35.3		54.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	15.4	6.3	7.9	27.1	0.3		8.2	8.7	29.1		0.4	
Delay (s)	74.0	46.3	46.9	78.9	27.1		40.2	40.9	64.3		54.4	
Level of Service	E	D	D	E	C		D	D	E		D	
Approach Delay (s)		46.8			46.0			51.7			54.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	48.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	119.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	421	1272	54	2	887	27	26	0	1	33	0	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.95			0.95	1.00
Satd. Flow (prot)	1770	3518		1770	3539	1583		1769			1770	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95			0.95	1.00
Satd. Flow (perm)	1770	3518		1770	3539	1583		1769			1770	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	468	1413	60	2	986	30	29	0	1	37	0	147
RTOR Reduction (vph)	0	2	0	0	0	16	0	1	0	0	0	136
Lane Group Flow (vph)	468	1471	0	2	986	14	0	29	0	0	37	11
Turn Type	Prot			Prot		Perm	Split			Split		custom
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						7
Actuated Green, G (s)	21.6	56.2		0.7	35.3	35.3		4.2			4.5	7.0
Effective Green, g (s)	21.6	56.2		0.7	35.3	35.3		4.2			4.5	7.0
Actuated g/C Ratio	0.23	0.61		0.01	0.38	0.38		0.05			0.05	0.08
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	413	2135		13	1349	603		80			86	120
v/s Ratio Prot	c0.26	c0.42		0.00	0.28			c0.02			c0.02	
v/s Ratio Perm						0.01						c0.01
v/c Ratio	1.13	0.69		0.15	0.73	0.02		0.36			0.43	0.09
Uniform Delay, d1	35.5	12.3		45.7	24.6	17.9		42.9			42.8	39.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	85.8	0.9		5.5	2.1	0.0		2.8			3.4	0.3
Delay (s)	121.3	13.2		51.1	26.6	17.9		45.7			46.2	40.2
Level of Service	F	B		D	C	B		D			D	D
Approach Delay (s)		39.3			26.4			45.7			41.4	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	0	59	46	0	562	12	1378	15	22	1298	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			0.95	0.95	1.00	0.95		1.00	0.95	
Frt		0.93			0.87	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1696			1533	1504	1770	3533		1770	3533	
Flt Permitted		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1696			1533	1504	1770	3533		1770	3533	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	68	0	66	51	0	624	13	1531	17	24	1442	18
RTOR Reduction (vph)	0	41	0	0	228	228	0	0	0	0	1	0
Lane Group Flow (vph)	0	93	0	0	110	109	13	1548	0	24	1459	0
Turn Type	Split			Split		Perm	Prot			Prot		
Protected Phases	2	2		6	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)		9.4			10.8	10.8	0.7	39.6		1.4	40.3	
Effective Green, g (s)		9.4			10.8	10.8	0.7	39.6		1.4	40.3	
Actuated g/C Ratio		0.12			0.14	0.14	0.01	0.51		0.02	0.52	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		207			214	210	16	1812		32	1844	
v/s Ratio Prot		c0.05			0.07		0.01	c0.44		c0.01	0.41	
v/s Ratio Perm						c0.07						
v/c Ratio		0.45			0.51	0.52	0.81	0.85		0.75	0.79	
Uniform Delay, d1		31.5			30.8	30.8	38.2	16.3		37.7	15.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.5			2.1	2.2	132.2	4.2		65.2	2.4	
Delay (s)		33.0			32.9	33.0	170.4	20.4		102.9	17.4	
Level of Service		C			C	C	F	C		F	B	
Approach Delay (s)		33.0			32.9			21.7			18.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations							
Volume (vph)	0	1059	507	416	941	368	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95	0.97	0.91
Frt		1.00	0.85	1.00	1.00	0.96	0.85
Flt Protected		1.00	1.00	0.95	1.00	0.96	1.00
Satd. Flow (prot)		3539	1583	3438	3539	3354	1441
Flt Permitted		1.00	1.00	0.95	1.00	0.96	1.00
Satd. Flow (perm)		3539	1583	3433	3539	3354	1441
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1177	563	462	1046	409	384
RTOR Reduction (vph)	0	0	272	0	0	32	194
Lane Group Flow (vph)	0	1177	291	462	1046	511	56
Turn Type	Prot		Perm	Prot			Perm
Protected Phases	3	8		7	4	6	
Permitted Phases			8				6
Actuated Green, G (s)		34.4	34.4	16.4	54.8	18.1	18.1
Effective Green, g (s)		34.4	34.4	16.4	54.8	18.1	18.1
Actuated g/C Ratio		0.43	0.43	0.20	0.68	0.22	0.22
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1505	673	696	2397	750	322
v/s Ratio Prot		c0.33		c0.13	0.30	c0.15	
v/s Ratio Perm			0.18				0.04
v/c Ratio		0.78	0.43	0.66	0.44	0.68	0.17
Uniform Delay, d1		20.0	16.4	29.7	6.0	28.8	25.4
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.7	0.4	2.4	0.1	2.6	0.3
Delay (s)		22.7	16.8	32.1	6.1	31.3	25.6
Level of Service		C	B	C	A	C	C
Approach Delay (s)		20.8			14.1	29.5	
Approach LOS		C			B	C	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	896	27	7	666	48	53
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	996	30	8	740	53	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	337					
pX, platoon unblocked						
vC, conflicting volume			1026		1396	513
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1026		1396	513
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		59	88
cM capacity (veh/h)			673		131	506

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	664	362	254	493	53	59
Volume Left	0	0	8	0	53	0
Volume Right	0	30	0	0	0	59
cSH	1700	1700	673	1700	131	506
Volume to Capacity	0.39	0.21	0.01	0.29	0.41	0.12
Queue Length 95th (ft)	0	0	1	0	44	10
Control Delay (s)	0.0	0.0	0.5	0.0	50.4	13.0
Lane LOS			A		F	B
Approach Delay (s)	0.0		0.2		30.8	
Approach LOS					D	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Year 2035 With Project

Via de la Valle / El Camino Real

Central & Western Alignment Lane Configuration

Synchro Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	589	728	762	821	1	686	1	198	0	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	0.92		1.00	1.00		1.00	1.00	0.85		1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3246		3433	3539		1681	1686	1583		1863	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3246		3433	3539		1681	1686	1583		1863	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	654	809	847	912	1	762	1	220	0	7	0
RTOR Reduction (vph)	0	140	0	0	0	0	0	0	150	0	0	0
Lane Group Flow (vph)	3	1323	0	847	913	0	381	382	70	0	7	0
Turn Type	Prot			Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			
Actuated Green, G (s)	0.8	56.2		34.0	89.4		31.0	31.0	31.0		6.1	
Effective Green, g (s)	0.8	56.2		34.0	89.4		31.0	31.0	31.0		6.1	
Actuated g/C Ratio	0.01	0.39		0.24	0.62		0.22	0.22	0.22		0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	10	1273		815	2208		364	365	342		79	
v/s Ratio Prot	0.00	c0.41		c0.25	0.26		c0.23	0.23			c0.00	
v/s Ratio Perm									0.04			
v/c Ratio	0.30	1.09dr		1.04	0.41		1.05	1.05	0.20		0.09	
Uniform Delay, d1	71.0	43.6		54.6	13.7		56.2	56.2	46.0		65.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	16.1	35.9		42.2	0.1		59.9	59.8	0.3		0.5	
Delay (s)	87.1	79.5		96.8	13.8		116.1	115.9	46.3		66.4	
Level of Service	F	E		F	B		F	F	D		E	
Approach Delay (s)		79.5			53.7			100.4			66.4	
Approach LOS		E			D			F			E	

Intersection Summary			
HCM Average Control Delay	73.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	143.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	813	924	382	656	7	1061	6	934	0	8	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	14	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95		0.95	0.95	1.00		1.00	
Frt	1.00	0.92		1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (prot)	1770	3257		3433	3534		1681	1686	1689		1835	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.95	1.00		1.00	
Satd. Flow (perm)	1770	3257		3433	3534		1681	1686	1689		1835	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	12	856	973	402	691	7	1117	6	983	0	8	1
RTOR Reduction (vph)	0	128	0	0	0	0	0	0	250	0	1	0
Lane Group Flow (vph)	12	1701	0	402	698	0	558	565	733	0	8	0
Turn Type	Prot			Prot			Split		Perm	Split		
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			
Actuated Green, G (s)	2.0	62.4		13.0	73.4		45.0	45.0	45.0		6.2	
Effective Green, g (s)	2.0	62.4		13.0	73.4		45.0	45.0	45.0		6.2	
Actuated g/C Ratio	0.01	0.44		0.09	0.51		0.32	0.32	0.32		0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	25	1425		313	1819		530	532	533		80	
v/s Ratio Prot	0.01	c0.52		c0.12	0.20		0.33	0.34			c0.00	
v/s Ratio Perm									c0.43			
v/c Ratio	0.48	1.19		1.28	0.38		1.05	1.06	1.38		0.10	
Uniform Delay, d1	69.8	40.1		64.8	20.9		48.8	48.8	48.8		65.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	13.8	94.3		150.1	0.1		53.7	56.5	180.6		0.6	
Delay (s)	83.6	134.4		214.9	21.1		102.5	105.3	229.4		66.1	
Level of Service	F	F		F	C		F	F	F		E	
Approach Delay (s)		134.0			91.9			162.5			66.1	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	136.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	142.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	123.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX H

OURSTON ROUNDABOUT ANALYSIS TECHNICAL MEMORANDUM

Ourston Roundabout Engineering

TECHNICAL MEMORANDUM

PREPARED FOR:	Edgar Camerino – Rick Engineering Company
PREPARED BY:	Jedidiah Munroe, Ourston Roundabout Engineering, Inc.
QA/QC BY:	Mark Lenters, Ourston Roundabout Engineering, Inc. Frank Penry, PE, TE, Senior Project Manager
PROJECT NUMBER	ORE 11-936
DATE:	May 25, 2012
SUBJECT:	**Operational Analysis** **El Camino Real Corridor between San Dieguito Road and Via de la Valle** **San Diego, California**

REGISTERED PROFESSIONAL ENGINEER
FRANK W. PENRY
TR 2304
Exp. 6-30-13
TRAFFIC
STATE OF CALIFORNIA

INTRODUCTION

An operational analysis of intersection capacity was completed for four intersections located on the El Camino corridor between San Dieguito Road and Via de la Valle just east of the City of Del Mar. This analysis evaluated the theoretical existing and future performance of roundabouts at the following intersections:

1. El Camino Real at San Dieguito Road
2. El Camino Real at the polo club access drive
3. El Camino Real at Via de la Valle
4. Via de la Valle at North El Camino Real

TRAFFIC FLOWS AND FORECAST ASSUMPTIONS

The traffic analysis was completed for the AM and PM peak for the existing turning movements derived from a recent traffic count and for the 2035 traffic forecasts. The recent traffic count was completed during an event at the polo field. This event added a significant amount of traffic to the surrounding network. In discussions with the City it has been determined that the event traffic will occur frequently and should be accounted for in our operational analysis. The existing turning movement counts and 2035 forecasts were provided by Urban Systems and are illustrated in Figure 1 and Figure 2 respectively.

OPERATIONAL ANALYSIS METHODOLOGY

The City of San Diego Traffic Impact Study (TIS) Manual states that the methodology for analyzing unsignalized intersections should follow Chapter 10 of the Highway Capacity Manual (2010). The updated 2010 HCM equations for roundabout analysis have many limitations which are well documented and are discussed in HCM and the latest national roundabout guidelines, NCHRP Report 672.

One of the major limitations discussed in NCHRP Report 672, 4.2.1 states the following:

"Much of the data available at the time of publication of the 2010 HCM dates to 2003, when fewer roundabouts operating at capacity were available for study in the United States. It is therefore probable that capacities will increase over time as drivers become more familiar and as demands on existing roundabouts force drivers to improve efficiency."

In addition, the 2010 HCM equations also produce inaccurate results when the degree of saturation is above 0.9. Page 21-19 of Volume 3 of the 2010 HCM manual states the following:

"Average control delay for a given lane is a function of the lane's capacity and degree of saturation. The analytical model used above to estimate average control delay assumes that there is no residual queue at the start of the analysis period. If the degree of saturation is greater than about 0.9, the average control delay is significantly affected by the length of the analysis period. In most cases, the recommended analysis period is 15 min. If demand exceeds capacity during a 15-min period, the delay results calculated by the procedure may not be accurate due to the likely presence of a queue at the start of the time period. In addition, the conflicting demand for movements downstream of the movement operating over capacity may not be fully realized (in other words, the flow cannot get past the oversaturated entry and thus cannot conflict with a downstream entry). In these cases, an iterative approach that accounts for this effect and the carryover of queues from one time period to the next may be considered, as discussed elsewhere (7)."

Our software model results indicate that the degree of saturation is higher than 0.9 on several of the approaches to the proposed roundabout intersections. It is our understanding that the HCM methodology is unreliable at this degree of saturation and that other methods or an iterative process should be considered.

Lastly the 2010 HCM states situations when alternative tools can produce more accurate results, (see Page 21-24 of Volume 3 of the 2010 HCM manual).

The conditions beyond the scope of this chapter that are treated explicitly by alternative tools include:

1. *Adjacent signals or roundabouts,*
2. *Priority reversal under extremely high flows,*
3. *High pedestrian or bicycle activity,*
4. *More than two entry lanes on an approach, or*
5. *Flared entry lanes.*

Each of the proposed roundabouts has at least one of these conditions. Because of the above documented limitations the roundabouts were analyzed with ARCADY Version 7.1.0.228. *ARCADY* (Assessment of Roundabout Capacity and Delay), which is a program based on U.K. empirical research into geometry-capacity relationships.

The findings on capacity performance for U.S. roundabouts to date implies a reduction in the capacity assumed for modeling this intersection as a roundabout is appropriate. The ARCADY analysis included a capacity reduction of 10%.

The combination of using ARCADY with a capacity adjustment allows for consideration of the U.S. data obtained by NCHRP and taking into account sensitivity of capacity to horizontal geometric design.

The 95th% queues were calculated by multiplying the max queue from the ARCADY results by two. Two times the max queue is based on the assumption that queue lengths are normally distributed. The max queue in ARCADY is the highest average queue of the four 15 minute time slices; which is comparable to the HCM methodology which takes the average queue of the 15 minute peak period. The reported queues in ARCADY are the expected queues for the entire entry, to calculate the queue in each lane the total queues were divided by the number of lanes.

The results for the analysis represents the most probable capacity of roundabouts and employ capacity measures of level of service, delay and queuing consistent with typical unsignalized level of service (LOS) ranges (Highway Capacity Manual, 2010). If there are no exclusive lanes at a roundabout entry, the ARCADY delay results are lane by lane results; ARCADY assumes even lane distribution at each entry, which means the average delay on each leg is the same as lane by lane results. The concept of critical lane is not well-established in the U.S. research. It originated because the multilane roundabouts being investigated did not have fully saturated entries. At times only one lane could be noted as achieving saturation. In the U.K. where roundabouts have been in existence longer, saturation of entries is not as elusive, thus the ARCADY model is robust for future conditions.

OPERATIONAL ANALYSIS RESULTS BY INTERSECTION

El Camino Real & San Dieguito Road (ARCADY Analysis)

Roundabout Level of Service - Existing Traffic Counts

The operational analysis was undertaken with the existing traffic volumes for the proposed roundabout configuration, as illustrated in Figure 3. The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 1.

Table 1. El Camino Real & San Dieguito Road – Existing Traffic Volumes

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach								
				SB - El Camino Real			NB - El Camino Real			WB - San Dieguito Rd		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	A	3.3	A	3.2	1	A	2.3	1	A	3.9	2
PM	Calibrated	A	3.0	A	2.4	1	A	3.2	1	A	3.4	1

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix A, pages A.1.1 and A.1.2

Roundabout Level of Service - 2035 Traffic Forecasts

The operational analysis was performed with the 2035 traffic forecasts for the proposed roundabout configuration, as illustrated in Figure 3. The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 2.

Table 2. El Camino Real & San Dieguito Road – 2035 Traffic Forecasts

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach								
				SB - El Camino Real			NB - El Camino Real			WB - San Dieguito Rd		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	B	12.4	C	20.3	25	A	3	1	A	8.1	5
PM	Calibrated	A	8.1	A	5.6	9	B	10	22	A	7.8	13

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix A, pages A.2.1 and A.2.2

Discussion

The proposed roundabout is at a T intersection and would be a conventional two-lane roundabout with: through/left and through lanes southbound; through and through/right lanes northbound; and, left and left/right lanes westbound. If the traffic forecasts were to change in the future the City could provide some flexibility in the design by protecting right-of-way for a future westbound partial right turn bypass lanes (see dashed lines on Figure 2).

El Camino Real & Horse Park/Polo Grounds (ARCADY Analysis)

Roundabout Level of Service - Existing Traffic Counts

The operational analysis was performed with the existing traffic volumes for the proposed roundabout configuration, as illustrated in Figure 4. The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 3.

Table 3. El Camino Real & Horse Park/Polo Grounds – Existing Traffic Volumes

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - El Camino Real			EB - Horse Park			NB - El Camino Real			WB - Polo Grounds		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	A	2.3	A	2.4	1	A	0.0	0	A	2.1	1	A	0.0	0
PM	Calibrated	A	2.7	A	2.2	1	A	6.1	1	A	2.5	1	A	3.8	1

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix B, pages B.1.1 and B.1.2

Roundabout Level of Service - 2035 Traffic Forecasts

The operational analysis was performed with the 2035 traffic forecasts for the proposed roundabout configuration, as illustrated in Figure 4. The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 4.

Table 4. El Camino Real & Horse Park/Polo Grounds – 2035 Traffic Forecasts

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - El Camino Real			EB - Horse Park			NB - El Camino Real			WB - Polo Grounds		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% queue (veh)	Level of Service	Average Delay	95th% queue (veh)	Level of Service	Average Delay	95th% queue (veh)	Level of Service	Average Delay	95th% queue (veh)
AM	Calibrated	A	4.0	A	4.8	3	A	10.0	1	A	2.8	1	A	0.0	0
PM	Calibrated	A	9.7	A	4.1	3	B	12.8	1	A	4.6	3	D	32.9	16

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix B, pages B.2.1 and B.2.2

Discussion

The proposed roundabout is a standard "two-by-one" roundabout with: two through lanes for southbound and northbound directions, consisting of a conventional left/through and through/right; a left/through and right only lane for eastbound; and, a left/through/right and right-only lane for westbound.

El Camino Real & Via de la Valle (ARCADY Analysis)

Roundabout Level of Service - Existing Traffic Counts

The operational analysis was performed with the existing traffic volumes for an interim roundabout configuration, as illustrated in Figure 5. The interim design is recommended at the initial stage because:

- It will be easier for drivers to navigate;
- Safer design due to slower entry speeds and reduced number of conflict points;
- The interim two lanes for the westbound direction will start to congest at approximately 95% of the projected traffic growth;
- Uncertainty in the event traffic from the Polo Fields ; and,
- Avoidance of overbuilding the layout if traffic growth is lower than expected. Several state agencies with long time roundabout experience have found it necessary to stage roundabout construction in response to concerns from communities for overbuilding and over complicating their roundabouts by needing to build for an uncertain ultimate traffic horizon.

The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 5.

Table 5. El Camino Real & Via de la Valle – Existing Traffic Volumes

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - Driveway			EB - Via de la Valle			NB - El Camino Real			WB - Via de la Valle		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	A	3.1	A	0.0	0	A	2.7	1	A	2.6	1	A	3.7	2
PM	Calibrated	A	3.3	A	6.5	1	A	2.7	1	A	3.9	2	A	2.8	1

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay In Seconds*

We also completed a residual capacity analysis on the existing traffic forecasts for the interim roundabout design. Residual capacity is expressed as the percentage increase in total entering traffic beyond the existing turning counts that would result in any individual leg operating at LOS E (delay greater than 35 seconds). Increases in traffic flows were assumed to occur equally on all legs until one leg reached LOS E. The residual capacity for the AM and PM peak hours is listed below:

AM: WB congests with a **61%** increase in traffic growth above the existing traffic volumes (which is approximately 95% of the project traffic increase).

PM: NB congests with a **54%** increase in traffic growth above the existing traffic volumes (which is approximately 50% of the project traffic increase).

The ARCADY operational analysis data is documented in Appendix C, pages C.1.1 and C.1.4

Roundabout Level of Service - 2035 Traffic Forecasts – Interim Design

The operational analysis was performed with the 2035 traffic forecasts for the interim roundabout configuration, as illustrated in Figure 5. The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 6.

Table 6. El Camino Real & Via de la Valle – 2035 Traffic Forecasts – Interim Design

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - Driveway			*EB - Via de la Valle			NB - El Camino Real			WB - Via de la Valle		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	E	37.0	F	885.8	10	*C/E	*15.2/41.4	*10/42	A	4.0	2	F	58.4	80
PM	Calibrated	F	204.2	D	28.6	1	*D/F	*28.4/81.9	*34/106	F	437.0	452	A	6.6	3

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

*Due to unbalanced flows a lane by lane analysis was complete for this intersection (left/thru)/(right)

The ARCADY operational analysis data is documented in Appendix C, pages C.2.1 and C.2.4

Roundabout Level of Service - 2035 Traffic Forecasts – Ultimate design

The operational analysis was performed with the 2035 traffic forecasts derived for the ultimate roundabout configuration which includes the addition of a second lane in the southbound direction, an eastbound and northbound partial right-turn bypass and a third lane in the westbound direction, as illustrated in Figure 5 (see dashed lines). The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 7.

Table 7. El Camino Real & Via de la Valle – 2035 Traffic Forecasts – Ultimate Design

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - Driveway			*EB - Via de la Valle			*NB - El Camino Real			WB - Via de la Valle		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	A	5.0	C	18.8	1	*A/A	*3.4/9.4	*1/4	*A/A	*3.3/3.3	*1/1	A	6.7	4
PM	Calibrated	A	9.3	B	10.4	1	*A/A	*3.2/8.2	*1/4	*A/C	*7/23.3	*4/17	A	4.7	2

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

*Due to proposed partial right turn bypass a lane by lane analysis was complete for this intersection (left/thru)/(right turn bypass)

The ARCADY operational analysis data is documented in Appendix C, pages C.3.1 and C.3.6

Discussion

The proposed roundabout design has an interim lane configuration and with minimal rework it can be upgraded to the ultimate lane configuration. The interim roundabout design consists of a single southbound lane, a conventional left/through and through/right lane for the eastbound and westbound directions, as well as a left turn only lane and a left/through/right lane for the northbound direction. The interim design will not be able to handle the projected 2035 traffic forecasts and will have to be upgraded to the ultimate lane configuration, the additions consists of a second southbound through lane, dual partial right turn bypass lanes for the eastbound and northbound directions, as well as an additional left turn for westbound direction, illustrated in Figure 5 as dashed lines

Via de la Valle & North El Camino Real (ARCADY Analysis)

Roundabout Level of Service - Existing Traffic Counts

The operational analysis was performed with the existing traffic volumes for the proposed roundabout configuration, as illustrated in Figure 6. The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 8.

Table 8. Via de la Valle & North El Camino Real – Existing Traffic Volumes

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - N. El Camino Real			EB - Via de la Valle			NB - Driveway			WB - Via de la Valle		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	A	2.7	A	3.0	1	A	2.0	1	A	0.0	0	A	3.1	1
PM	Calibrated	A	2.5	A	2.4	1	A	2.5	1	A	0.0	0	A	2.7	1

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix D, pages D.1.1 and D.1.2

Roundabout Level of Service - 2035 Traffic Forecasts

The operational analysis was performed with the 2035 traffic forecasts for the proposed roundabout configuration, as illustrated in Figure 6. The overall intersection level of service, anticipated delay for each approach and 95th% queues are listed in Table 9.

Table 9. Via de la Valle & North El Camino Real – 2035 Traffic Forecasts

Peak Hour	Analysis Condition	Overall Intersection Level of Service		Average Delay By Approach											
				SB - N. El Camino Real			EB - Via de la Valle			NB - Driveway			WB - Via de la Valle		
		Level of Service	Average Delay	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)	Level of Service	Average Delay	95th% Queue (veh)
AM	Calibrated	A	5.6	A	5.5	1	A	2.5	1	A	5.2	1	A	7.6	5
PM	Calibrated	A	7.1	A	3.3	1	A	8.1	8	C	20.8	1	A	5.5	3

LOS Source: 2010 Highway Capacity Manual - Unsignalized Intersections *Delay in Seconds*

The ARCADY operational analysis data is documented in Appendix D, pages D.2.1 and D.2.2

Discussion

The proposed intersection layout is a conventional multilane roundabout T intersection with southbound and westbound approaches flaring from single lanes to two lanes at the entries. In the future a fourth leg could be added to access a proposed development in the south quadrant; however, this was not depicted conceptually.

ADDITIONAL CONSIDERATIONS

Design Vehicle

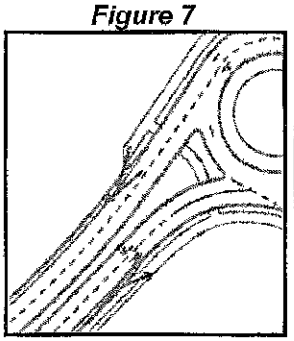
A WB-67 was selected to be accommodated in all the roundabouts except for the north leg of the Via de la Valle and El Camino Real roundabout and is a conservative estimation of the truck paths; the WB-67 has a longer trailer than the standard Cal Trans vehicle STAA-STD-50. The STAA-STD-50 was used to design the entry and exit to the shopping center for the north leg of the Via de la Valle and El Camino Real roundabout. The design vehicle turning movements are shown in Appendix E.

Bike Accommodations

Cyclist will have two options to traverse the roundabouts, see Figure 7:

- They may choose to travel through the roundabout like the other vehicles; or,
- They may choose to exit the roadway at the bike off-ramp and use the wider shared use sidewalk to travel on foot and re-enter the roundabout at the downstream bike on ramp.

Figure 7



Pedestrian Accommodations

The proposed roundabout designs meet the current accessibility design standards by providing accessible pedestrian crosswalks at most of the entries and exits of the four proposed roundabouts along the El Camino Real corridor. The crosswalks are at grade crosswalks located between 20 feet and 25 feet of the entries and exits. At this time studies of pedestrian safety at roundabouts have found no evidence that roundabouts put pedestrians at greater risk of being struck, or at greater risk of injury when involved in a motor vehicle collision. The documented evidence that they are actually safer is for the following reasons:

- Roundabout have slower operating speeds;
- Pedestrians only need to look in one direction as they cross;
- Shorter crossing distances; and,
- Pedestrians are more alert when crossing, because it is an uncontrolled crossing.

Notwithstanding, the uncontrolled pedestrian crosswalks at roundabouts are uncomfortable for pedestrians, i.e. their sense of safety is low. This presents a challenge for some pedestrians with disabilities, e.g. visually impaired. In response to these concerns the US Access Board is proposing the use of , pedestrian actuated crossing systems, e.g. hybrid beacons (PHB) at pedestrian crosswalks for multi-lane roundabouts. Final rule-making and legislation has not been enacted, thus the City is not obliged to install additional devices at this time.

To be proactive the City could consider placing underground conduit for a possible future pedestrian crossing signal on one or more roundabout approaches or exits. The basis of determining which intersection legs could be candidates for pedestrian actuated signals requires further discussion and examination of the potential pedestrian desire lines. This examination, while allowing the City to place pedestrian crossings at the appropriate locations, will minimizing unneeded pedestrian crossings. One such example might be to strategically place one pedestrian crossing on Via de la Valle between the El Camino Real (south) and El Camino Real (north) roundabouts instead of one at each roundabout. We can offer further guidance on the setback distance and design of these devices.

Knowledge of pedestrian crossings at roundabouts both un-signalized and signalized is growing. Generally, pedestrian crossing capacity is optimal when there is roadway congestion because gaps in approaching traffic occur more frequently as vehicle queues develop. Impact of signalized pedestrian crossings can be modeled based on some U.S. research but mostly from European research. In general, the same expectations prevail, that roundabouts with congestion are more accessible because traffic is queued near the roundabout crossing locations. Pedestrian actuated signals are then more useful in off-peak conditions when speeds of approach and departure are higher and gaps are more difficult to predict.

Prediction of the impact of potential pedestrian signals on a roundabout operation will require determination of future pedestrian crossing volumes. From field reports we understand that pedestrian traffic is very low at present. Pedestrian crossing counts and travel patterns for the corridor have not been obtained to date. Notwithstanding, if the expected pedestrian traffic is as low as the current conditions, the effect on roundabout operations will be negligible. The NCHRP Report 672 documents the research into potential capacity effect of pedestrian crossings (see Section 4.5.4). A 10% effect on capacity requires over 200 pedestrian crossings per hour with moderate traffic circulating in front of the roundabout entry in question. Given the improved efficiency of newer pedestrian actuated signal technology, e.g. push-button, split phase, count-down and gap-out detection, the effect on roundabout operations is not likely to be significant.

CONCLUSIONS

The results of the ARCADY analysis of the proposed roundabouts show an overall intersection LOS and a LOS B or better for the El Camino Real/San Dieguito roundabout, El Camino Real/Horse Park/Polo Fields roundabout , Via de la Valle/North El Camino Real roundabout, and the ultimate lane configuration for the Via de la Valle/El Camino Real roundabout.

For the Via de la Valle/El Camino Real roundabout an interim/ultimate staging plan is being proposed. The interim lane configuration will have significant delay at the 2035 forecasted traffic volumes, but with minimal rework the roundabout could be upgraded to the ultimate lane configuration. Also if the traffic patterns would change in the future then only some elements of the ultimate lane configuration would be needed. The interim design is recommended at the initial stage because:

- It will be easier for drivers to navigate;
- Safer design due to slower entry speeds and reduced number of conflict points;
- The interim two lanes for the westbound direction will reach capacity at approximately 95% of the projected traffic growth;
- Uncertainty in the event traffic from the Polo Fields ; and,
- Avoidance of overbuilding the layout if traffic growth is lower than expected. Several state agencies with long time roundabout experience have found it necessary to stage roundabout construction in response to concerns from communities for overbuilding and over complicating their roundabouts by needing to build for an uncertain ultimate traffic horizon.

Figure 1: Existing AM and PM Turning Movement Diagrams from a Recently Completed Traffic Count (c. November 2011)

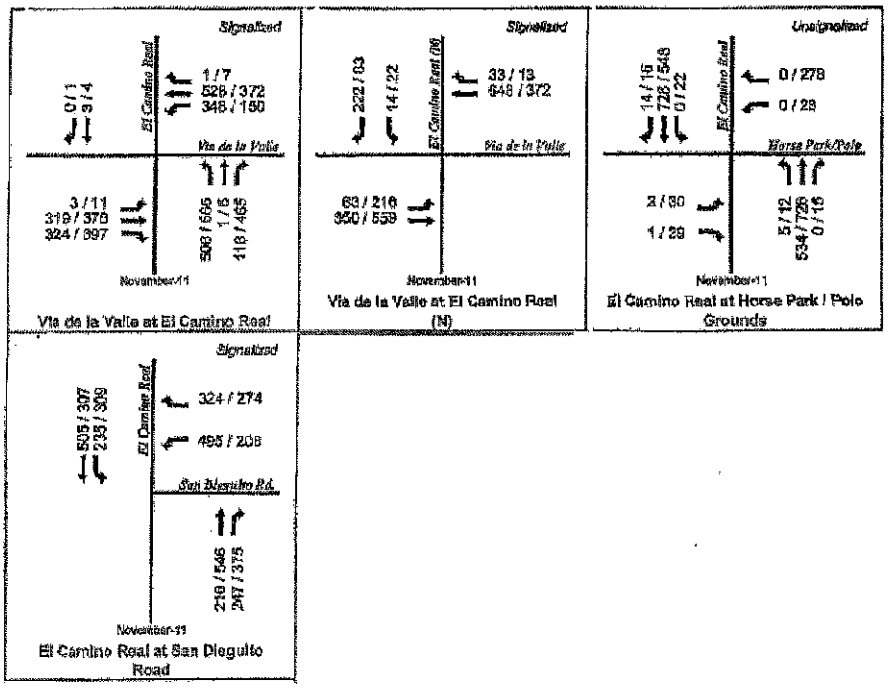


Figure 2: 2035 AM and PM Turning Movement Diagrams projected from the Recently Completed Traffic Count (c. November 2011)

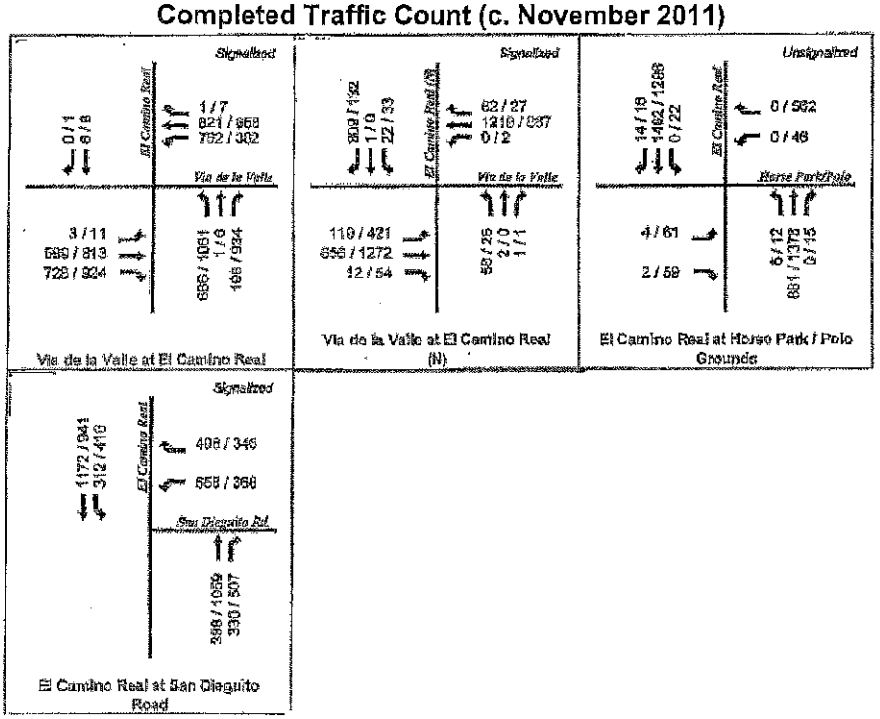


Figure 3: Lane Configuration for El Camino Real & San Dieguito Road

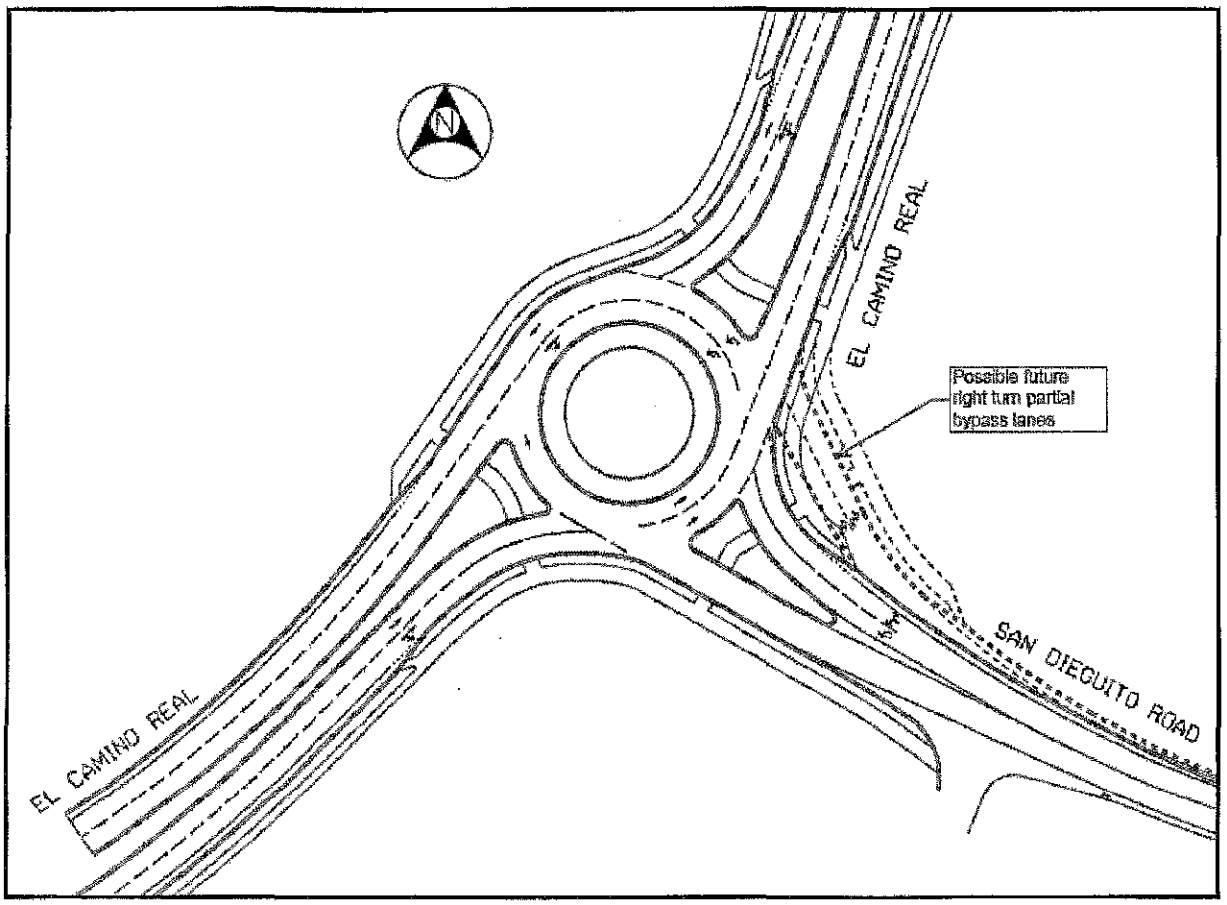


Figure 4: Lane Configuration for El Camino Real & Horse Park/Polo Grounds

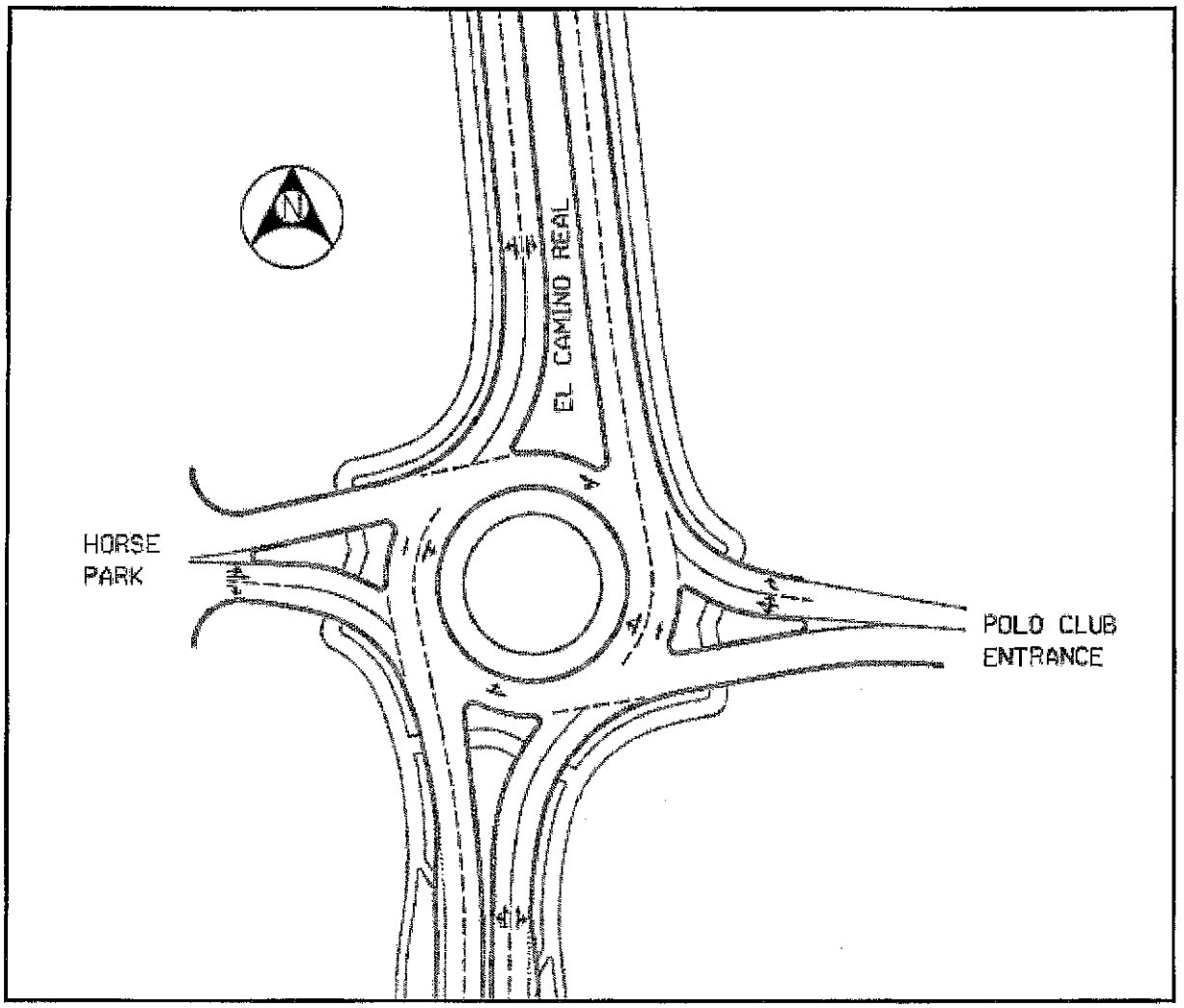


Figure 5: Lane Configuration for El Camino Real & Via de la Valle

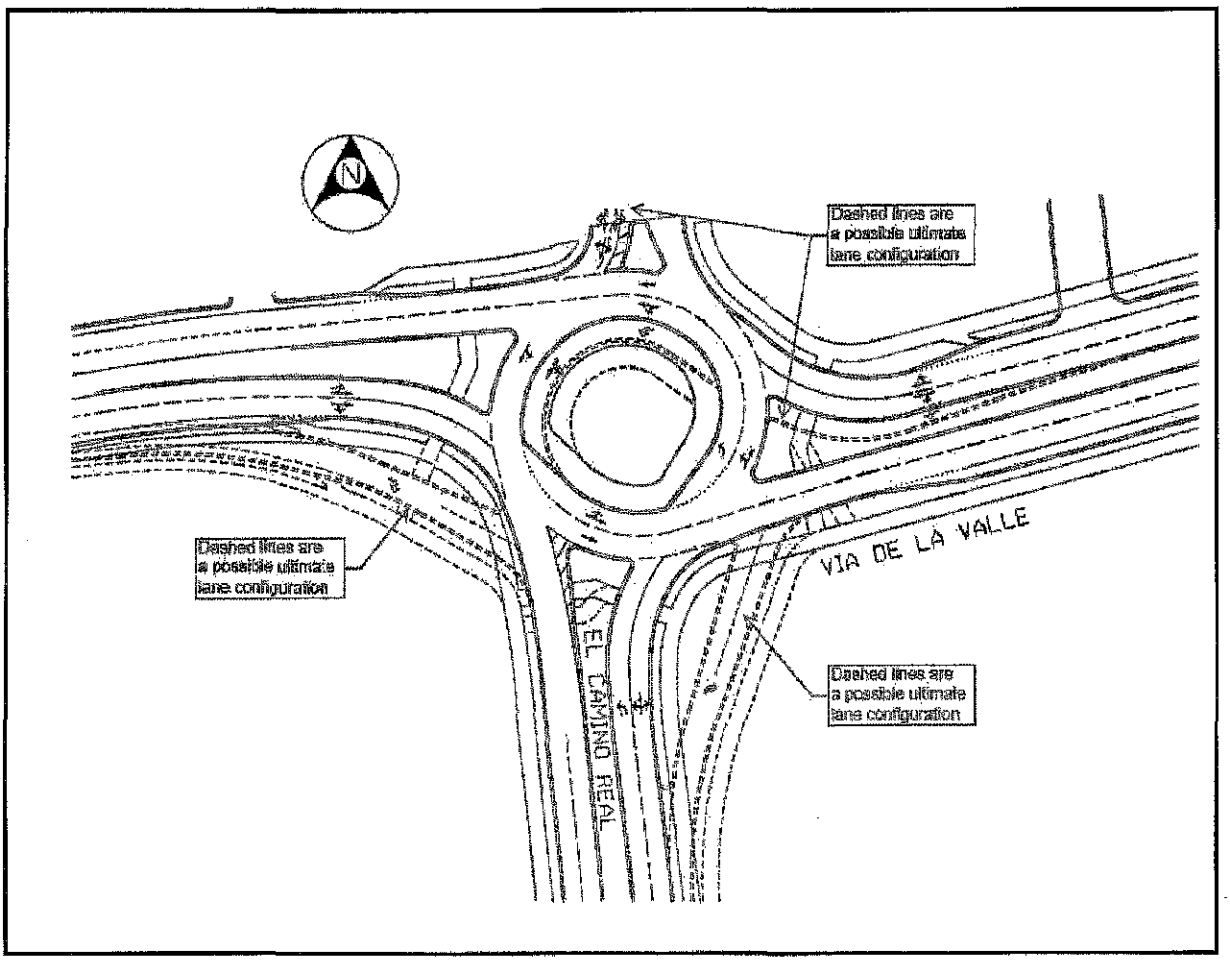
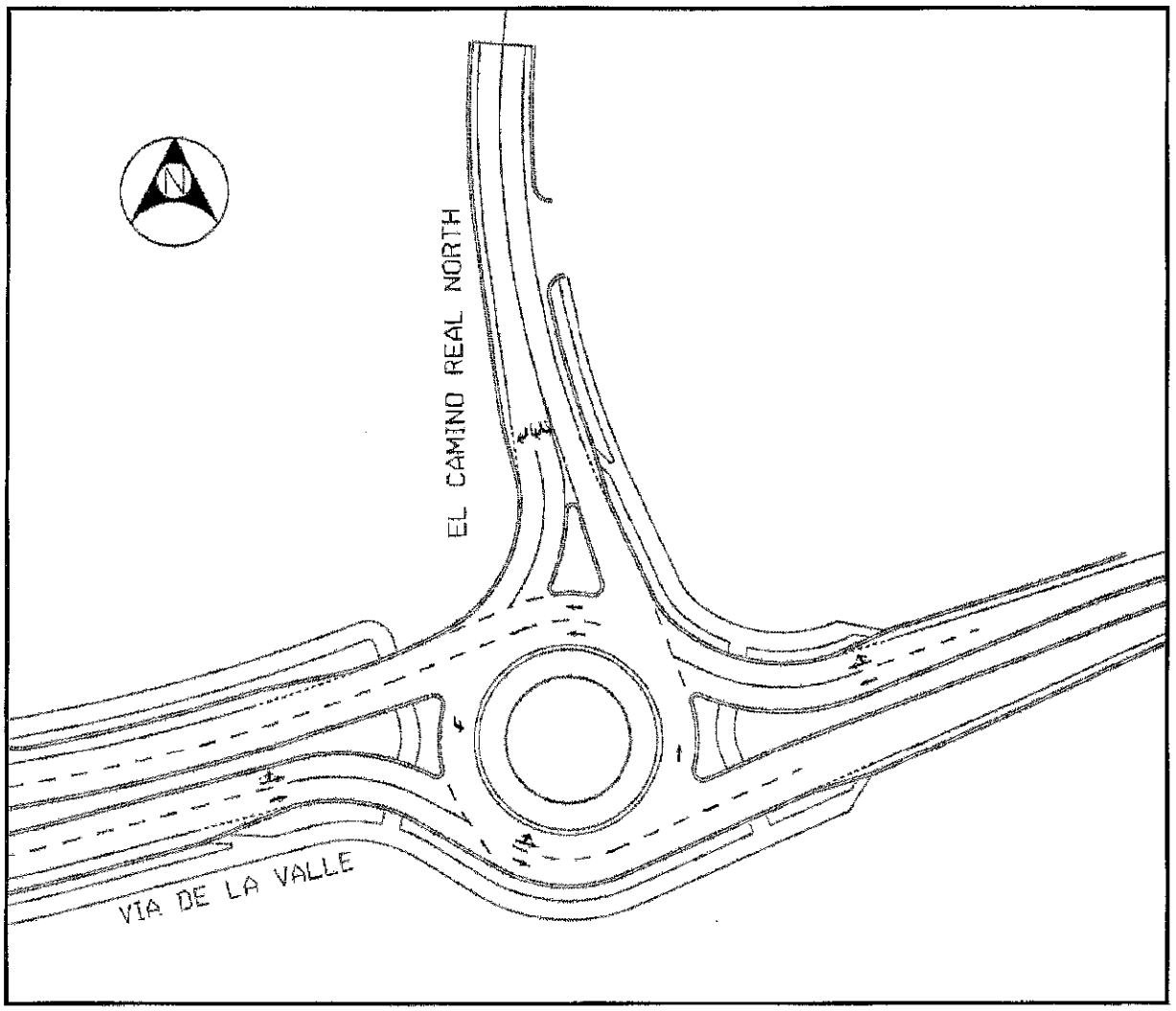


Figure 6: Lane Configuration for Via de la Valle & North El Camino Real



APPENDIX A

El Camino Real Corridor

San Dieguito Road

A.1 Existing 2011 Traffic Volumes Operational Analysis ..... A.1.1 – A.1.2

A.2 2035 Traffic Volumes Operational Analysis..... A.2.1 – A.2.2

Existing 2011 Traffic Volumes Operational Analysis

AM

D3 - Existing 2011, AM

Data Grid - Standard Geometry - Showing 3 of 3 items, 15 column(s)

Column Layouts | Rotate grid | Full-size mode

Standard Geometry

Edit In Window

Arm	SB El Camino Real	NB El Camino Real	San Dieguito Road
V - Approach road half-width (ft)	24.00	24.00	12.00
E - Entry width (ft)	26.00	26.00	26.00
l' - Effective flare length (ft)	50.00	50.00	100.00
R - Entry radius (ft)	90.00	90.00	75.00
D - Inscribed circle diameter (ft)	170.00	150.00	170.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00
Exit Only	☐	☐	☐
Total Demand (Veh/hr)	679.04	424.86	751.53
Total Arrivals (Veh)	1018.56	637.29	1127.29
Max Queue (Veh)	0.84	0.34	1.16
Max Delay (s)	3.71	2.42	4.65
Max RFC	0.46	0.26	0.54
Slope	0.762	0.794	0.683
Intercept (PCE/hr)	2244.383	2244.383	1874.866
Average Queueing Delay (s)	3.17	2.26	3.92

Turning Proportions/Counts - El Camino Real & San Dieguito - Whole Pe...

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	U-Turn	Total
SB El Camino Real	505.000	235.000	0.000	740.00
NB El Camino Real	247.000	216.000	0.000	463.00
San Dieguito Road	324.000	495.000	0.000	819.00
Total	1076.00	946.00	0.00	

Enter Turning Counts OR Proportions.

Existing 2011 Traffic Volumes Operational Analysis

PM

D4 - Existing 2011, PM

Data Grid - Standard Geometry - Showing 3 of 3 Items - 15 column(s)

Column Layouts | Rotate Grid | Full Size Mode

Standard Geometry

Edit In Window

Item	SB El Camino Real	NB El Camino Real	San Dieguito Road
V - Approach road half-width (ft)	24.00	24.00	12.00
E - Entry width (ft)	26.00	26.00	26.00
l - Effective flare length (ft)	50.00	50.00	100.00
R - Entry radius (ft)	90.00	90.00	75.00
D - Inscribed circle diameter (ft)	170.00	150.00	170.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00
Exit Only	☐	☐	☐
Total Demand (Veh/hr)	565.22	845.08	442.27
Total Arrivals (Veh)	847.83	1267.62	663.40
Max Queue (Veh)	0.48	1.05	0.56
Max Delay (s)	2.59	3.75	3.86
Max RPC	0.33	0.51	0.36
Slope	0.762	0.794	0.683
Intercept (PCE/hr)	2244.383	2244.383	1874.666
Average Queueing Delay (s)	2.39	3.19	3.40

Turning Proportions/Counts - El Camino Real & San Dieguito - Whole Pe...

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	U-Turn	Total
SB El Camino Real	307.000	309.000	0.000	616.00
NB El Camino Real	375.000	546.000	0.000	921.00
San Dieguito Road	274.000	208.000	0.000	482.00
Total	956.00	1063.00	0.00	

Enter Turning Counts OR Proportions.

2035 Traffic Volumes Operational Analysis

AM

D2 - El Camino Real & San Dieguito, AM

Data Grid - Standard Geometry - Showing 3 of 3 items, 15 column(s)

Column Layouts | Rotate grid | Full-size mode

Standard Geometry

Edit In Window

Arm	SB El Camino Real	NB El Camino Real	San Dieguito Road
V - Approach road half-width (ft)	24.00	24.00	12.00
E - Entry width (ft)	26.00	26.00	25.00
T - Effective flare length (ft)	50.00	50.00	100.00
R - Entry radius (ft)	90.00	90.00	75.00
D - Inscribed circle diameter (ft)	170.00	150.00	170.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00
Exit Only	☐	☐	☐
Total Demand (Veh/hr)	1361.74	658.85	1060.77
Total Arrivals (Veh)	2042.62	988.27	1591.15
Max Queue (Veh)	24.61	0.69	4.48
Max Delay (s)	54.90	3.15	13.05
Max RFC	0.99	0.41	0.82
Slope	0.762	0.794	0.683
Intercept (PCE/hr)	2244.383	2244.383	1874.866
Average Queueing Delay (s)	20.32	2.80	8.10

Turning Proportions/Counts - El Camino Real & San Dieguito - Whole Peri.

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	U-Turn	Total
SB El Camino Real	1172.000	312.000	0.000	1484.00
NB El Camino Real	330.000	389.000	0.000	718.00
San Dieguito Road	498.000	658.000	0.000	1156.00
Total	2000.00	1358.00	0.00	

Enter Turning Counts OR Proportions.

2035 Traffic Volumes Operational Analysis

PM

D1 – El Camino Real & San Dieguito, PM

Data Grid - Standard Geometry - Showing 3 of 3 items, 15 column(s)

Column Layouts | Rotate grid | Full Size mode

Standard Geometry — Edit In Window

Arm	SB El Camino Real	NB El Camino Real	San Dieguito Road
V - Approach road half-width (ft)	24.00	24.00	12.00
E - Entry width (ft)	26.00	26.00	26.00
L - Effective flare length (ft)	50.00	50.00	100.00
R - Entry radius (ft)	90.00	90.00	75.00
D - Inscribed circle diameter (ft)	170.00	150.00	170.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00
Exit Only	☐	☐	☐
Total Demand (Veh/hr)	1245.14	1436.90	655.14
Total Arrivals (Veh)	1867.71	2155.34	982.70
Max Queue (Veh)	3.31	9.66	2.59
Max Delay (s)	8.13	21.44	12.28
Max RFC	0.77	0.92	0.73
Slope	0.762	0.794	0.683
Intercept (PCE/hr)	2244.383	2244.383	1874.366
Average Queueing Delay (s)	5.57	10.43	7.76

Turning Proportions/Counts - El Camino Real & San Dieguito - Whole Peri...

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	U-Turn	Total
SB El Camino Real	941.000	416.000	0.000	1357.00
NB El Camino Real	507.000	1059.000	0.000	1566.00
San Dieguito Road	346.000	368.000	0.000	714.00
Total	1794.00	1843.00	0.00	

Enter Turning Counts OR Proportions.

APPENDIX B

El Camino Real Corridor

Horse Park & Polo Grounds

B.1 Existing 2011 Traffic Volumes Operational Analysis ..... B.1.1 – B.1.2

B.2 2035 Traffic Volumes Operational Analysis ..... B.2.1 – B.2.2

Existing 2011 Traffic Volumes Operational Analysis

AM

D3 - 2011 Peak Hour, AM

Data Grid - Standard Geometry - Showing 4 of 4 items, 15 column(s)

Column Layouts | Rotate grid | Full-size mode

Standard Geometry

Edit In Window

Item	SB - El Camino Real	EB - Horse Park	NB - El Camino Real	WB - Polo Grounds
V - Approach road half-width (ft)	24.00	12.00	24.00	12.00
E - Entry width (ft)	26.00	26.00	26.00	26.00
L - Effective flare length (ft)	50.00	50.00	50.00	65.00
R - Entry radius (ft)	90.00	70.00	90.00	75.00
D - Inscribed circle diameter (ft)	150.00	170.00	150.00	170.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	690.87	0.00	494.60	0.00
Total Arrivals (Veh)	1021.31	0.00	741.89	0.00
Max Queue (Veh)	0.59	0.00	0.37	0.00
Max Delay (s)	2.61	0.00	2.24	0.00
Max RFC	0.37	0.00	0.27	0.00
Slope	0.794	0.640	0.794	0.659
Intercept (PCE/hr)	2244.383	1671.796	2244.383	1755.146
Average Queueing Delay (s)	2.48	0.00	2.12	0.00

Turning Proportions/Counts - El Camino Real & Polo Club/Driveway - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From / To	1st	2nd	3rd	U-Turn	Total
SB - El Camino Real	14.000	728.000	0.000	0.000	742.00
EB - Horse Park	1.000	0.000	2.000	0.000	3.00
NB - El Camino Real	0.000	534.000	5.000	0.000	539.00
WB - Polo Grounds	0.000	0.000	0.000	0.000	0.00
Total	15.00	1262.00	7.00	0.00	

Enter Turning Counts OR Proportions.

Existing 2011 Traffic Volumes Operational Analysis

PM

D4 - 2011 Peak Hour, PM

Data Grid - Standard Geometry - Showing 4 of 4 items, 15 column(s)

Column Layouts | Rotate grid | Full-size mode

Standard Geometry

Edit In Window

From	SB - El Camino Real	EB - Horse Park	NB - El Camino Real	WB - Polo Grounds
V - Approach road half-width (ft)	24.00	12.00	24.00	12.00
E - Entry width (ft)	26.00	26.00	26.00	26.00
l' - Effective flare length (ft)	50.00	50.00	50.00	65.00
R - Entry radius (ft)	90.00	70.00	90.00	75.00
D - Inscribed circle diameter (ft)	150.00	170.00	150.00	170.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	537.72	54.14	690.97	276.20
Total Arrivals (Veh)	806.59	81.21	1036.45	414.30
Max Queue (Veh)	0.42	0.12	0.62	0.40
Max Delay (s)	2.36	6.60	2.71	4.32
Max RFC	0.30	0.11	0.38	0.28
Slope	0.794	0.640	0.794	0.659
Intercept (PCE/hr)	2244.383	1671.796	2244.383	1755.146
Average Queueing Delay (s)	2.21	6.12	2.48	3.77

Turning Proportions/Counts - El Camino Real & Polo Club/Driveway - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - El Camino Real	16.000	548.000	22.000	0.000	586.00
EB - Horse Park	29.000	0.000	30.000	0.000	59.00
NB - El Camino Real	15.000	726.000	12.000	0.000	753.00
WB - Polo Grounds	278.000	0.000	23.000	0.000	301.00
Total	338.00	1274.00	87.00	0.00	

Enter Turning Counts OR Proportions.

2035 Traffic Volumes Operational Analysis

AM

D1 - 2035 Peak Hour, AM

Data Grid - Standard Geometry - Showing 4 of 4 items; 15 column(s)

Column Layouts | Rotate grid | Full size mode

Standard Geometry

Edit In Window

Arm	SB - El Camino Real	EB - Horse Park	NB - El Camino Real	WB - Polo Grounds
V - Approach road half-width (ft)	24.00	12.00	24.00	12.00
E - Entry width (ft)	26.00	26.00	26.00	26.00
T - Effective flare length (ft)	50.00	50.00	50.00	65.00
R - Entry radius (ft)	90.00	70.00	90.00	75.00
D - Inscribed circle diameter (ft)	150.00	170.00	150.00	170.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	1372.75	5.51	813.01	0.00
Total Arrivals (Veh)	2059.13	8.26	1219.51	0.00
Max Queue (Veh)	2.96	0.02	0.80	0.00
Max Delay (s)	6.55	12.39	2.95	0.00
Max RFC	0.75	0.02	0.44	0.00
Slope	0.794	0.640	0.794	0.659
Intercept (PCE/hr)	2244.383	1671.796	2244.383	1755.145
Average Queueing Delay (s)	4.80	9.99	2.54	0.00

Turning Proportions/Counts - El Camino Real & Polo Club/Driveway - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - El Camino Real	14.000	1482.000	0.000	0.000	1496.00
EB - Horse Park	2.000	0.000	4.000	0.000	6.00
NB - El Camino Real	0.000	881.000	5.000	0.000	886.00
WB - Polo Grounds	0.000	0.000	0.000	0.000	0.00
Total	16.00	2363.00	9.00	0.00	

Enter Turning Counts OR Proportions.

2035 Traffic Volumes Operational Analysis

PM

D2 - 2035 Peak Hour, PM

Data Grid - Standard Geometry - Showing 4 of 4 items - 15 column(s)

Column Layouts | Rotate grid | Full size mode

Standard Geometry

Edit In Window

From	SB - El Camino Real	EB - Horse Park	NB - El Camino Real	WB - Polo Grounds
V - Approach road half-width (ft)	24.00	12.00	24.00	12.00
E - Entry width (ft)	26.00	26.00	26.00	26.00
l' - Effective flare length (ft)	50.00	50.00	50.00	65.00
R - Entry radius (ft)	90.00	70.00	90.00	75.00
D - Inscribed circle diameter (ft)	150.00	170.00	150.00	170.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	1225.94	110.11	1289.25	557.91
Total Arrivals (Veh)	1838.91	165.17	1933.88	836.87
Max Queue (Veh)	2.14	0.63	2.63	17.79
Max Delay (s)	5.29	17.43	6.19	95.64
Max RFC	0.88	0.39	0.73	1.00
Slope	0.794	0.640	0.794	0.659
Intercept (PCE/hr)	2244.383	1671.796	2244.383	1755.146
Average Queueing Delay (s)	4.12	12.75	4.61	32.88

Turning Proportions/Counts - El Camino Real & Polo Club/Driveway - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - El Camino Real	16.000	1298.000	22.000	0.000	1336.00
EB - Horse Park	59.000	0.000	61.000	0.000	120.00
NB - El Camino Real	15.000	1378.000	12.000	0.000	1405.00
WB - Polo Grounds	562.000	0.000	46.000	0.000	608.00
Total	652.00	2676.00	141.00	0.00	

Enter Turning Counts OR Proportions

APPENDIX C

El Camino Real Corridor

Via de la Valle & El Camino Real

C.1 Existing 2011 Traffic Volumes Operational Analysis ..... C.1.1 – C.1.4

C.2 2035 Traffic Volumes Interim Operational Analysis..... C.2.1 – C.2.4

C.3 2035 Traffic Volumes Ultimate Operational Analysis ..... C.3.1 – C.3.6

Existing 2011 Traffic Volumes Operational Analysis

AM

D3 - 2011 Peak Hour, AM

Data Grid - Standard Geometry - Showing 4 of 4 items, 15 column(s)

Column Layouts ... Rotate grid ... Collapse nodes

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
L' - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	0.00	592.78	573.51	804.75
Total Arrivals (Veh)	0.00	889.17	860.27	1207.13
Max Queue (Veh)	0.00	0.60	0.56	1.20
Max Delay (s)	0.00	3.04	2.91	4.52
Max RFC	0.00	0.38	0.36	0.55
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	0.00	2.72	2.62	3.67

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

FROM / TO	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	0.000	3.000	0.000	0.000	3.00
EB - Via de la Valle	324.000	319.000	3.000	0.000	646.00
NB - El Camino Real	118.000	1.000	505.000	0.000	625.00
WB - Via de la Valle	1.000	528.000	349.000	0.000	877.00
Total	443.00	851.00	857.00	0.00	

Enter Turning Counts OR Proportions.

Existing 2011 Traffic Volumes Operational Analysis

PM

D4 - 2011 Peak Hour, PM

Data Grid - Standard Geometry - Showing 4 of 4 items, 15 column(s)

Column Layouts | Rotate Grid | Edit Selected

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
L' - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	150.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	4.59	719.41	950.65	485.42
Total Arrivals (Veh)	6.88	1079.12	1425.98	728.13
Max Queue (Veh)	0.01	0.72	1.56	0.52
Max Delay (s)	7.67	3.01	4.95	3.22
Max RFC	0.01	0.42	0.61	0.34
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1119.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	6.59	2.69	3.93	2.84

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	1.000	4.000	0.000	0.000	5.00
EB - Via de la Valle	397.000	376.000	11.000	0.000	784.00
NB - El Camino Real	465.000	6.000	565.000	0.000	1036.00
WB - Via de la Valle	7.000	372.000	150.000	0.000	529.00
Total	870.00	758.00	726.00	0.00	

Enter Turning Counts OR Proportions.

Existing 2011 Traffic Volumes Operational Analysis

AM

Residual Capacity

WB Via de la Valle Fails at an Additional 61%

D3 - 2011 Peak Hour, AM

Data Grid - Standard Geometry - Showing 4 of 4 items - 15 column(s)

Column Layouts | Relate Grid | Full Screen Mode

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
W - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
T - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	0.00	964.38	923.35	1295.65
Total Arrivals (Veh)	0.00	1431.57	1385.03	1943.47
Max Queue (Veh)	0.00	1.92	1.70	45.76
Max Delay (s)	0.00	6.10	5.56	98.80
Max RFC	0.00	0.66	0.63	1.04
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	0.00	4.64	4.28	35.13

Network Flow Scaling Factor (%) 161.000

Existing 2011 Traffic Volumes Operational Analysis

PM

Residual Capacity

NB El Camino Real Fails at an Additional 54%

D4 - 2011 Peak Hour, PM

Data Grid - Standard Geometry Showing 4 of 4 items 15 column(s)

Column Layouts Reset Fit Size Index

Standard Geometry Edit In Window

Item	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
W - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
L' - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	7.07	1107.89	1464.00	747.55
Total Arrivals (Veh)	10.60	1661.84	2196.01	1121.32
Max Queue (Veh)	0.05	2.00	50.78	1.56
Max Delay (s)	23.57	5.45	95.71	6.33
Max RPC	0.05	0.67	1.04	0.61
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	15.15	4.22	35.21	4.82

Network Flow Scaling Factor (%) 154.000

2035 Traffic Volumes Interim Operational Analysis

AM

DI - 2035 Peak Hour, AM

Data: Grid - Standard Geometry - Showing 4 of 4 items - 15 columns

Column Layouts | Relate grid | Save as mods

Standard Geometry

Edit in Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
L - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	50.00	50.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	5.51	543.90	812.09	1453.51
Total Arrivals (Veh)	8.26	815.85	1218.14	2180.26
Max Queue (Veh)	4.78	4.21	1.34	79.28
Max Delay (s)	N/A	24.38	5.01	145.11
Max RFC	9999999999.00	0.82	0.58	1.08
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	885.82	15.16	3.96	58.38

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	0.000	6.000	0.000	0.000	6.00
EB - Via de la Valle	0.728	529.000	3.000	0.000	552.73
NB - El Camino Real	199.000	1.000	685.000	0.000	885.00
WB - Via de la Valle	1.000	821.000	762.000	0.000	1584.00
Total	199.73	1417.00	1451.00	0.00	

Enter Turning Counts OR Proportions.

2035 Traffic Volumes Interim Operational Analysis

AM – Lane by Lane (eastbound left and through movements)

D1 - 2035 Peak Hour, AM

Data Grid - Standard Geometry - Showing 4 of 4 items; 15 column(s)

Column Layouts > Rotate grid | Edit grid mode

Standard Geometry Edit In Window

Area	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
l' - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	5.51	543.90	912.09	1453.51
Total Arrivals (Veh)	8.26	815.85	1218.14	2180.26
Max Queue (Veh)	4.78	4.21	1.34	79.20
Max Delay (s)	N/A	24.38	5.01	145.11
Max RFC	9999999999.00	0.82	0.58	1.08
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	885.82	15.16	3.96	58.38

AM – Lane by Lane (eastbound right turn movement)

D1 - 2035 Peak Hour, AM

Data Grid - Standard Geometry - Showing 4 of 4 items; 15 column(s)

Column Layouts > Rotate grid | Edit grid mode

Standard Geometry Edit In Window

Area	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
l' - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	5.51	668.57	912.09	1453.51
Total Arrivals (Veh)	8.26	1002.85	1218.14	2180.26
Max Queue (Veh)	4.78	21.13	8.79	78.22
Max Delay (s)	N/A	95.19	2.94	143.46
Max RFC	9999999999.00	1.01	0.44	1.00
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	865.44	41.36	2.64	57.42

2035 Traffic Volumes Interim Operational Analysis

PM

D2 - 2035 Peak Hour, PM

Data Grid - Standard Geometry - Showing 1 of 1 items, 15 column(s)

Column Layouts - Rotate grid | Full size mode

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
L' - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	8.26	796.96	1836.15	958.91
Total Arrivals (Veh)	12.39	1135.45	2754.23	1438.37
Max Queue (Veh)	0.13	16.43	451.91	2.74
Max Delay (s)	47.27	67.70	985.36	8.67
Max RFC	0.02	0.98	1.46	0.74
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	28.64	28.44	436.95	5.64

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	1.000	8.000	0.000	0.000	9.00
EB - Via de la Valle	0.924	813.000	11.000	0.000	824.92
NB - El Camino Real	934.000	6.000	1061.000	0.000	2001.00
WB - Via de la Valle	7.000	656.000	382.000	0.000	1045.00
Total	942.92	1483.00	1454.00	0.00	

Enter Turning Counts OR Proportions.

2035 Traffic Volumes Interim Operational Analysis

PM – Lane by Lane (eastbound left and through movements)

D2 - 2035 Peak Hour, PM

Data Grid - Standard Geometry - Showing 4 of 4 items; 15 column(s)

Column Layouts ▾ Rotate Grid Full size mode

Standard Geometry Edit in Window

	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
W - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
L - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	30.00	88.00	98.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	8.26	758.98	1836.15	958.91
Total Arrivals (Veh)	12.39	1135.45	2754.23	1438.37
Max Queue (Veh)	0.13	18.45	451.91	2.74
Max Delay (s)	47.27	67.70	965.36	8.67
Max RFC	0.12	0.58	1.46	0.74
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	28.64	28.44	436.95	6.64

PM – Lane by Lane (eastbound right turn movement)

D2 - 2035 Peak Hour, PM

Data Grid - Standard Geometry - Showing 4 of 4 items; 15 column(s)

Column Layouts ▾ Rotate Grid Full size mode

Standard Geometry Edit in Window

	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
W - Approach road half-width (ft)	12.00	24.00	24.00	24.00
E - Entry width (ft)	14.00	26.00	26.00	26.00
L - Effective flare length (ft)	50.00	50.00	50.00	50.00
R - Entry radius (ft)	39.00	60.00	50.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	8.26	848.63	1836.15	958.91
Total Arrivals (Veh)	12.39	1272.95	2754.23	1438.37
Max Queue (Veh)	5.01	53.18	23.88	6.77
Max Delay (s)	1462.23	173.25	54.85	22.45
Max RFC	9999999999.00	1.09	1.09	0.88
Slope	0.520	0.776	0.779	0.779
Intercept (PCE/hr)	1118.294	2235.776	2244.383	2244.383
Average Queueing Delay (s)	453.85	81.90	20.82	10.94

2035 Traffic Volumes Ultimate Operational Analysis

AM

D1 - 2035 Peak Hour, AM

Data Grid - Standard Geometry - Showing 1 of 1 items; 15 column(s)

Column Layouts | Rotate grid | Full size mode

Standard Geometry

Edit In Window

	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	20.00	24.00	24.00	24.00
E - Entry width (ft)	22.00	26.00	26.00	40.00
l' - Effective flare length (ft)	35.00	40.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	5.51	543.90	630.58	1453.51
Total Arrivals (Veh)	8.26	815.85	945.88	2180.26
Max Queue (Veh)	0.07	0.74	0.80	5.53
Max Delay (s)	40.90	4.09	3.84	11.79
Max RFC	0.07	0.48	0.45	0.85
Slope	0.656	0.775	0.779	0.893
Intercept (PCE/hr)	1767.456	2231.062	2245.383	2778.863
Average Queueing Delay (s)	18.83	3.42	3.25	6.72

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	0.000	6.000	0.000	0.000	6.00
EB - Via de la Valle	0.728	589.000	3.000	0.000	592.73
NB - El Camino Real	0.198	1.000	686.000	0.000	687.20
WB - Via de la Valle	1.000	821.000	762.000	0.000	1584.00
Total	1.93	1417.00	1451.00	0.00	-

2035 Traffic Volumes Ultimate Operational Analysis

AM – EB Partial Right Bypass (Dual Lanes)

D1 - 2035 Peak Hour, AM

Data Grid - Standard Geometry - Showing 1 of 1 grids, 15 column(s)

Column Layouts | Rotate grid | Full-size mode

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	20.00	12.00	24.00	24.00
E - Entry width (ft)	22.00	26.00	26.00	40.00
L - Effective flare length (ft)	35.00	40.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (veh/hr)	5.51	668.57	630.59	1453.51
Total Arrivals (veh)	8.26	1002.85	945.88	2180.26
Max Queue (veh)	0.07	3.27	0.52	5.48
Max Delay (s)	40.90	15.16	2.49	11.68
Max RFC	0.07	0.77	0.34	0.85
Slope	0.656	0.644	0.779	0.893
Intercept (PCE/hr)	1767.456	1613.865	2245.993	2778.863
Average Queueing Delay (s)	18.87	[illegible]	2.31	6.68

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From / To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	0.000	6.000	0.000	0.000	6.00
EB - Via de la Valle	728.000	0.589	0.003	0.000	728.59
NB - El Camino Real	0.198	1.000	686.000	0.000	687.20
WB - Via de la Valle	1.000	821.000	762.000	0.000	1584.00
Total	729.20	828.59	1448.00	0.00	

2035 Traffic Volumes Ultimate Operational Analysis

AM – NB Partial Right Bypass (Dual Lanes)

D1 - 2035 Peak Hour, AM

Data Grid - Standard Geometry - Showing 1 of 1 items; 15 column(s)

Column Layouts ~ | Rotate grid | Fit size mode ~

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	20.00	24.00	12.00	24.00
E - Entry width (ft)	22.00	26.00	26.00	40.00
L - Effective flare length (ft)	35.00	40.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	5.51	543.90	182.32	1453.51
Total Arrivals (Veh)	8.26	815.85	273.48	2180.26
Max Queue (Veh)	0.01	0.74	0.22	1.78
Max Delay (s)	6.18	4.09	3.58	3.68
Max RFC	0.01	0.43	0.18	0.64
Slope	0.656	0.775	0.661	0.893
Intercept (PCE/hr)	1767.456	2231.062	1688.031	2778.863
Average Queuing Delay (s)	4.95	3.42	3.27	2.99

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	0.000	6.000	0.000	0.000	6.00
EB - Via de la Valle	0.728	589.000	3.000	0.000	592.73
NB - El Camino Real	198.000	0.001	0.686	0.000	198.69
WB - Via de la Valle	1.000	821.000	762.000	0.000	1584.00
Total	199.73	1416.00	765.69	0.00	

2035 Traffic Volumes Ultimate Operational Analysis

PM

D2 - 2035 Peak Hour, PM

Data Grid - Standard Geometry - Showing 4 of 4 items, 15 column(s)

Column Layouts | Rotate grid | Full-size mode

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	20.00	24.00	24.00	24.00
E - Entry width (ft)	22.00	28.00	26.00	40.00
L - Effective flare length (ft)	35.00	40.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	8.26	756.96	979.95	958.91
Total Arrivals (Veh)	12.39	1135.45	1469.93	1438.37
Max Queue (Veh)	0.05	0.96	3.59	2.20
Max Delay (s)	17.37	3.80	11.25	6.98
Max RFC	0.05	0.49	0.79	0.69
Slope	0.656	0.775	0.779	0.893
Intercept (PCE/hr)	1767.456	2231.062	2245.383	2778.863
Average Queueing Delay (s)	10.37	3.23	6.98	4.74

Turning Proportions - Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	1.000	8.000	0.000	0.000	9.00
EB - Via de la Valle	0.924	813.000	11.000	0.000	824.92
NB - El Camino Real	0.934	6.000	1061.000	0.000	1067.93
WB - Via de la Valle	7.000	656.000	382.000	0.000	1045.00
Total	9.86	1483.00	1454.00	0.00	

2035 Traffic Volumes Ultimate Operational Analysis

PM – EB Partial Right Bypass (Dual Lanes)

D2 - 2035 Peak Hour, PM

Data Grid - Standard Geometry - Showing 4 of 4 Items, 15 column(s)

Column Layouts | Rotate grid | Full-size mode

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	20.00	12.00	24.00	24.00
E - Entry width (ft)	22.00	26.00	26.00	40.00
L - Effective flare length (ft)	35.00	40.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (veh/hr)	8.26	848.63	979.95	958.91
Total Arrivals (Veh)	12.39	1272.95	1469.93	1438.37
Max Queue (Veh)	0.05	3.48	1.14	2.16
Max Delay (s)	17.39	12.46	3.51	6.85
Max RFC	0.05	0.78	0.53	0.69
Slope	0.656	0.644	0.779	0.893
Intercept (PCE/hr)	1767.456	1613.865	2245.383	2778.863
Average Queuing Delay (s)	10.44	[illegible]	3.03	4.69

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	1.000	8.000	0.000	0.000	9.00
EB - Via de la Valle	924.000	0.813	0.011	0.000	924.82
NB - El Camino Real	0.934	6.000	1061.000	0.000	1067.93
WB - Via de la Valle	7.000	656.000	382.000	0.000	1045.00
Total	932.93	670.81	1443.01	0.00	

2035 Traffic Volumes Ultimate Operational Analysis

PM – NB Partial Right Bypass (Dual Lanes)

D2 - 2035 Peak Hour, PM

Data Grid - Standard Geometry - Showing 1 of 1 items, 15 column(s)

Column Layouts | Rotate Grid | Full-size Mode

Standard Geometry

Edit In Window

Arm	SB - La Valley Plaza	EB - Via de la Valle	NB - El Camino Real	WB - Via de la Valle
V - Approach road half-width (ft)	20.00	24.00	12.00	24.00
E - Entry width (ft)	22.00	26.00	26.00	40.00
L - Effective flare length (ft)	35.00	40.00	50.00	50.00
R - Entry radius (ft)	30.00	80.00	90.00	90.00
D - Inscribed circle diameter (ft)	160.00	160.00	160.00	160.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	8.26	756.96	857.16	958.91
Total Arrivals (Veh)	12.39	1135.45	1285.74	1438.37
Max Queue (Veh)	0.01	0.96	16.70	0.73
Max Delay (s)	3.70	3.80	60.68	2.30
Max RFC	0.01	0.49	0.97	0.42
Slope	0.656	0.775	0.661	0.893
Intercept (PCE/hr)	1767.456	2231.062	1688.031	2778.863
Average Queueing Delay (s)	3.33	3.23	22.30	2.08

Turning Proportions/Counts - El Camino Real & Via de la Valle - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - La Valley Plaza	1.000	8.000	0.000	0.000	9.00
EB - Via de la Valle	0.924	813.000	11.000	0.000	824.92
NB - El Camino Real	934.000	0.006	0.106	0.000	934.11
WB - Via de la Valle	7.000	656.000	382.000	0.000	1045.00
Total	942.92	1477.01	393.11	0.00	

APPENDIX D

El Camino Real Corridor

Via de la Valle & North El Camino Real

D.1 Existing 2011 Operational Analysis.....D.1.1 – D.1.2

D.2 2035 Traffic Volumes Operational Analysis.....D.2.1 – D.2.2

Existing 2011 Traffic Volumes Operational Analysis

AM

D3 - 2011 Peak Hour, AM

Data Grid - Standard Geometry - Showing 4 of 4 items; 15 column(s)

Column Layout | Rotate grid | Full-size header

Standard Geometry

Edit In Window

Arm	SB - North El Camino Real	EB - Via de la Valle	NB - Driveway	WB - Via de la Valle
V - Approach road half-width (ft)	12.00	24.00	12.00	12.00
E - Entry width (ft)	26.00	26.00	14.00	26.00
l' - Effective flare length (ft)	100.00	50.00	50.00	100.00
R - Entry radius (ft)	75.00	90.00	70.00	90.00
D - Inscribed circle diameter (ft)	160.00	140.00	160.00	140.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	216.56	376.98	0.00	624.90
Total Arrivals (Veh)	324.84	568.46	0.00	937.35
Max Queue (Veh)	0.24	0.26	0.00	0.71
Max Delay (s)	3.33	2.09	0.00	3.43
Max RFC	0.19	0.21	0.00	0.42
Slope	0.699	0.806	0.552	0.728
Intercept (PCE/hr)	1874.866	2244.383	1183.035	1887.135
Average Queuing Delay (s)	3.03	1.99	0.00	3.09

Turning Proportions/Counts - El Camino Real & Polo Club/Driveway - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - North El Camino Real	222.000	0.000	14.000	0.000	236.00
EB - Via de la Valle	0.000	350.000	63.000	0.000	413.00
NB - Driveway	0.000	0.000	0.000	0.000	0.00
WB - Via de la Valle	33.000	648.000	0.000	0.000	681.00
Total	255.00	998.00	77.00	0.00	

Enter Turning Counts OR Proportions.

Existing 2011 Traffic Volumes Operational Analysis

PM

D4 - 2011 Peak Hour, PM

Data Mod - Standard Geometry - Showing 4 of 4 items: 15 column(s)

Column Layouts | Rotate grid | Full size mode

Standard Geometry

Edit In Window

From	SB - North El Camino Real	EB - Via de la Valle	NB - Driveway	WB - Via de la Valle
W - Approach road half-width (ft)	12.00	24.00	12.00	12.00
E - Entry width (ft)	26.00	26.00	14.00	26.00
T - Effective flare length (ft)	100.00	50.00	50.00	100.00
R - Entry radius (ft)	75.00	90.00	70.00	90.00
D - Inscribed circle diameter (ft)	160.00	140.00	160.00	140.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	96.35	711.15	0.00	353.28
Total Arrivals (Veh)	144.52	1066.73	0.00	529.92
Max Queue (Veh)	0.08	0.64	0.00	0.34
Max Delay (s)	2.51	2.71	0.00	2.87
Max RFC	0.07	0.39	0.00	0.25
Slope	0.696	0.886	0.552	0.728
Intercept (PCE/hr)	1874.856	2244.383	1108.035	1887.835
Average Queueing Delay (s)	2.40	2.49	0.00	2.68

Turning Proportions/Counts - El Camino Real & Polo Club/Driveway - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - North El Camino Real	83.000	0.000	22.000	0.000	105.00
EB - Via de la Valle	0.000	559.000	216.000	0.000	775.00
NB - Driveway	0.000	0.000	0.000	0.000	0.00
WB - Via de la Valle	13.000	372.000	0.000	0.000	385.00
Total	96.00	931.00	238.00	0.00	

Enter Turning Counts OR Proportions.

2035 Traffic Volumes Operational Analysis

AM

D1 - 2035 Peak Hour, AM

Data Grid - Standard Geometry - Showing 4 of 4 items; 15 column(s)

Column Layouts - Rotate grid - Full-screen mode

Standard Geometry

Edit In Window

Arm	SB - North El Camino Real	EB - Via de la Valle	NB - Driveway	WB - Via de la Valle
V - Approach road half-width (ft)	12.00	24.00	12.00	12.00
E - Entry width (ft)	25.00	26.00	14.00	26.00
L - Effective flare length (ft)	100.00	50.00	50.00	100.00
R - Entry radius (ft)	75.00	90.00	70.00	90.00
D - Inscribed circle diameter (ft)	160.00	140.00	160.00	140.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Edit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	304.65	722.15	54.14	1175.47
Total Arrivals (Veh)	456.97	1083.25	81.21	1763.20
Max Queue (Veh)	0.74	0.66	0.11	4.57
Max Delay (s)	7.31	2.74	5.85	12.08
Max RFC	0.43	0.40	0.10	0.83
Slope	0.699	0.806	0.552	0.728
Intercept (PCE/hr)	1874.869	2244.383	1188.035	1887.135
Average Queueing Delay (s)	5.49	2.50	5.19	7.62

Turning Proportions/Counts - El Camino Real & Polo Club/Driveway - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From / To	1st	2nd	3rd	U-Turn	Total
SB - North El Camino Real	309.000	1.000	22.000	0.000	332.00
EB - Via de la Valle	12.000	656.000	119.000	0.000	787.00
NB - Driveway	1.000	2.000	56.000	0.000	59.00
WB - Via de la Valle	62.000	1219.000	0.000	0.000	1281.00
Total	384.00	1878.00	197.00	0.00	

Enter Turning Counts OR Proportions.

2035 Traffic Volumes Operational Analysis

PM

D2 - 2035 Peak Hour, PM

Data Grid - Standard Geometry - Showing 4 of 4 items, 15 column(s)

Column Layouts | Rotate grid | Full-screen mode

Standard Geometry

Edit In Window

Arm	SB - North El Camino Real	EB - Via de la Valle	NB - Driveway	WB - Via de la Valle
V - Approach road half-width (ft)	12.00	24.00	12.00	12.00
E - Entry width (ft)	26.00	26.00	14.00	26.00
F - Effective flare length (ft)	100.00	50.00	50.00	100.00
R - Entry radius (ft)	75.00	90.00	70.00	90.00
D - Inscribed circle diameter (ft)	160.00	140.00	160.00	140.00
PHI - Conflict (entry) angle (deg)	20.00	20.00	20.00	20.00
Exit Only	☐	☐	☐	☐
Total Demand (Veh/hr)	151.41	1603.08	24.78	840.54
Total Arrivals (Veh)	227.11	2404.62	37.16	1260.81
Max Queue (Veh)	0.19	7.33	0.33	2.06
Max Delay (s)	3.78	14.33	41.44	7.43
Max RFC	0.16	0.89	0.26	0.68
Slope	0.630	0.906	0.552	0.728
Intercept (PCE/hr)	1874.866	2244.383	1188.035	1887.135
Average Queueing Delay (s)	3.34	9.07	20.79	5.51

Turning Proportions/Counts - El Camino Real & Polo Club/Driveway - Whole Period

Counts (Veh/hr) | Proportions (Veh) | Options

From \ To	1st	2nd	3rd	U-Turn	Total
SB - North El Camino Real	132.000	0.000	33.000	0.000	165.00
EB - Via de la Valle	54.000	1272.000	421.000	0.000	1747.00
NB - Driveway	1.000	0.000	26.000	0.000	27.00
WB - Via de la Valle	27.000	887.000	2.000	0.000	916.00
Total	214.00	2159.00	482.00	0.00	

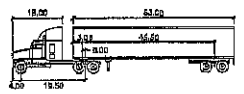
Enter Turning Counts OR Proportions.

APPENDIX E

El Camino Real Corridor

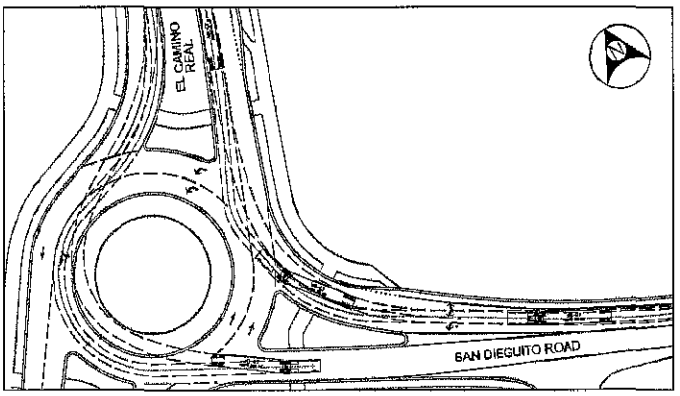
Via de la Valle & North El Camino Real

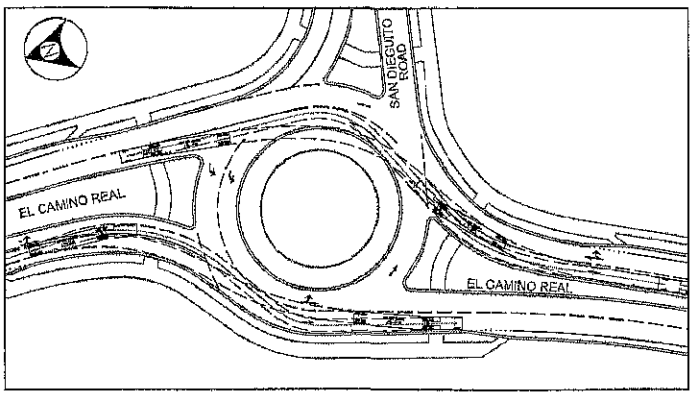
Design Vehicle Turning Movements.....E.1.1 – E.1.6

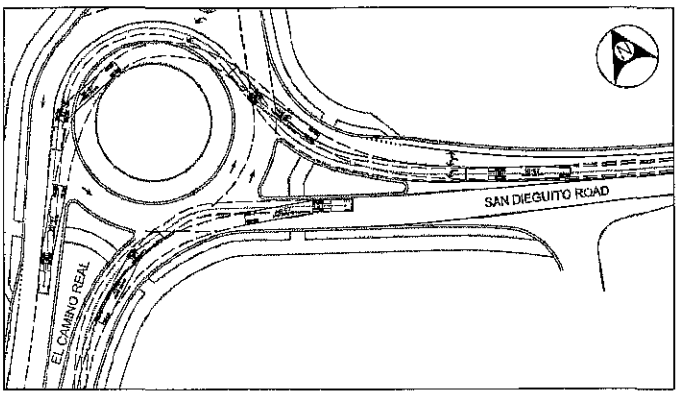


WB-67

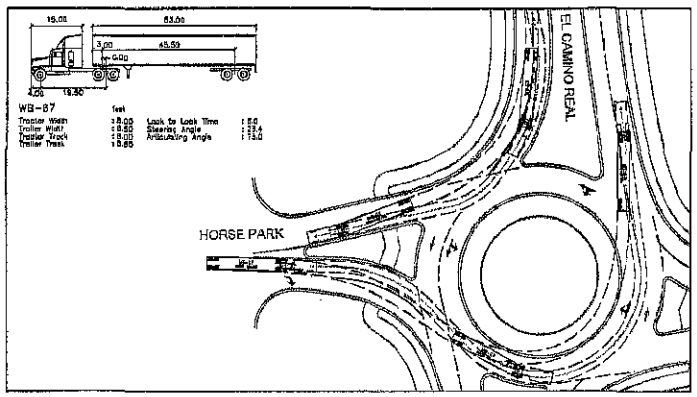
	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 33.4
Tractor Track	: 8.00	Articulating Angle	: 79.2
Trailer Track	: 8.50		

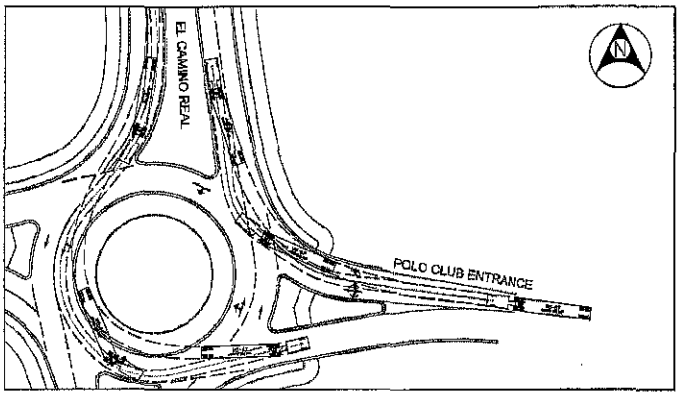


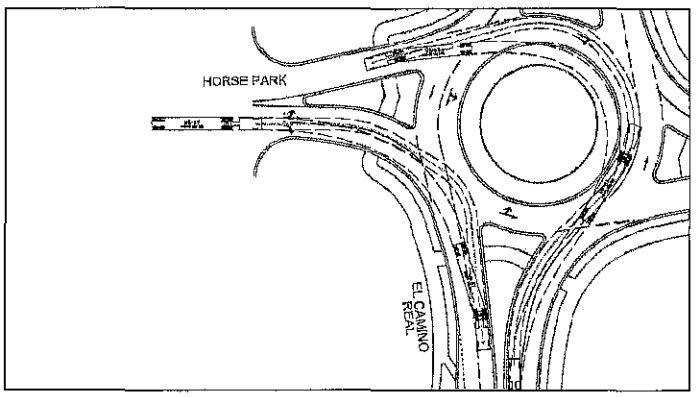


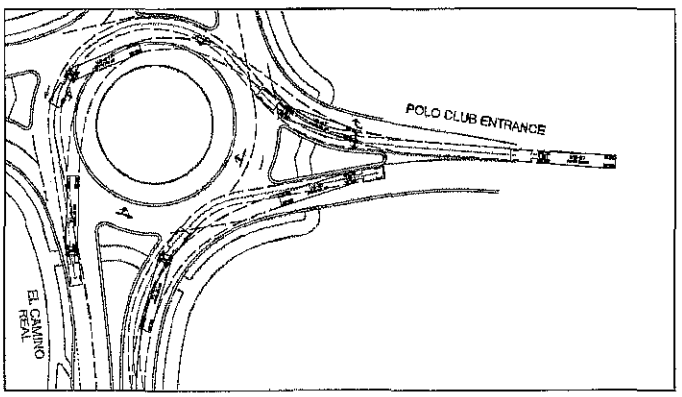


Durston Roundabout Engineering	EL CAMINO REAL & SAN DIEGUITO ROAD SAN DIEGO, CALIFORNIA	DESIGN VEHICLE - WB-67	SCALE 0 30 60 E.1.1

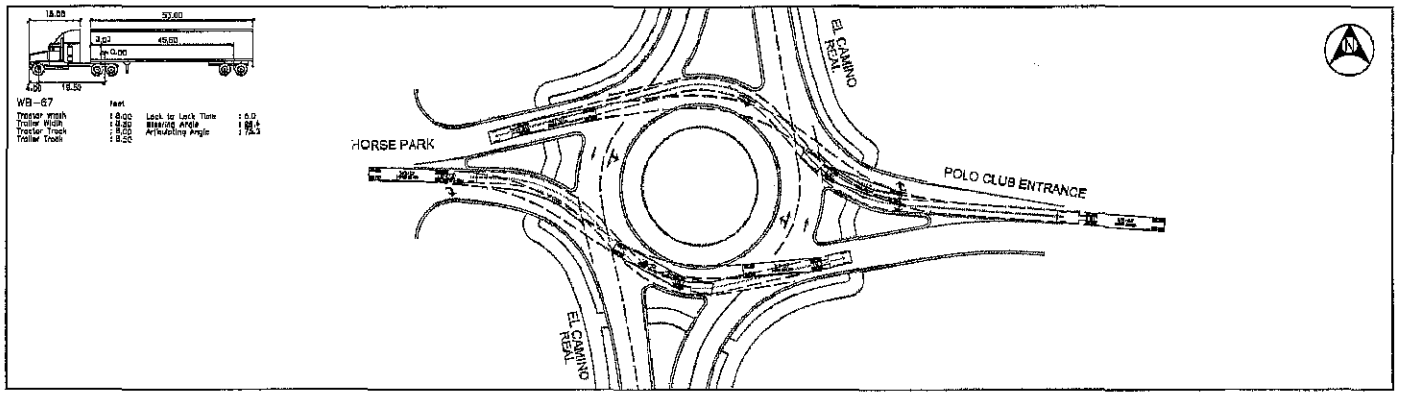


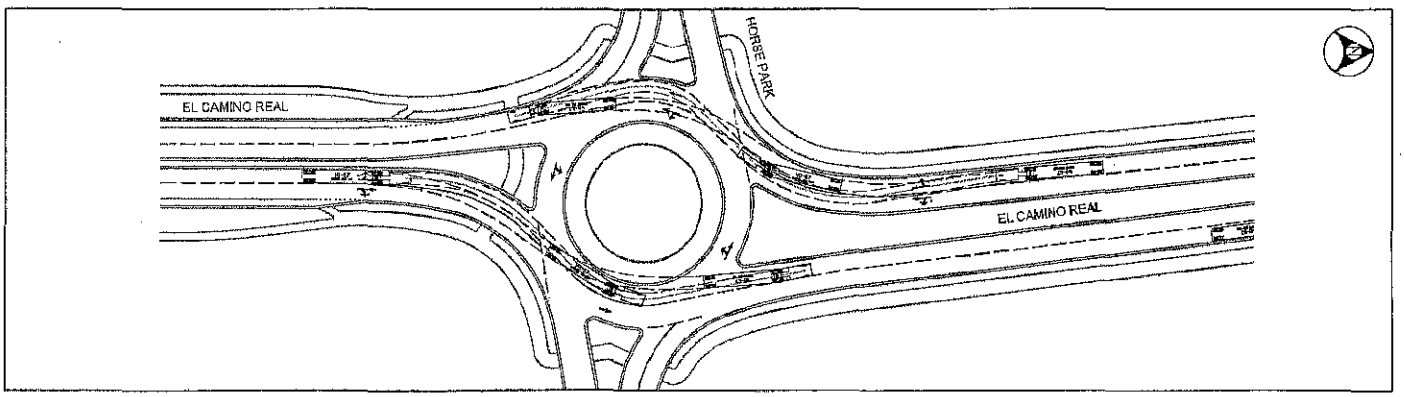




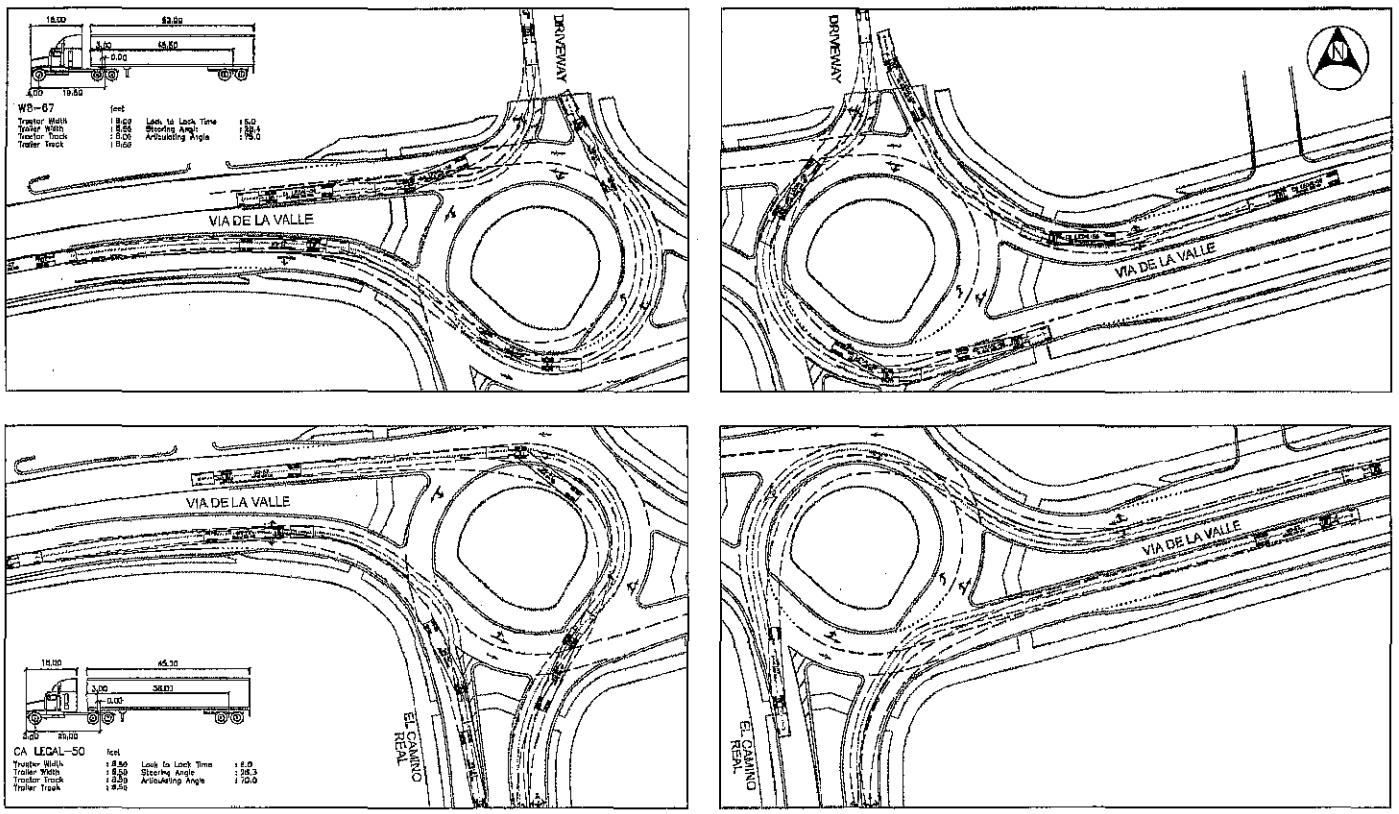


Durston Roundabout Engineering	EL CAMINO REAL & HORSE PARK/POLO CLUB ENTRANCE SAN DIEGO, CALIFORNIA	DESIGN VEHICLE - WB-67	SCALE 0 30 60 E.1.2





Ourston Roundabout Engineering	EL CAMINO REAL & HORSE PARK/POLO CLUB ENTRANCE SAN DIEGO, CALIFORNIA	DESIGN VEHICLE - WB-67	SCALE 0 15 30 E1.3



Ourston Roundabout Engineering

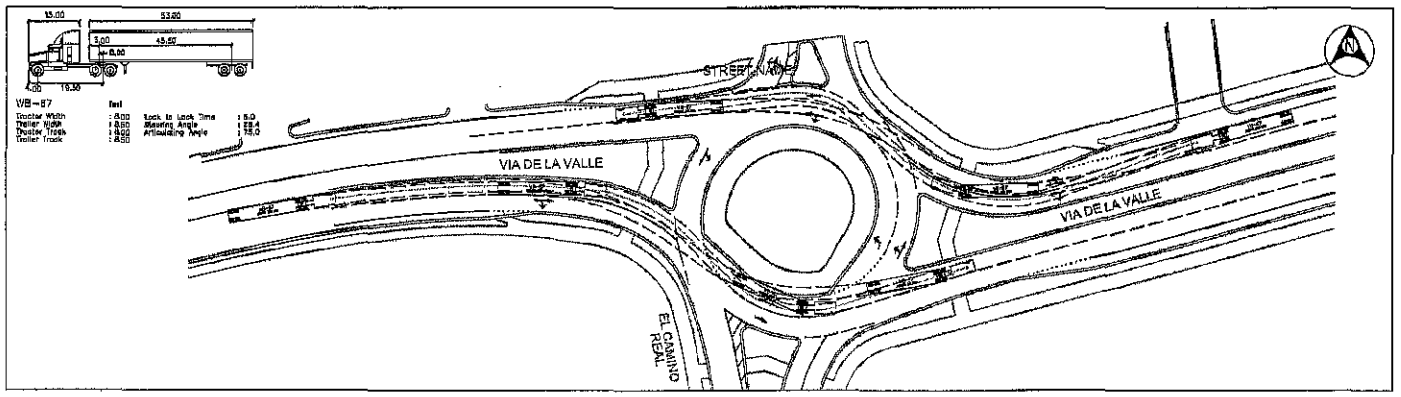
VIA DE LA VALLE & EL CAMINO REAL

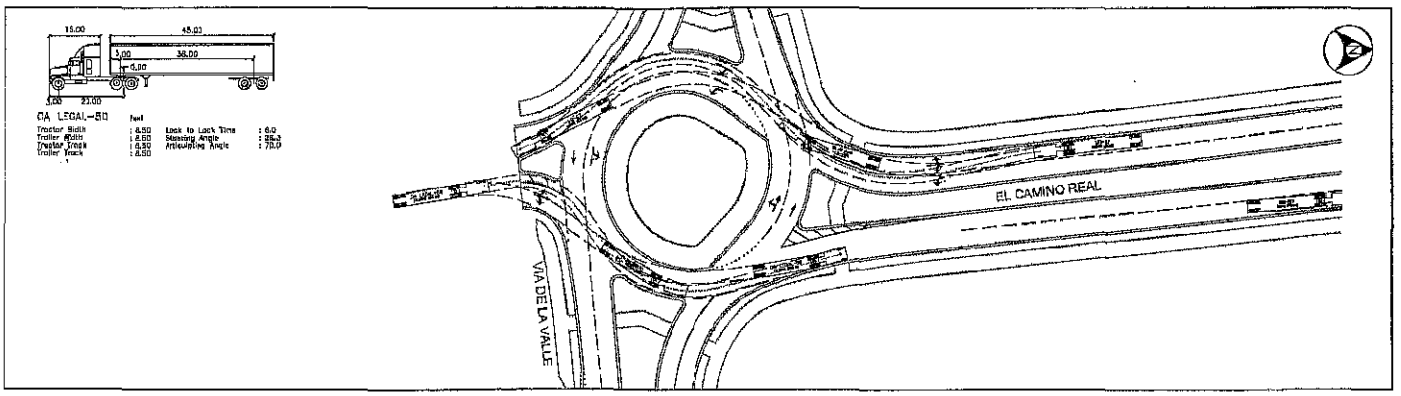
SAN DIEGO, CALIFORNIA

DESIGN VEHICLE - WB-67
DESIGN VEHICLE - CA LEGAL 50

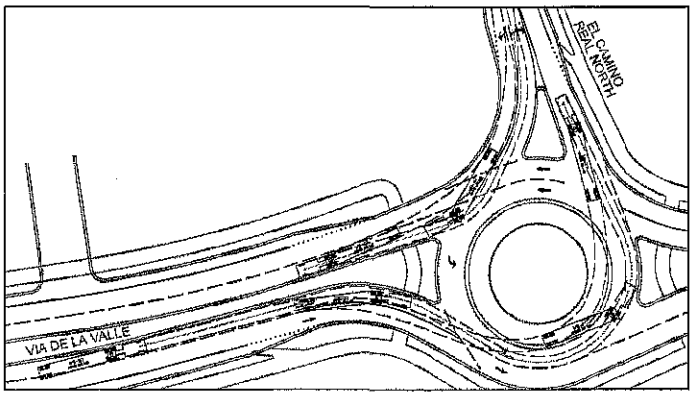
SCALE 0 30 60

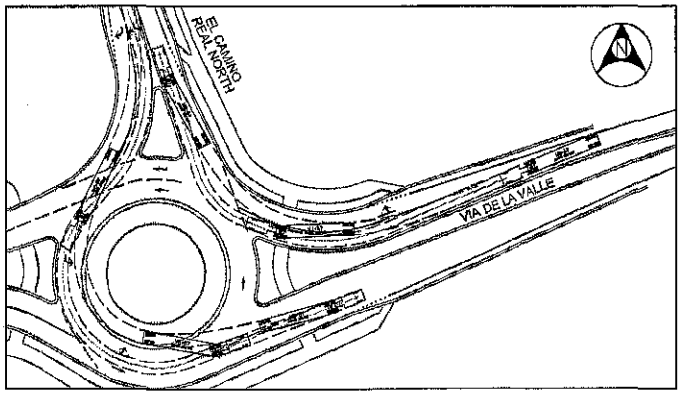
E.1.4

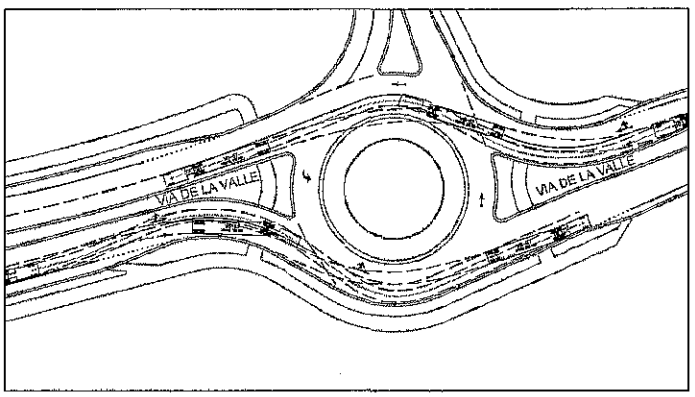


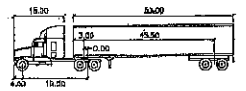


Ourston Roundabout Engineering	VIA DE LA VALLE & EL CAMINO REAL SAN DIEGO, CALIFORNIA	DESIGN VEHICLE - WB-67 DESIGN VEHICLE - CA LEGAL 50	SCALE 0 15 30 E1.5









WB-67 feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 36.4
Tractor Track	: 5.00	Articulating Angle	: 71.0
Trailer Track	: 5.50		

Ourston Roundabout Engineering

VIA DE LA VALLE & EL CAMINO REAL NORTH
SAN DIEGO, CALIFORNIA

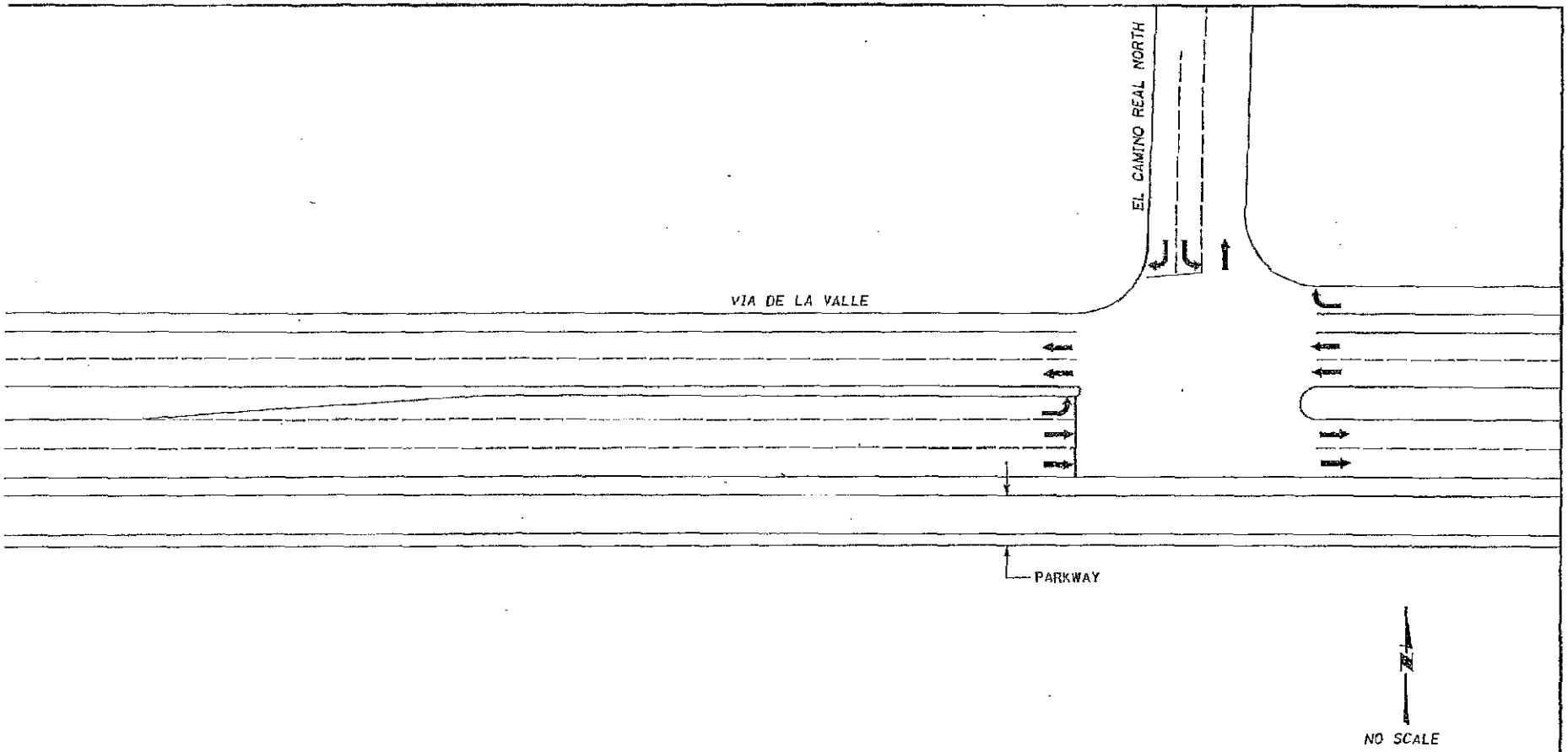
DESIGN VEHICLE - WB-67

SCALE 0 30 60

E.1.6

APPENDIX I

INTERSECTION LANE CONFIGURATIONS WITH PROJECT (SOURCE: RICK ENGINEERING)

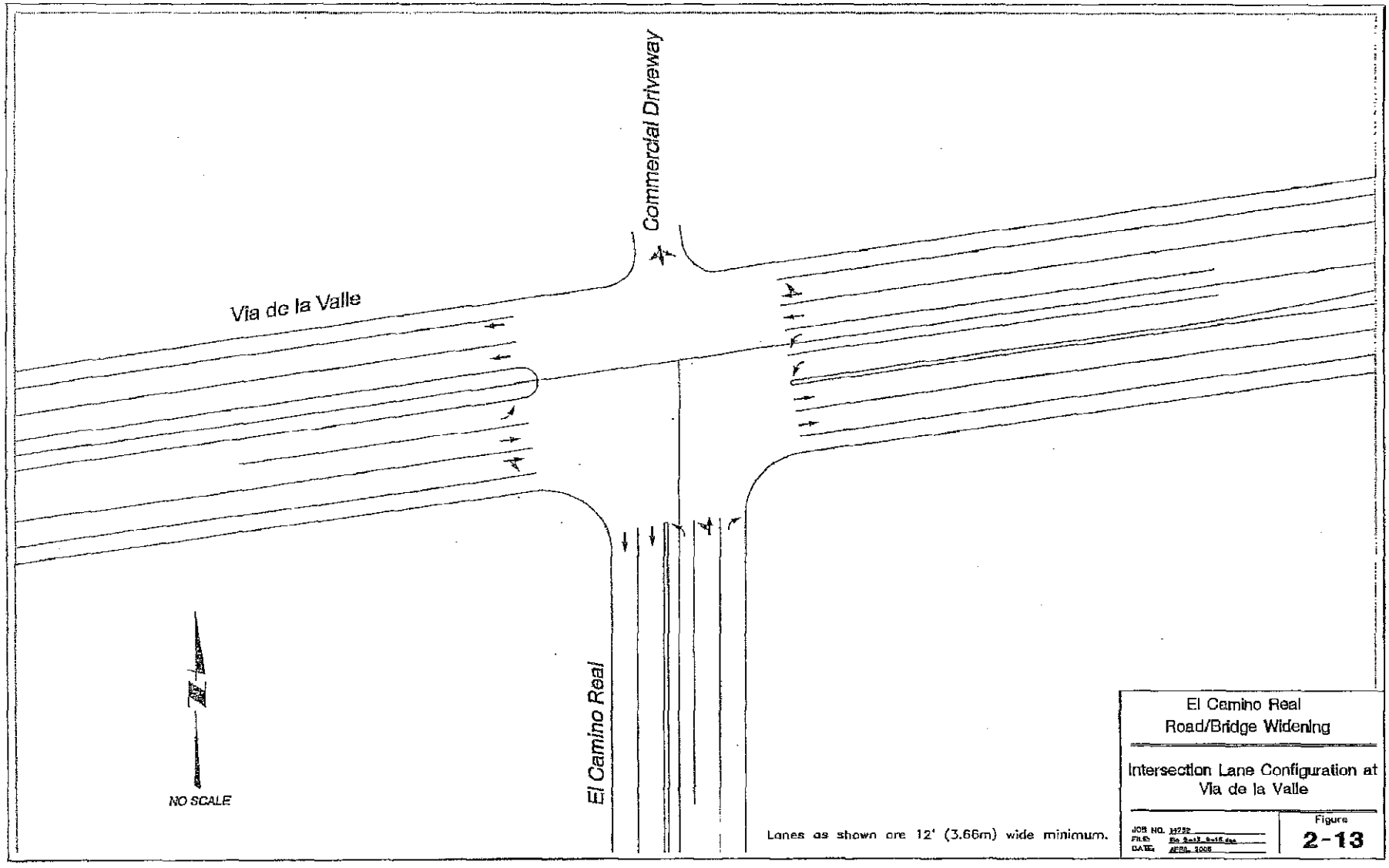


NOTE:
THE ULTIMATE INTERSECTION CONFIGURATION IS PRESENTED FOR INFORMATION PURPOSES ONLY AND IS NOT PROPOSED AS PART OF THIS PROJECT.

El Camino Real Road / Bridge Widening

Ultimate Intersection Lane Configuration at El Camino Real North

Figure **2-16b**

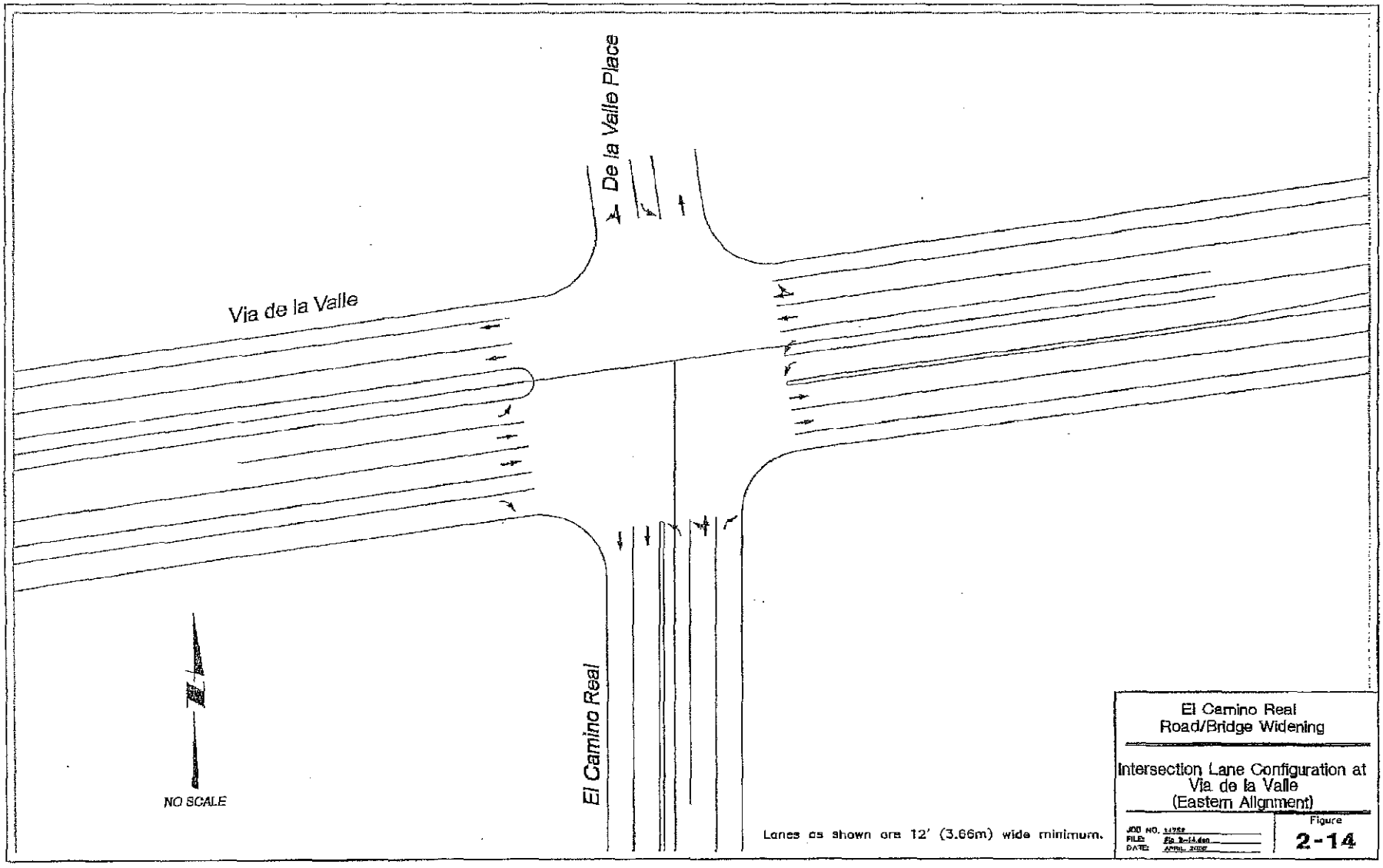


El Camino Real
Road/Bridge Widening

Intersection Lane Configuration at
Via de la Valle

JOB NO. 3252
FILE: Fig 2-13, 2-14.dwg
DATE: APRIL 2006

Figure
2-13

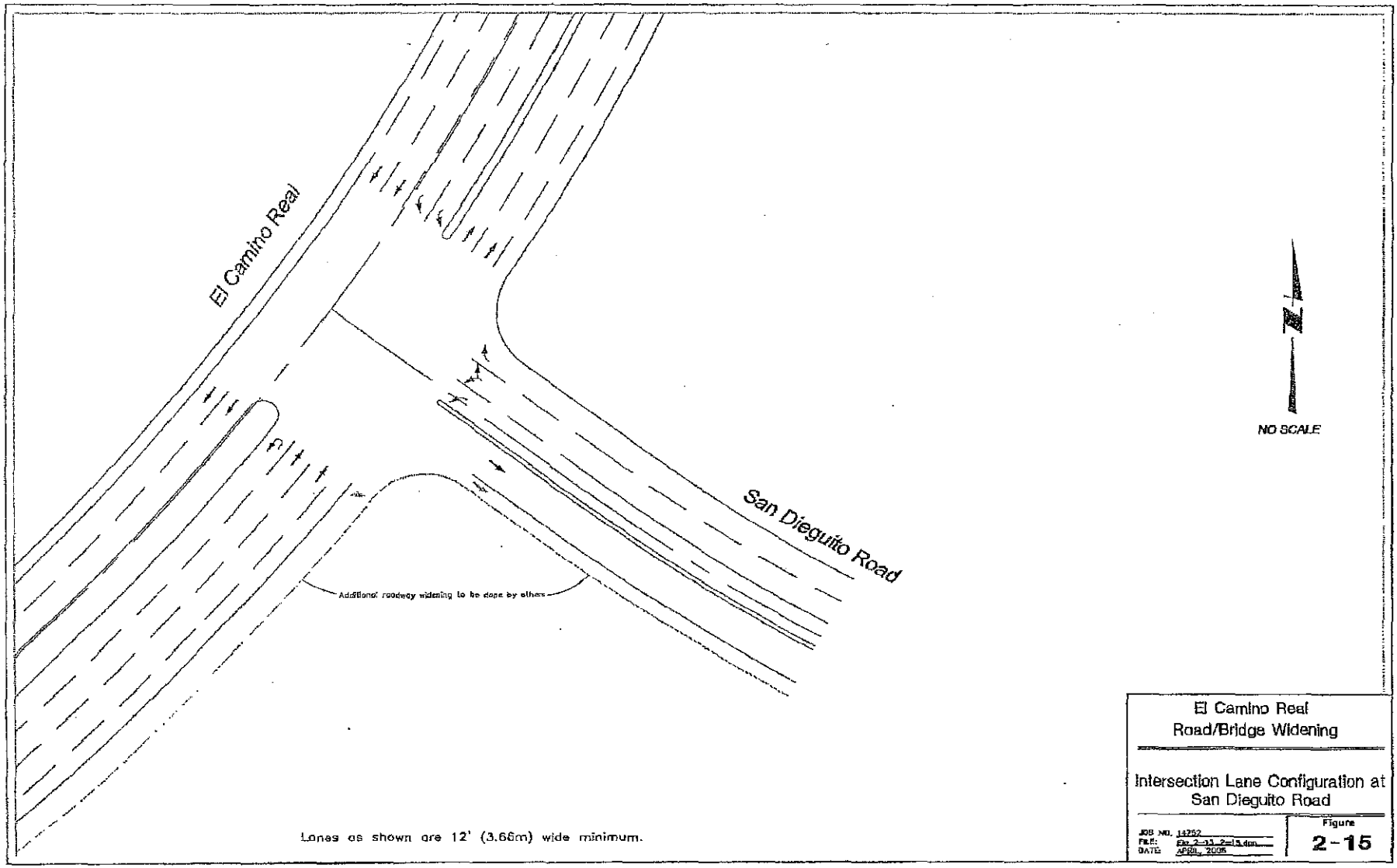


El Camino Real
Road/Bridge Widening

Intersection Lane Configuration at
Via de la Valle
(Eastern Alignment)

JOB NO. 11752
FILE: Fig 2-14.dgn
DATE: APRIL 2002

Figure
2-14

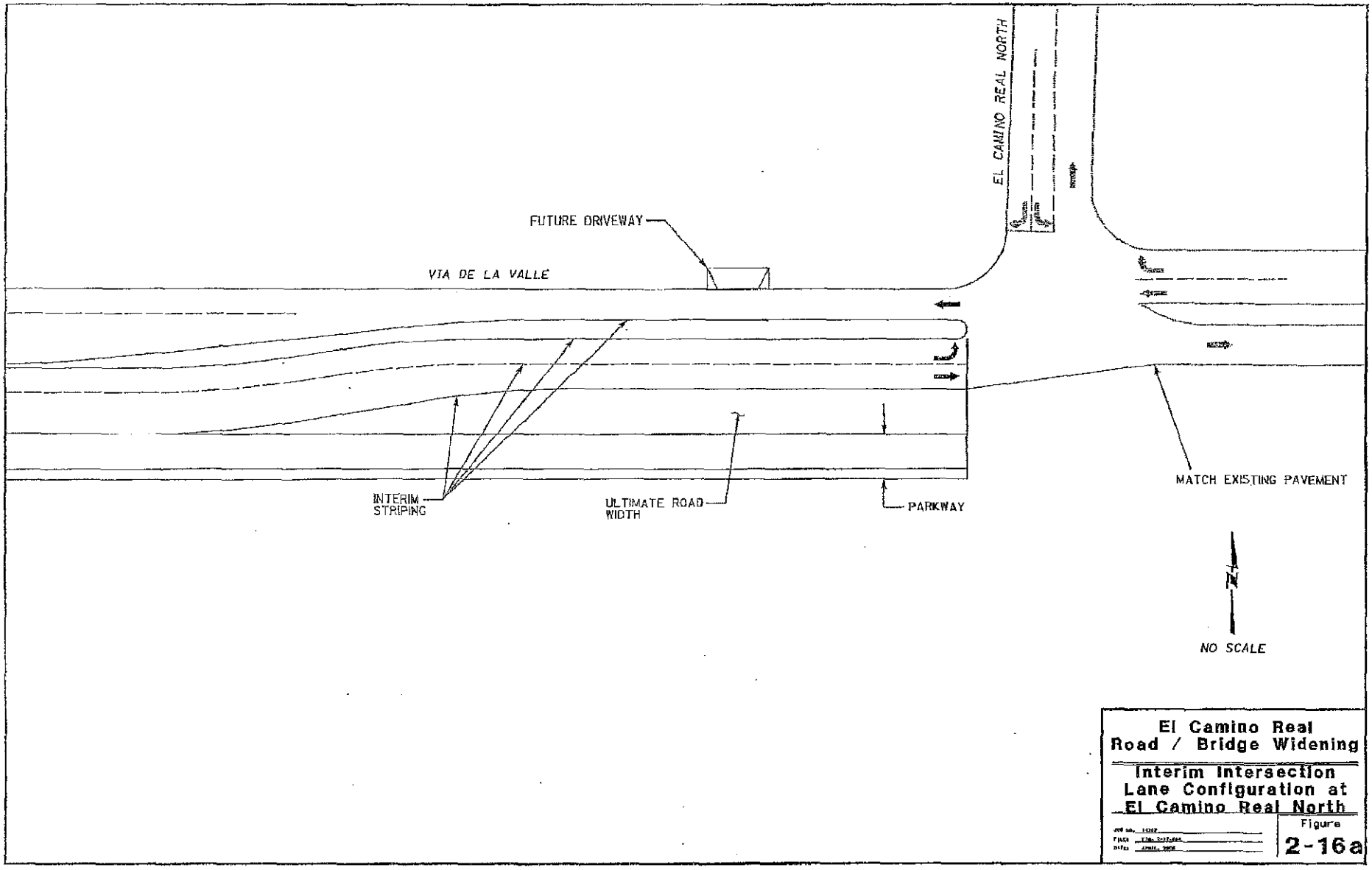


El Camino Real
Road/Bridge Widening

Intersection Lane Configuration at
San Dieguito Road

JOB NO. 14252
FILE: Fig. 2-11, 2-15.dgn
DATE: APRIL 2005

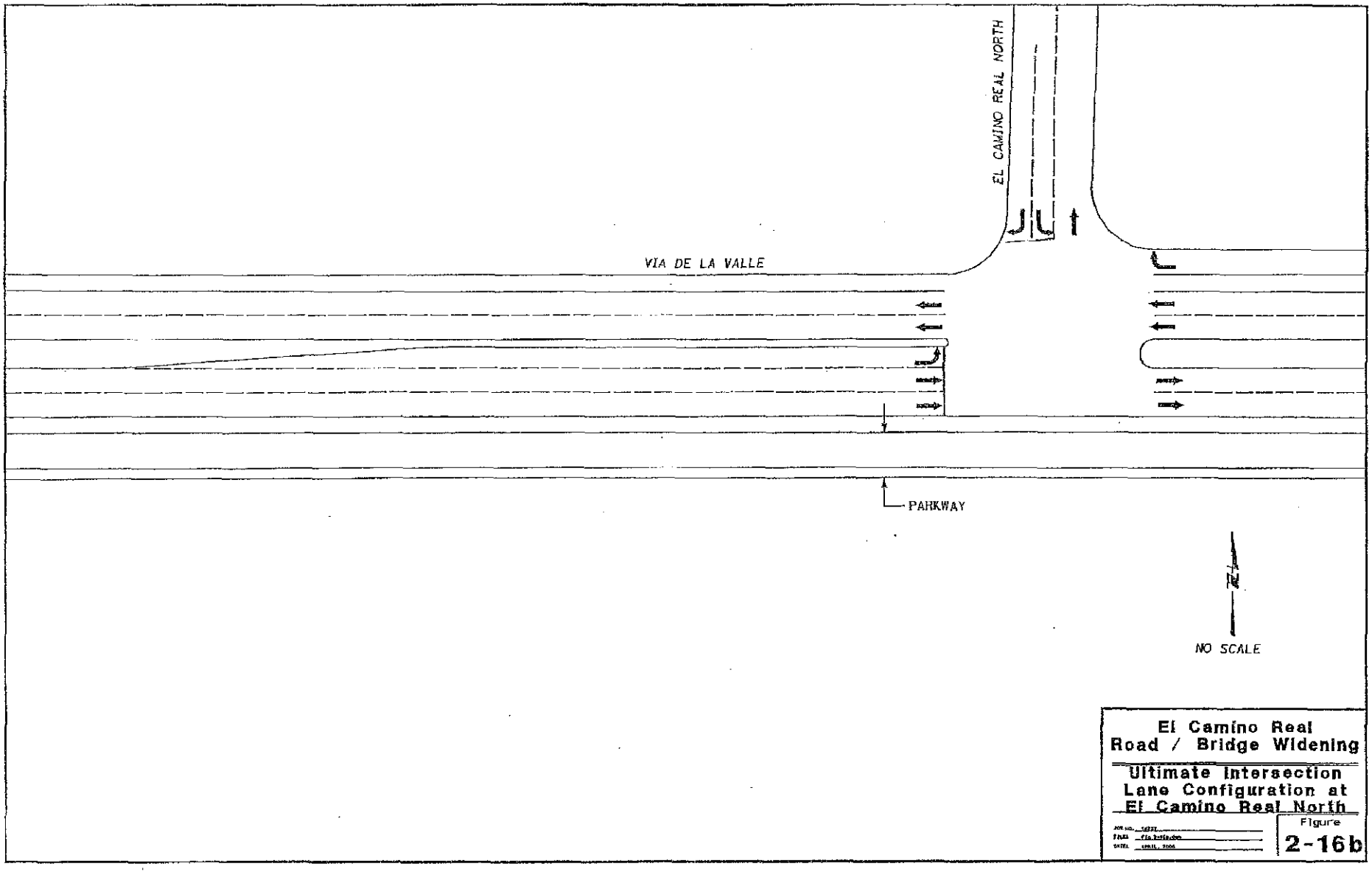
Figure
2-15



El Camino Real Road / Bridge Widening

Interim Intersection Lane Configuration at El Camino Real North

Figure **2-16a**



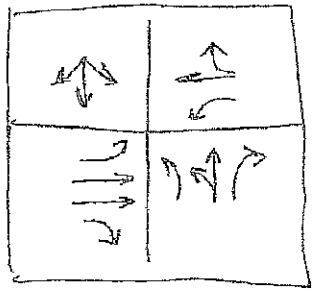
El Camino Real
Road / Bridge Widening

Ultimate Intersection Lane Configuration at El Camino Real North

JOB NO. 18737
FILE: fig 2-16b.dwg
DATE: APRIL, 2006

Figure
2-16b

3-Lane ⊥



Transition to Existing Improvements

EL CAMINO REAL

SAN ANDRESITO DR

SOLA VALLEY PL

1

2

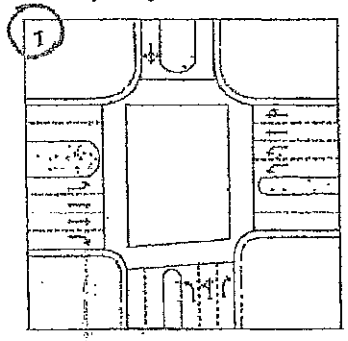
Transition to Existing Full-Width Improvements

VIA DELA VAGUE

SAN ANDRESITO RD

4-lane ⊥

1



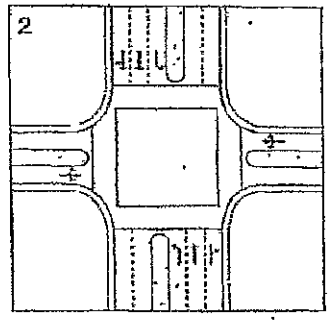
5

42

3

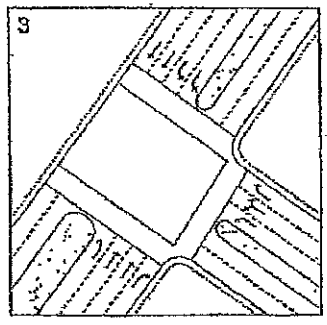
EL CAMINO REAL

2



SAN ANDRESITO RD

3



Legend:

- 3-Lane Concept
- Transition from Intersection Configuration to 3-Lane Concept
- Bridge
- Proposed Gonzales Canyon Trail and Wildlife Undercrossing

Transition to Existing Full-Width Improvements

Task Force Recommended Improvements
ATTACHMENT E

RICK ENGINEERING COMPANY
Urban Design/Planning Division

North
Not To Scale
Date of Issue: 02/01/07
JN 3145

HYDRAULIC STUDY
FOR
EL CAMINO REAL BRIDGE PROJECT
ON THE SAN DIEGUITO RIVER

Job Number 14752-B
Original: April 27, 2006
Revised: July 29, 2011
Revised: April 12, 2012

RICK ENGINEERING COMPANY

RICK ENGINEERING COMPANY

HYDRAULIC STUDY
FOR
EL CAMINO REAL BRIDGE PROJECT
ON THE SAN DIEGUITO RIVER

Job Number 14752-B

REGISTERED PROFESSIONAL ENGINEER
DENNIS CALVIN BOWLING
NO. 32838
EXP. 06/30/12
CIVIL
STATE OF CALIFORNIA

Dennis C. Bowling, M.S.
R.C.E. #32838
Exp. 06/12

Prepared For:

City of San Diego
Engineering and Capitol Projects-
Right of Way Division
600 B Street, Suite 800
San Diego, CA 92101
(619) 533-4608

Prepared By:

Rick Engineering Company
Water Resources Department
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707
www.rickengineering.com

Original: April 27, 2006
Revised: July 29, 2011
Revised: April 12, 2012

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3.0 Hydraulic Analysis.....4

4.0 Hydraulic Results.....6

5.0 Brackish Marsh Mitigation Area Hydraulics.....10

6.0 Conclusion.....13

Tables:

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Figures:

Figure 3.12-6: El Camino Real Mitigation Concept Plan

Figure 3.12-7: El Camino Real Road / Bridge Widening - Mitigation Site Cross Section

Figure 3.12-8: Exhibit Showing Mitigation Flow Stages 1 to 5

Appendices:

Appendix A: HEC-RAS Output for the Existing Condition

Appendix B: HEC-RAS Output for the Preferred Alternative

Map Pockets:

Map Pocket 1: HEC-RAS Work Map for the Existing Condition

Map Pocket 2: HEC-RAS Work Map for the Preferred Alternative

Attachments:

Attachment 1: "Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Chang Consultants, dated June 2005.

Attachment 2: "Hydraulic and Sediment Modeling of the San Dieguito River for Wetland Creation at the JPA/Boudreau Site," prepared by Chang Consultants, dated November 2005.

HYDRAULIC STUDY FOR EL CAMINO REAL BRIDGE PROJECT

ON THE

SAN DIEGUITO RIVER

REVISION PAGE

April 12, 2012

This hydraulic study report presents a revision to the July 29, 2011 report pursuant to changes for the El Camino Real Bridge project. The primary purpose of this revision is to address the recent decision to remove the existing El Camino Real Bridge as part of this project. The following text identifies the changes which were made to the HEC-RAS analysis, and to the map located in Map Pocket 2.

1. Existing El Camino Real Bridge was removed from the HEC-RAS hydraulic model for the preferred alternative.

2. The HEC-RAS analysis for the preferred alternative was modified at cross-sections 2.675, 2.614, 2.609, and 2.590 due to the revised grading reflecting removal of the existing El Camino Real Bridge.

3. The HEC-RAS Work Map for the Preferred Alternative was revised accordingly.

The results shown with the revised hydraulics differ only slightly from those in the 2006 and 2011 studies and the conclusions remain consistent with those reached previously.

HYDRAULIC STUDY FOR EL CAMINO REAL BRIDGE PROJECT

ON THE

SAN DIEGUITO RIVER

REVISION PAGE

July 29, 2011

This hydraulic study report presents a revision to the April 27, 2006 report pursuant to changes in the Brackish Marsh mitigation area. The primary purpose of the revision is to address previous comments and dialogue with the resource agencies to modify the mitigation concept. The following text identifies the changes which were made to the Brackish Marsh Mitigation concept plan, updates to Figures 3.12-6, 3.12-7, and 3.12-8, and the HEC-RAS analysis.

1. The revised mitigation concept plan includes an earthen berm which runs along the southern bank of the San Dieguito River, immediately downstream of the existing and proposed bridge location.

2. Figures 3.12-6, 3.12-7, and 3.12-8 have each been updated to reflect the revised mitigation concept.

3. The HEC-RAS analysis for the preferred alternative was modified at cross-sections 2.590, 2.524, 2.439, and 2.341 due to the revised grading concept for the mitigation site.

4. The HEC-RAS analyses have also been revised to address previous comments received during the public review process. These include:

    - Edits to the existing bridge modeling, using the pier editor in lieu of ground points, along with debris factors;

- Edits to the proposed bridge to reflect two (2) piers in lieu of four (4) piers, along with debris factors;
- The ineffective flow location at cross-section 2.439 was adjusted to reflect previous resource agency comments.

The results shown with the revised hydraulics differ only slightly from those in the 2006 study and the conclusions remain consistent with those reached previously.

1.0 INTRODUCTION

This report presents a hydraulic study of the San Dieguito River for the proposed El Camino Real Bridge project in the City of San Diego. The approximate location of the existing El Camino Real Bridge is shown on the Vicinity Map on Page 2 of this report.

The hydraulic study for this project is divided into two parts. The first part of the study (hereon referred to as the Existing Condition) analyzes the San Dieguito River with just the existing El Camino Real Bridge. The second part of the hydraulic study (hereon referred to as the Preferred Alternative) analyzes the San Dieguito River by proposing the following conditions: constructing the proposed El Camino Real Bridge located just upstream of the existing bridge (Eastern Alignment), creating the brackish marsh mitigation area located just downstream of the existing bridge (including lowering of the overbank area immediately adjacent to the brackish marsh mitigation site), widening the roadway of Via de la Valle from El Camino Real to El Camino Real North, and removing the existing El Camino Real Bridge. The brackish marsh mitigation area was designed to provide compensation for impacts to disturbed brackish marsh impacted by the project. The Environmental Impact Report (EIR) for the project provides additional information regarding the mitigation area and the reasons for it. The hydraulic design of the area is discussed later in this report.

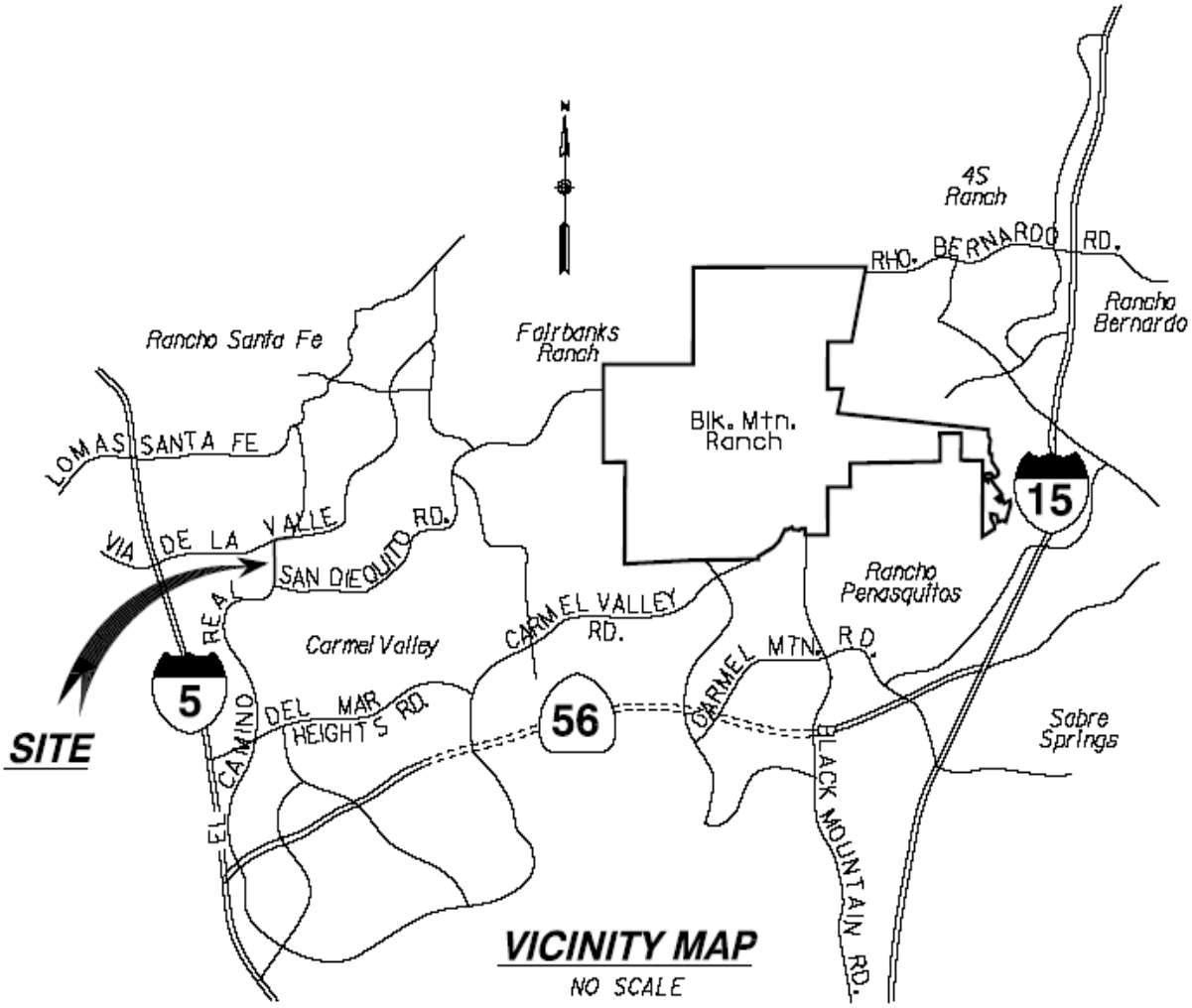
Background of Hydraulic Studies:

Several hydrologic and hydraulic studies have been prepared for this project in recent years. Most recently, the following two reports have been prepared and remain as a source of information and reference for this report:

> "Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Chang Consultants, dated June 2005.
>
> "Hydraulic and Sediment Modeling of the San Dieguito River for Wetland Creation at the JPA/Boudreau Site," prepared by Chang Consultants, dated November 2005.

The methodology used in the November 2005 report considers sediment transport. While this is important to many design considerations (and was utilized in the design of the mitigation area), any future processing and approval through the Federal Emergency Management Association (FEMA) will require the HEC-RAS methodology (that does not consider sediment transport). Therefore, the main purpose of this report is to provide an update to the June 2005 report that utilized the HEC-RAS methodology for both existing and proposed analyses. Specifically, the updates include adding in the effect of the mitigation area, lowering of the overbank directly adjacent to the brackish marsh mitigation area (on the channel side of the proposed berm), and removal of the existing bridge for the proposed condition. This report presents the existing and proposed condition (for the preferred alternative) water surface elevations (WSELs) and velocities that have been referenced throughout the revised EIR for the project.

2.0 VICINITY MAP



3.0 HYDRAULIC ANALYSIS

The U.S. Army Corps of Engineers HEC-River Analysis System (HEC-RAS) was used to model the hydraulic characteristics of San Dieguito River for this study. HEC-RAS has the capability to model subcritical, supercritical, and mixed flow. HEC-RAS calculates water surface profiles based on the energy equation and the momentum equation. Geometric information, Manning's roughness and discharge as well as any known boundary conditions are required to complete the hydraulic model.

The HEC-RAS study reach starts from downstream at Section 1.979 and ends upstream at Section 12. Cross-sections from 1.979 to 2.844 were imported from the previous report, titled "Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Chang Consultants, dated June 2005. The analyses for both the existing and proposed conditions were extended farther upstream to help model conditions along Via de la Valle in the vicinity of El Camino Real North.

HEC-RAS models were prepared for the scenarios listed below:

- Existing Condition (having only the existing bridge)
- Preferred Alternative Condition, constructing the proposed bridge upstream of the existing bridge, creating the mitigation area immediately downstream of the existing bridge in the southern overbank, widening the roadway of Via de la Valle from El Camino Real to El Camino Real North), and removing the existing bridge.

The flood discharges used for the analyses of the Existing Condition and the Preferred Alternative are referenced from page 1 of the "Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Chang Consultants, dated June 2005. The peak discharges at 10-year, 50-year and 100-year are 5,900 cfs, 32,500 cfs, and 42,800 cfs, respectively.

The Preferred Alternative hydraulic analysis within this report has updated the analysis previously provided in the "Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Chang Consultants, dated June 2005, by incorporating the grading of the mitigation area, widening of Via de la Valle, removing the existing bridge, and providing the additional upstream cross-sections.

4.0 HYDRAULIC RESULTS

Existing Condition

Table 1 presents a summary of water surface elevations for the Existing Condition. The HEC-RAS summary table, profile plot, cross-section plots, and generated report for the Existing Condition are located in Appendix A. The HEC-RAS Workmap for the Existing Condition is located in Map Pocket 1.

Table 1

WSELs in San Dieguito River

For the Existing Condition

Existing Condition	
HEC-RAS Cross Section	**Water Surface Elevation (feet)**
12	25.7
11	25.7
10	25.5
9	25.1
8	24.7
7	24.2
6	24.0
5	23.5
4	23.1
3	22.9
2.844	22.7
2.782	22.5
2.732	22.3
2.675	21.9
2.623	20.6
2.614	20.4
2.6115	Location of the Existing Bridge
2.609	19.9
2.59	19.8
2.524	19.6
2.439	19.5
2.341	19.3
2.231	19.2
2.155	19.1
2.06	19.1
1.979	19.0

The existing bridge is shown on the workmap included in Map Pocket 1. HEC-RAS cross-sections at the existing bridge are cross-sections 2.609 (downstream of the bridge) and 2.614 (upstream of the bridge).

Preferred Alternative

Table 2 presents a summary of water surface elevations for the Preferred Alternative Condition. The HEC-RAS summary table, profile plot, cross section plots, and generated report for the Preferred Alternative Condition are located in Appendix A. The HEC-RAS Workmap for the Preferred Alternative Condition is located in Map Pocket 2.

Table 2

WSELs in San Dieguito River

For the Preferred Alternative Condition

Preferred Alternative	
HEC-RAS Cross Section	**Water Surface Elevation (feet)**
12	25.6
11	25.6
10	25.4
9	25.0
8	24.6
7	24.1
6	23.9
5	23.3
4	23.0
3	22.7
2.844	22.4
2.782	22.3
2.732	21.8
2.675	20.8
2.649	20.2
2.637	Location of the Proposed Bridge
2.625	20.0
2.614	19.6
2.6115	Location of the Existing Bridge (Removed)
2.609	19.4
2.59	19.5
2.524	19.7
2.439	19.4
2.341	19.3
2.231	19.2
2.155	19.1
2.06	19.1
1.979	19.0

The proposed conditions in the Preferred Alternative are shown on the workmap included in Map Pocket 2. HEC-RAS cross-sections for the proposed bridge in the Preferred Alternative are cross-sections 2.625 (downstream of the bridge) and 2.649 (upstream of the bridge). Furthermore, HEC-RAS cross-sections at the brackish marsh mitigation area are cross-sections 2.439, 2.524, and 2.59, whereas cross-sections intersecting the widened roadway of Via de la Valle are cross-sections 2.675, 2.732, and 2.782.

As mentioned previously within this report, additional information and hydraulic analyses are presented in earlier studies (and included as Attachments 1 & 2 within this report).

The results of the Existing Condition and the Preferred Alternative analyses continue to show no increase in the Base Flood Elevation (BFE) due to the proposed project.

5.0 BRACKISH MARSH MITIGATION AREA HYDRAULICS

The design of the brackish marsh mitigation area was the result of extensive study of the hydraulics of the San Dieguito River by Chang Consultants, specifically the November 2005 report, and further revisions by Rick Engineering between 2007 and 2009 based on feedback from the resources agencies. It was determined that an earthen berm would be required to protect the created marsh from sediment deposition. The berm would have a 10-foot top width, and would stand approximately 7- to 10-feet above the current ground level, constructed at a 3:1 slope on the channel side of the berm, and a 3:1 slope facing into the mitigation site. An armored weir would be constructed within the berm approximately 7 feet lower than the top of the berm. This weir would be approximately 250 feet long and would allow water to flow through the constructed wetland during large flood events while excluding bedload sediment. The portion of the berm that would parallel the main river channel along the north-facing slope (adjacent to main channel) would be fully vegetated and planted with native species. The remaining portions of the berm would also be vegetated and planted with native species. Pursuant to hydraulics reflecting the revised mitigation concept, the berm would not require additional slope protection such as turf reinforcement matting (TRM). Cross sections of the berm are illustrated in the attached Figure 3.12-7.

As mentioned earlier, the bottom of the mitigation site would have slight variations in depth, including a low-flow pilot channel to allow for meandering of flows in and out of the basin. During dry conditions, ground water could also provide water to the mitigation site, much like the current conditions of the main river channel during dry weather conditions.

The protective berm in the revised design extends approximately east – west from the existing bridge abutment, but is solely located along the north edge of the mitigation area (southern bank of the river), leaving a single opening at its west end to allow river flows to enter and exit the excavated basin. In this configuration, the mitigation basin is still protected from sediment deposition because water traveling down the river would need to turn nearly 180 degrees to wrap around the end of the berm and enter the mitigation area, thus losing much of its velocity and dropping much of its sediment load within the effective flow area of the river. Therefore,

sediment transport within the river would be maintained. No berm is planned for the west edge of the area.

The flow characteristics of water entering and exiting the mitigation area will vary during different stages of each storm event. The chronology of flow entering and exiting the mitigation area is more specifically described as follows (see also the attached figure titled "Exhibit Showing Mitigation Flow – Stages 1 to 5"):

1st – The beginning of a storm event: Water enters the mitigation site through the opening in the west end of the berm.

2nd – When the WSEL of the river reaches the elevation of the weir: Additional water enters through the west end opening in the berm. Mitigation area continues to fill up to weir elevation.

3rd – When WSEL of the river continues to rise above the weir: Water continues to enter the mitigation site by overtopping the weir. Water exits the mitigation site through downstream opening and throughout floodplain corridor west of the mitigation site.

4th – WSEL of the river drops below the elevation of the weir: Water in the mitigation site continues to exit through the opening at the west end of the weir and throughout floodplain corridor west of the mitigation site.

5th – WSEL of the river reaches the elevation of the downstream edge of the mitigation site: As WSELs continue to recede within the main channel of the river (below the elevation of the downstream edge of the mitigation site), flow will slowly continue to exit the mitigation area through the low-flow pilot channel. The WSEL within the mitigation site will continue to recede at approximately the same rate of the main channel.

Even during the larger storm events, flow velocities through the wetland area will be low and should have limited effects on scour. This is described on page 26 of the "Hydraulic and Sediment Modeling of the San Dieguito River for Wetland Creation at the JPA/Boudreau Site," prepared by Chang Consultants, dated November 2005. Specifically, they will be lower than 2.4 f.p.s. As stated in the report, "it may therefore be concluded that the flow through the wetland will not cause scour damages."

6.0 CONCLUSION

This report presents an updated hydraulic study of the San Dieguito River for the El Camino Real Bridge project, in the City of San Diego. In the previous report titled "Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Chang Consultants, dated June 2005, cross-sections from 1.979 to 2.844 were used to analyze the existing El Camino Real Bridge, as well as proposed alternatives (without the mitigation area). In this report, the preferred alternative hydraulic analysis (the eastern alignment) has been updated to incorporate the proposed grading of the mitigation area (and lowered adjacent overbank area), the widening of Via de la Valle (from El Camino Real to El Camino Real North), and providing the additional upstream cross-sections (cross-sections 3 through 12). This preferred alternative includes removing the existing bridge.

The hydraulic design of the mitigation area has been discussed in Section 5 of this report. However, detailed discussion and analyses are provided throughout the report titled "Hydraulic and Sediment Modeling of the San Dieguito River for Wetland Creation at the JPA/Boudreau Site," prepared by Chang Consultants, dated November 2005.

The proposed El Camino Real Bridge project will provide 100% conveyance of the 100-year storm under the proposed bridge. As stated in the previous hydraulic studies for this project (and reiterated within these revised analyses), this project will not cause any increase to WSELs, as compared to existing conditions.

FIGURES

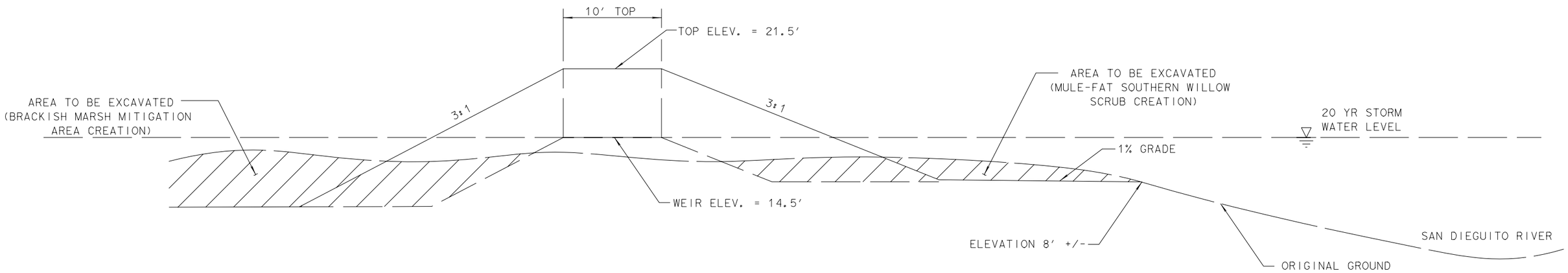
FIGURE 3.12-6: El Camino Real Mitigation Concept Plan

FIGURE 3.12-7: El Camino Real Road / Bridge Widening Mitigation Site Cross Sections

FIGURE 3.12-8: Exhibit Showing Mitigation Flow Stages 1 to 5

SAN DIEGUITO RIVER
PROPOSED EL CAMINO REAL
EXISTING EL CAMINO REAL
FAIRBANKS RANCH MITIGATION (0.4 ACRES) ARROYO WILLOW FOREST
FAIRBANKS RANCH MITIGATION (0.1 ACRES) RIP RAP WITH SAND BAR WILLOW THICKETS
FUTURE MITIGATION OPPORTUNITY 2.9 ACRES
MULE-FAT SOUTHERN WILLOW SCRUB ENHANCEMENT 2.0 ACRES
MULE-FAT SOUTHERN WILLOW SCRUB CREATION 3.0 ACRES
A
A
APPROXIMATE LOCATION OF JPA SALT MARSH CREATION
UTILITY CORRIDOR
10' - WIDE TOP OF VEGETATED BERM
ARMORED WEIR WITH TOE KEYED-IN
BRACKISH MARSH CREATION 12.5 ACRES
100' BUFFER
FAIRBANKS RANCH COUNTRY CLUB
FUTURE MITIGATION OPPORTUNITY (SALT MARSH)
0.1% DRAINAGE PATH
SAN DIEGUITO ROAD
EL CAMINO REAL
Legend
MAJOR CONTOURS
MINOR CONTOURS
DAYLIGHT LINE
PILOT CHANNEL
TOP-TOE OF SLOPE
Mitigation Concept Plan
Mule-Fat Southern Willow Scrub Enhancement
Brackish Marsh Creation
Southern Willow Scrub Creation
Future Mitigation Opportunity
Salt Marsh Creation
Area Of Potential Effect
Area of Potential Effect from Road / Bridge Construction
Proposed El Camino Real
Eastern Alignment
Fairbanks Ranch Mitigation Areas
EL CAMINO REAL
MITIGATION CONCEPT PLAN
Revised Date: 07/29/11
N
Feet
0 100 200
FIGURE
3.12-6
U:\14752B\Exhibits\FIG3.12-6_Mitigation_Concept_Plan_20110801.mxd

NOTE: SEE PLAN VIEW (FIG 3-12.6) FOR SLOPE PROTECTION



SECTION A-A - INLET WEIR

MITIGATION AREA

EL CAMINO REAL ROAD/BRIDGE WIDENING

MITIGATION SITE CROSS SECTION

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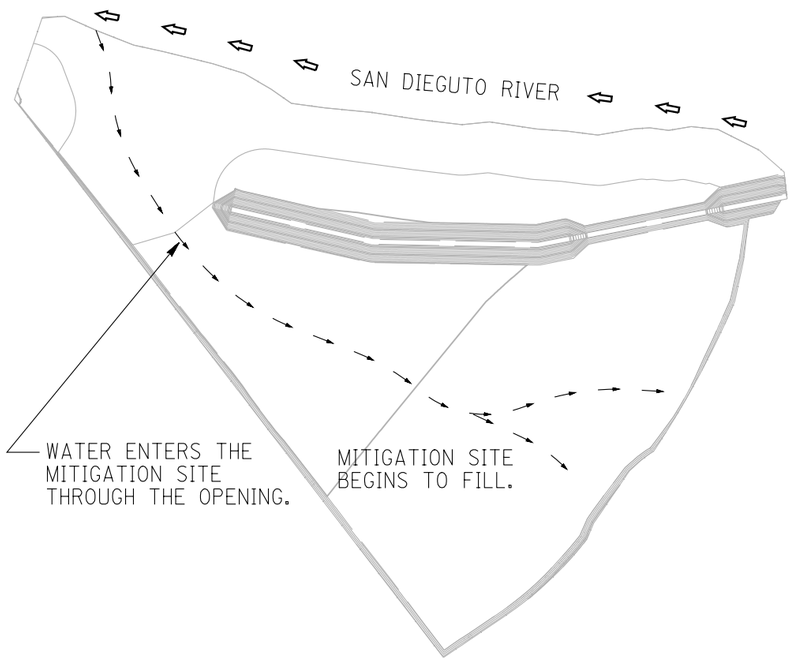
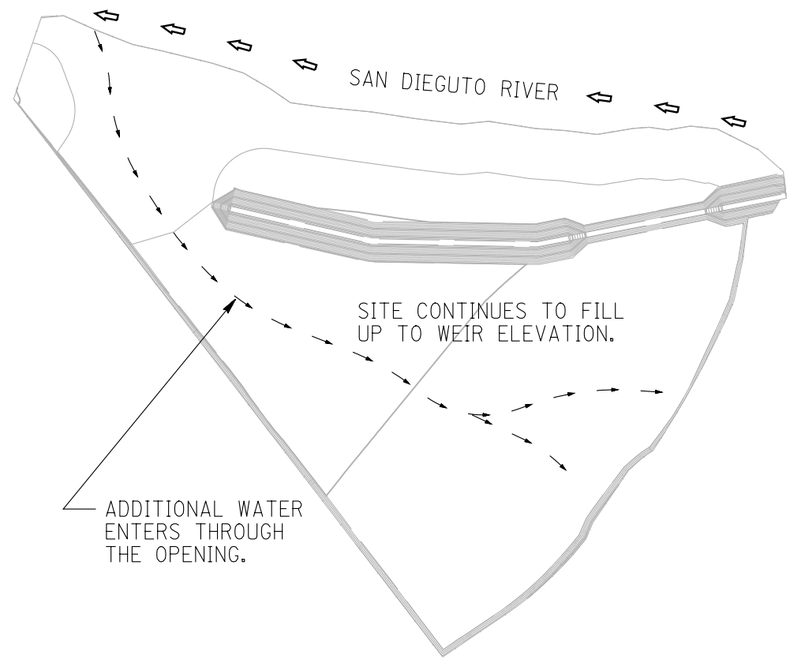
DATE: July, 2011

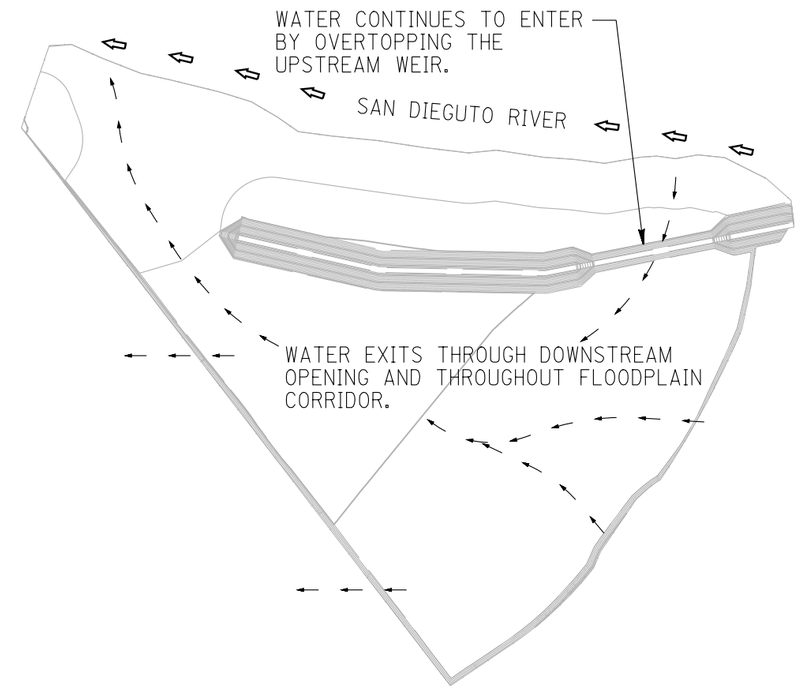
Figure
3.12-7



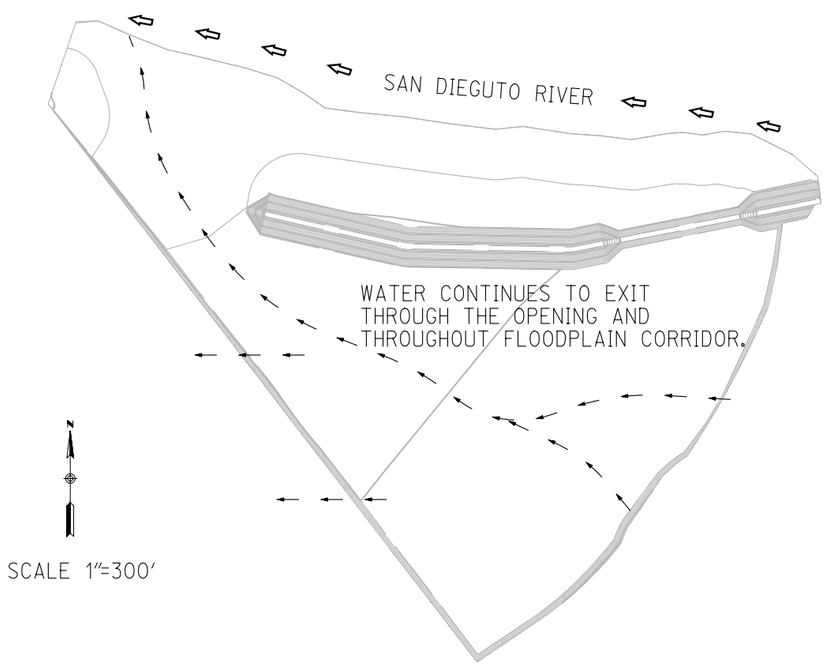
STAGE 1
BEGINNING OF A STORM EVENT



STAGE 2
WHEN THE WSEL OF THE RIVER REACHES THE ELEVATION OF THE WEIR.

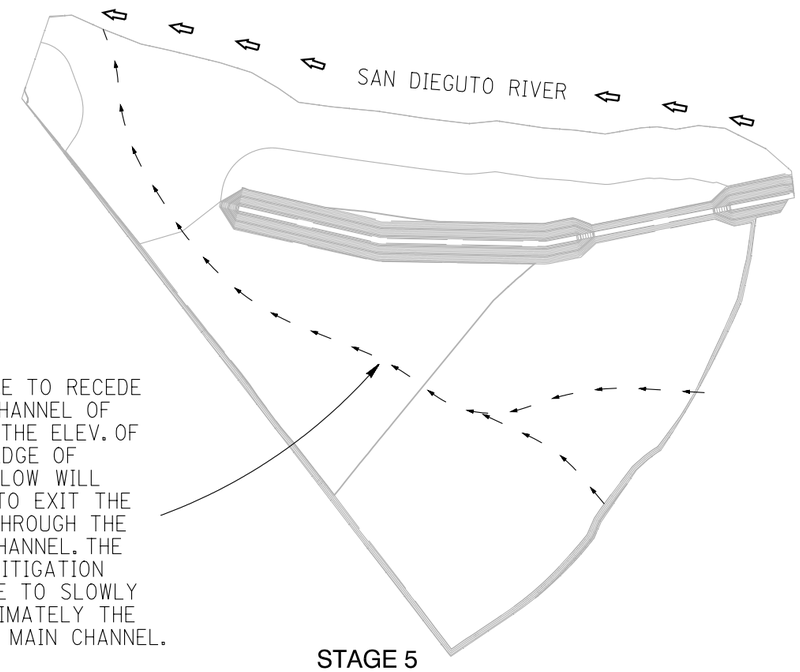


STAGE 3
WHEN THE WSEL OF THE RIVER CONTINUES TO RISE ABOVE THE WEIR.



STAGE 4
WSEL OF THE RIVER DROPS BELOW THE ELEVATION OF THE WEIR.

AS WSEL's CONTINUE TO RECEDE WITHIN THE MAIN CHANNEL OF THE RIVER (BELOW THE ELEV. OF THE DOWNSTREAM EDGE OF MITIGATION SITE), FLOW WILL SLOWLY CONTINUE TO EXIT THE MITIGATION AREA THROUGH THE LOW-FLOW PILOT CHANNEL. THE WSEL WITHIN THE MITIGATION SITE WILL CONTINUE TO SLOWLY RECEDE AT APPROXIMATELY THE SAME RATE OF THE MAIN CHANNEL.



STAGE 5
WSEL OF THE RIVER REACHES THE ELEVATION OF THE DOWNSTREAM EDGE OF MITIGATION SITE AND CONTINUES TO RECEDE.

LEGEND

→ → → DIRECTION OF FLOW

⇨ ⇨ RIVER

RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165

El Camino Real
Road / Bridge Widening

Exhibit Showing
Mitigation Flow Stages 1 to 5

JOB NO. 14752-B
REVISED: July 29, 2011

Figure
3.12-8

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APPENDIX A

HEC-RAS Output for the Existing Condition

HEC-RAS Plan: Exist+Ext River: RIVER-1 Reach: Reach-1

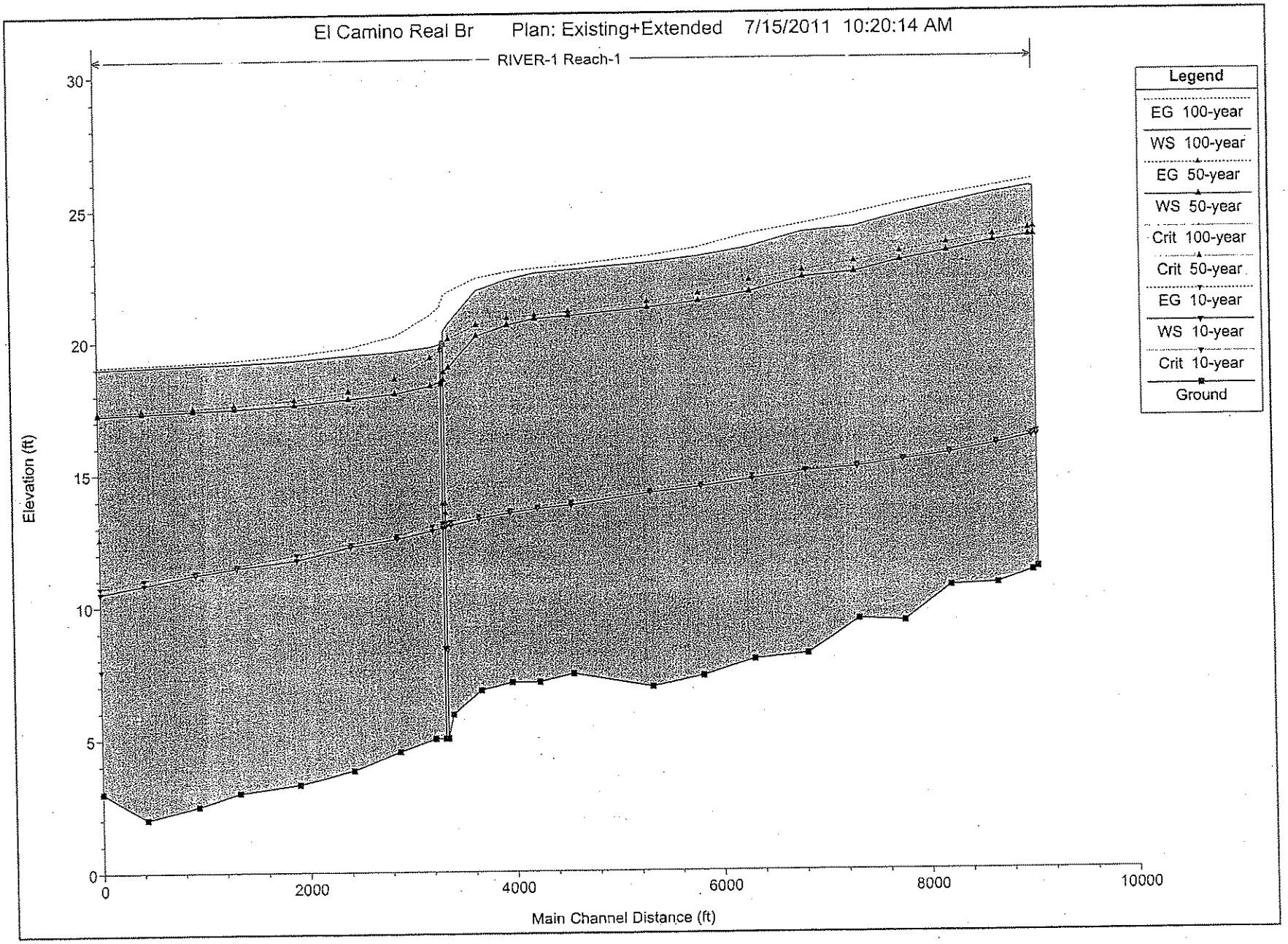
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	12	100-year	42800.00	11.32	25.67		25.97	0.000641	4.73	10405.27	2593.00	0.23
Reach-1	12	50-year	32500.00	11.32	23.83		24.12	0.000758	4.66	8035.81	2195.92	0.24
Reach-1	12	10-year	5900.00	11.32	16.30		16.43	0.000998	2.84	2077.30	461.51	0.24
Reach-1	11.	100-year	42800.00	11.20	25.68		25.92	0.000523	4.28	11764.78	2693.50	0.20
Reach-1	11.	50-year	32500.00	11.20	23.82		24.07	0.000662	4.37	8927.84	2365.05	0.23
Reach-1	11.	10-year	5900.00	11.20	16.26		16.38	0.000997	2.82	2091.17	468.86	0.24
Reach-1	10.	100-year	42800.00	10.72	25.47		25.71	0.000499	4.23	11151.61	2644.78	0.20
Reach-1	10.	50-year	32500.00	10.72	23.62		23.83	0.000534	3.98	9043.89	2090.50	0.20
Reach-1	10.	10-year	5900.00	10.72	15.96		16.07	0.000830	2.57	2295.80	521.34	0.21
Reach-1	9.	100-year	42800.00	10.64	25.07		25.43	0.000677	4.96	9102.17	1994.14	0.23
Reach-1	9.	50-year	32500.00	10.64	23.25		23.55	0.000663	4.47	7642.59	1547.37	0.23
Reach-1	9.	10-year	5900.00	10.64	15.64		15.72	0.000693	2.35	2518.24	571.49	0.20
Reach-1	8.	100-year	42800.00	9.32	24.67		25.10	0.000754	5.30	8196.37	1808.06	0.25
Reach-1	8.	50-year	32500.00	9.32	22.91		23.24	0.000682	4.61	7124.40	1690.84	0.23
Reach-1	8.	10-year	5900.00	9.32	15.39		15.46	0.000456	2.11	2792.63	537.39	0.16
Reach-1	7.	100-year	42800.00	9.40	24.22		24.72	0.000918	5.84	7804.58	2248.92	0.27
Reach-1	7.	50-year	32500.00	9.40	22.49		22.89	0.000864	5.19	6563.95	2118.32	0.26
Reach-1	7.	10-year	5900.00	9.40	15.13		15.23	0.000628	2.43	2438.36	846.99	0.19
Reach-1	6.	100-year	42800.00	8.10	24.02		24.34	0.000491	4.39	9555.58	2054.99	0.20
Reach-1	6.	50-year	32500.00	8.10	22.31		22.56	0.000421	3.74	8305.64	1904.60	0.18
Reach-1	6.	10-year	5900.00	8.10	15.00		15.05	0.000212	1.53	3505.83	1446.33	0.11
Reach-1	5.	100-year	42800.00	7.90	23.46		23.97	0.000994	6.22	7679.49	2120.38	0.29
Reach-1	5.	50-year	32500.00	7.90	21.77		22.22	0.001020	5.80	6357.91	2060.63	0.28
Reach-1	5.	10-year	5900.00	7.90	14.70		14.84	0.000829	3.09	1935.96	937.56	0.22
Reach-1	4.	100-year	42800.00	7.30	23.13		23.46	0.000627	5.00	9490.50	2709.69	0.23
Reach-1	4.	50-year	32500.00	7.30	21.42		21.71	0.000640	4.66	7885.77	2692.41	0.23
Reach-1	4.	10-year	5900.00	7.30	14.43		14.52	0.000482	2.46	2408.55	1128.29	0.17
Reach-1	3.	100-year	42800.00	6.90	22.91		23.17	0.000481	4.44	10783.25	2748.18	0.20
Reach-1	3.	50-year	32500.00	6.90	21.19		21.41	0.000499	4.18	8924.08	2665.66	0.20

HEC-RAS Plan: Exist+Ext River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	3.	10-year	5900.00	6.90	14.21		14.30	0.000410	2.35	2525.27	1253.76	0.16
Reach-1	2.844	100-year	42800.00	7.40	22.65		22.82	0.000350	3.63	12826.70	2819.76	0.17
Reach-1	2.844	50-year	32500.00	7.40	20.90		21.06	0.000382	3.47	10523.92	2749.23	0.17
Reach-1	2.844	10-year	5900.00	7.40	13.78		13.89	0.000691	2.74	2156.15	855.59	0.20
Reach-1	2.782	100-year	42800.00	7.10	22.54		22.72	0.000308	3.52	12877.77	2776.33	0.16
Reach-1	2.782	50-year	32500.00	7.10	20.80		20.94	0.000310	3.26	10853.69	2769.97	0.16
Reach-1	2.782	10-year	5900.00	7.10	13.65		13.72	0.000357	2.09	2854.81	1130.85	0.15
Reach-1	2.732	100-year	42100.00	7.10	22.31		22.60	0.000526	4.51	9787.93	2749.91	0.21
Reach-1	2.732	50-year	32500.00	7.10	20.58		20.82	0.000541	4.20	8264.16	2718.16	0.21
Reach-1	2.732	10-year	5900.00	7.10	13.50		13.60	0.000555	2.57	2318.41	1096.70	0.18
Reach-1	2.675	100-year	41300.00	6.80	21.88		22.37	0.000956	5.71	7391.83	2742.14	0.28
Reach-1	2.675	50-year	32500.00	6.80	20.17		20.59	0.000999	5.32	6288.32	2701.16	0.28
Reach-1	2.675	10-year	5900.00	6.80	13.27		13.40	0.000853	2.87	2052.29	975.57	0.22
Reach-1	2.623	100-year	40500.00	5.90	20.64		21.84	0.002455	8.90	4752.02	2551.89	0.44
Reach-1	2.623	50-year	32500.00	5.90	18.99		20.05	0.002521	8.33	4017.72	2297.60	0.44
Reach-1	2.623	10-year	5900.00	5.90	13.04		13.18	0.000712	3.04	1939.10	1139.73	0.21
Reach-1	2.614	100-year	40100.00	5.00	20.38	14.64	21.69	0.002008	9.19	4365.69	1895.50	0.45
Reach-1	2.614	50-year	32500.00	5.00	18.82	13.51	19.93	0.001995	8.44	3848.69	1338.64	0.44
Reach-1	2.614	10-year	5900.00	5.00	13.01	8.27	13.15	0.000509	2.96	1995.65	299.24	0.20
Reach-1	2.6115		Bridge									
Reach-1	2.609	100-year	40100.00	5.00	19.87		21.29	0.002284	9.55	4197.53	1761.07	0.47
Reach-1	2.609	50-year	32500.00	5.00	18.46		19.64	0.002213	8.72	3729.05	1290.11	0.46
Reach-1	2.609	10-year	5900.00	5.00	12.97		13.11	0.000519	2.97	1983.29	298.93	0.20
Reach-1	2.59	100-year	40100.00	5.00	19.76		20.96	0.002184	8.84	4566.19	2269.56	0.46
Reach-1	2.59	50-year	32500.00	5.00	18.30		19.34	0.002288	8.27	3967.13	2235.30	0.46
Reach-1	2.59	10-year	5900.00	5.00	12.83		13.02	0.001138	3.46	1727.19	669.49	0.28
Reach-1	2.524	100-year	40800.00	4.50	19.58		20.19	0.001166	6.46	6622.20	2451.92	0.34
Reach-1	2.524	50-year	32500.00	4.50	18.02		18.57	0.001287	6.16	5574.24	2436.48	0.34

HEC-RAS Plan: Exist+Ext River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.524	10-year	5900.00	4.50	12.54		12.67	0.000791	2.84	2087.84	956.16	0.24
Reach-1	2.439	100-year	41500.00	3.80	19.45		19.74	0.000548	4.72	9743.08	2317.40	0.23
Reach-1	2.439	50-year	32500.00	3.80	17.82		18.09	0.000622	4.58	8047.44	2254.14	0.24
Reach-1	2.439	10-year	5900.00	3.80	12.24		12.36	0.000615	2.84	2316.42	1015.94	0.22
Reach-1	2.341	100-year	42200.00	3.30	19.28		19.49	0.000370	4.39	12180.39	2404.91	0.22
Reach-1	2.341	50-year	32500.00	3.30	17.60		17.80	0.000449	4.39	9720.12	2396.54	0.24
Reach-1	2.341	10-year	5900.00	3.30	11.75		11.95	0.000945	3.79	1863.02	829.11	0.30
Reach-1	2.231	100-year	42800.00	3.00	19.18		19.30	0.000220	3.19	15687.33	2385.53	0.17
Reach-1	2.231	50-year	32500.00	3.00	17.46		17.58	0.000255	3.08	12516.73	2352.97	0.17
Reach-1	2.231	10-year	5900.00	3.00	11.46		11.54	0.000477	2.22	2703.14	803.13	0.20
Reach-1	2.155	100-year	42800.00	2.50	19.13		19.22	0.000170	2.89	18701.15	2354.14	0.15
Reach-1	2.155	50-year	32500.00	2.50	17.40		17.49	0.000209	2.89	14640.56	2320.43	0.16
Reach-1	2.155	10-year	5900.00	2.50	11.22		11.32	0.000609	2.64	2413.61	813.86	0.23
Reach-1	2.06	100-year	42800.00	2.00	19.05		19.15	0.000169	3.27	18250.76	2197.55	0.15
Reach-1	2.06	50-year	32500.00	2.00	17.31		17.40	0.000201	3.27	14444.65	2160.70	0.16
Reach-1	2.06	10-year	5900.00	2.00	10.82		11.00	0.000638	3.63	2098.51	1097.06	0.26
Reach-1	1.979	100-year	42800.00	3.00	19.00	13.18	19.08	0.000145	2.90	19913.77	2420.18	0.14
Reach-1	1.979	50-year	32500.00	3.00	17.24	12.57	17.32	0.000176	2.91	15682.74	2387.81	0.15
Reach-1	1.979	10-year	5900.00	3.00	10.50	7.56	10.70	0.000844	3.65	1887.90	871.94	0.28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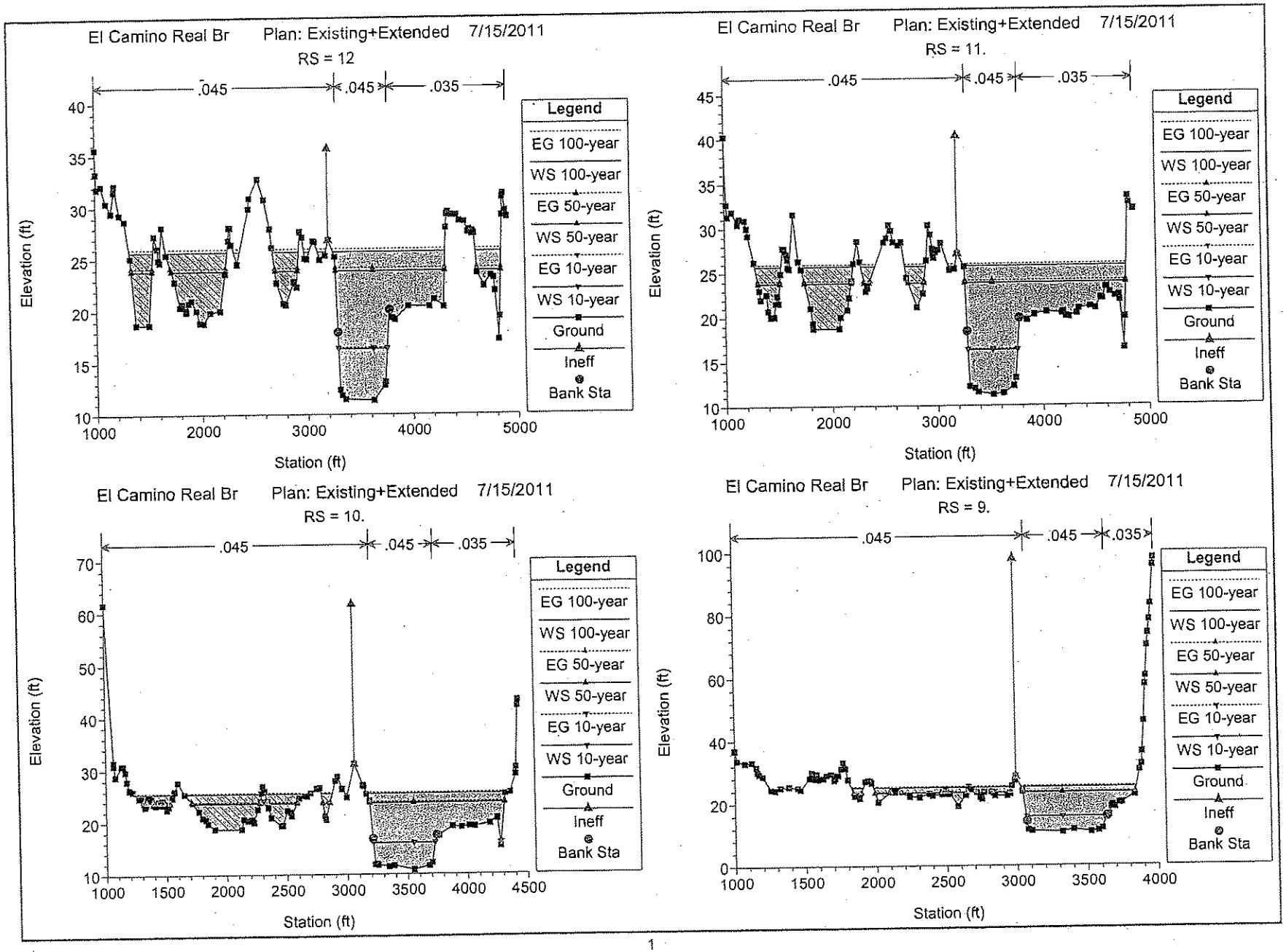
RIVER-1 Reach-1
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Elevation (ft)
30
25
20
15
10
5
0
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)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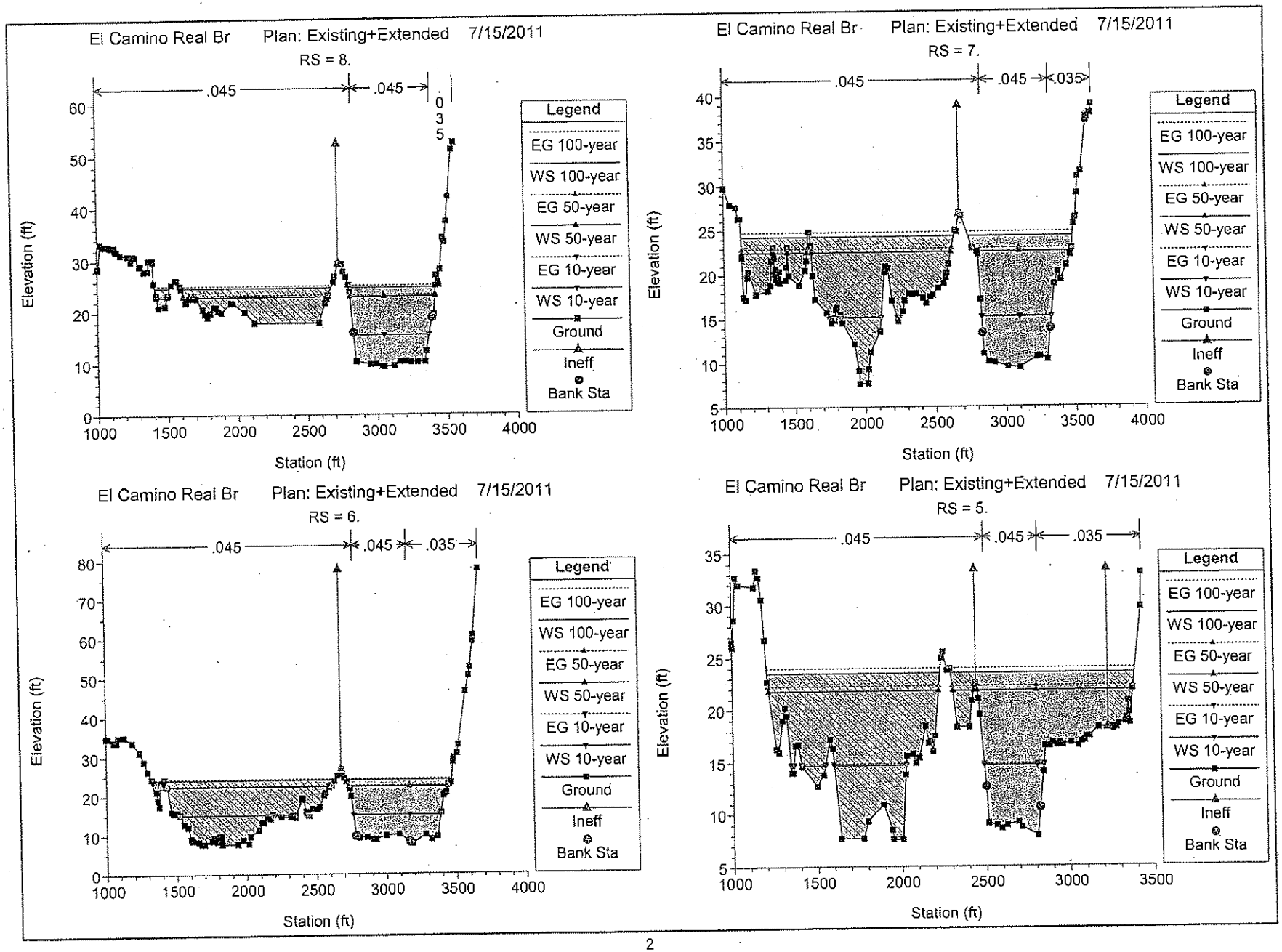
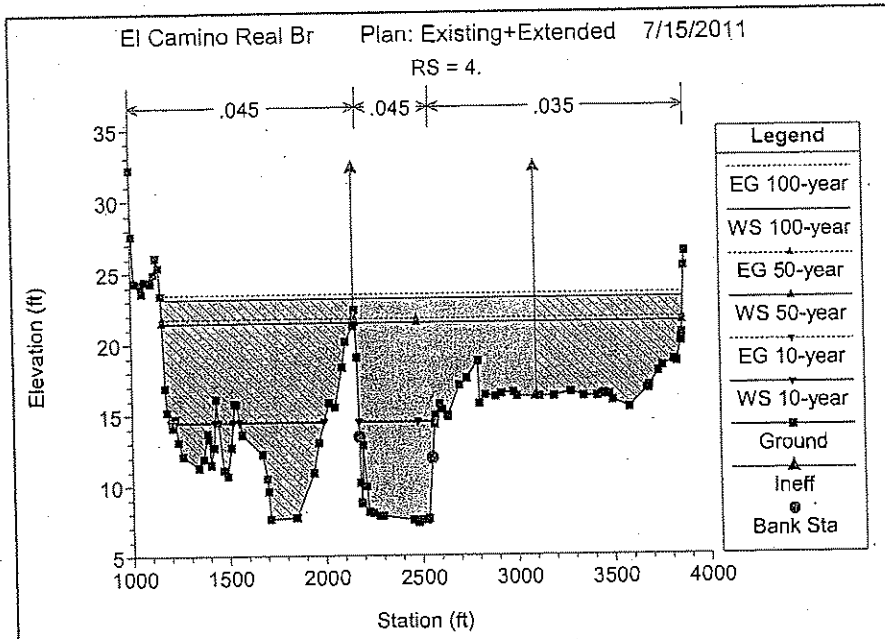
RS = 12
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 11.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 10.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 9.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta


El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 8.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 7.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 6.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 5.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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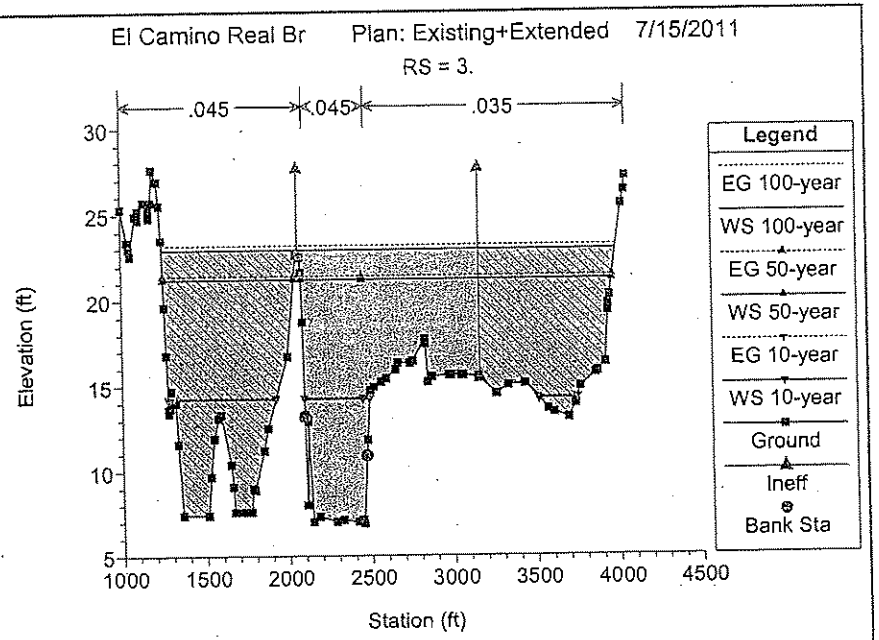
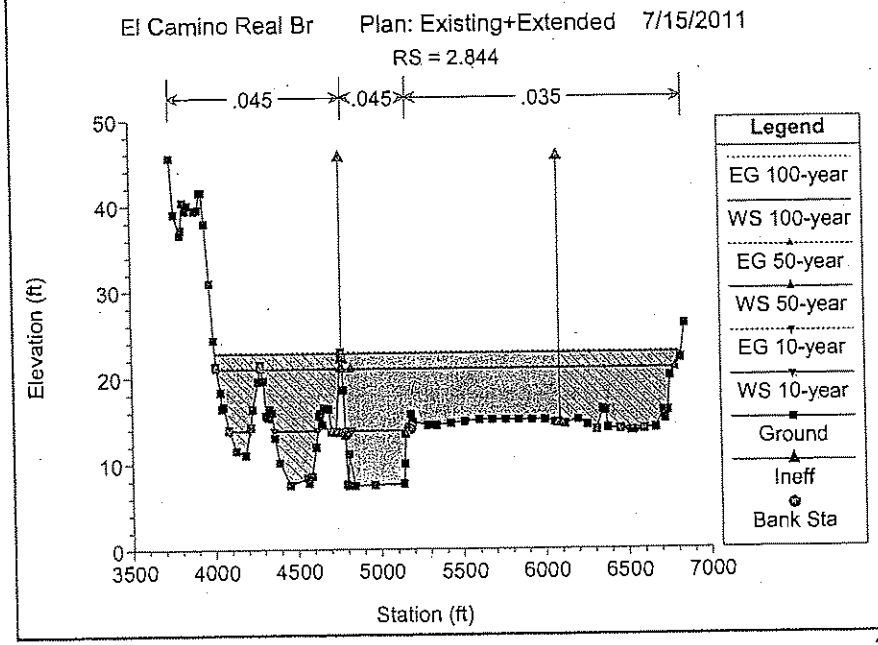
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta


El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 3.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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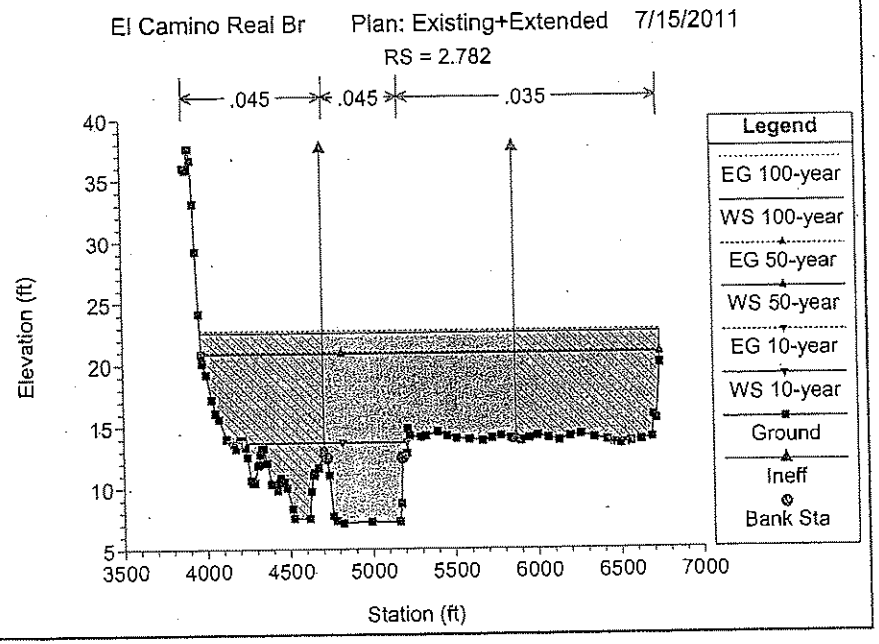
RS = 2.844
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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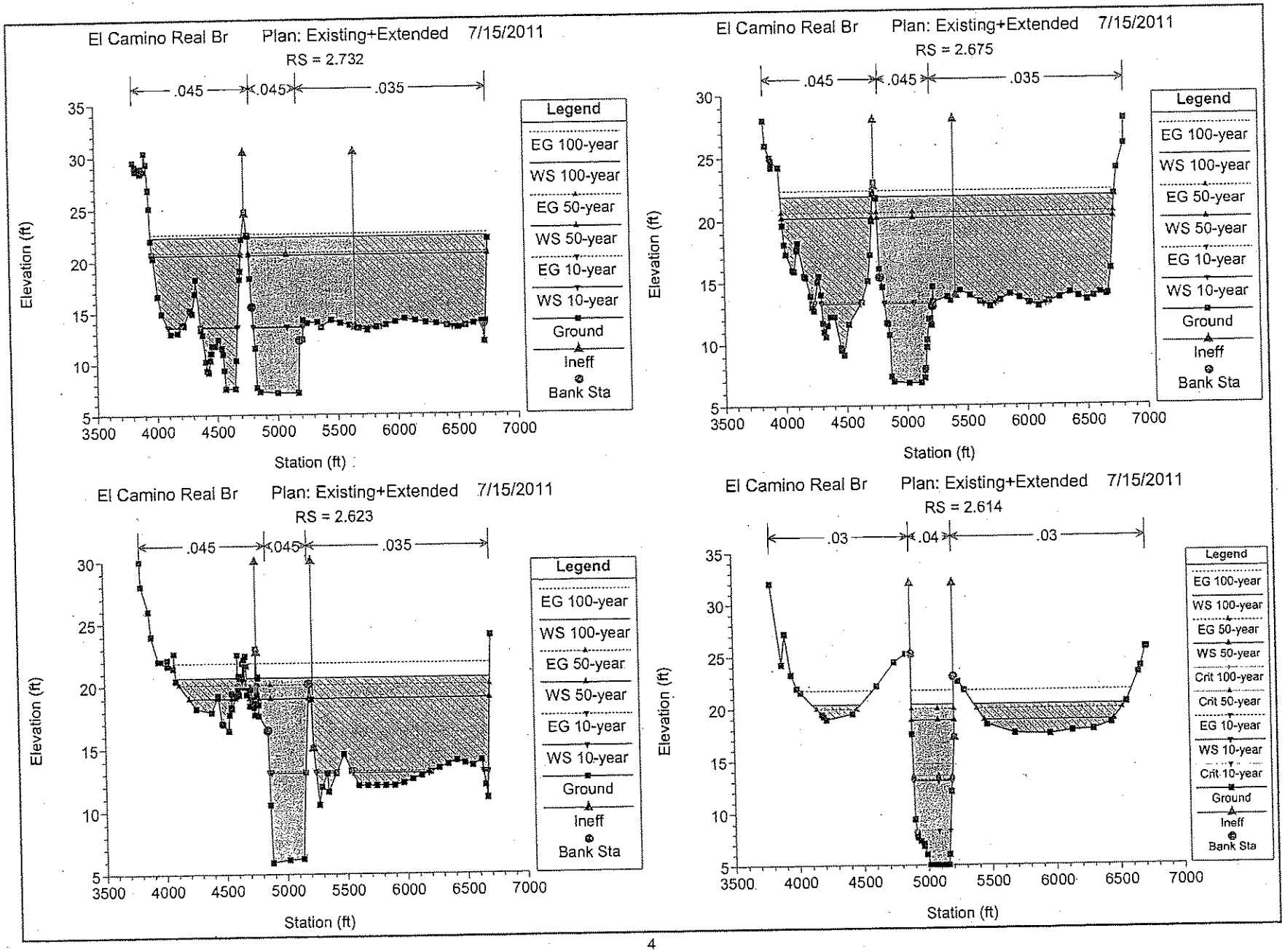
RS = 2.782
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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Station (ft)
Legend
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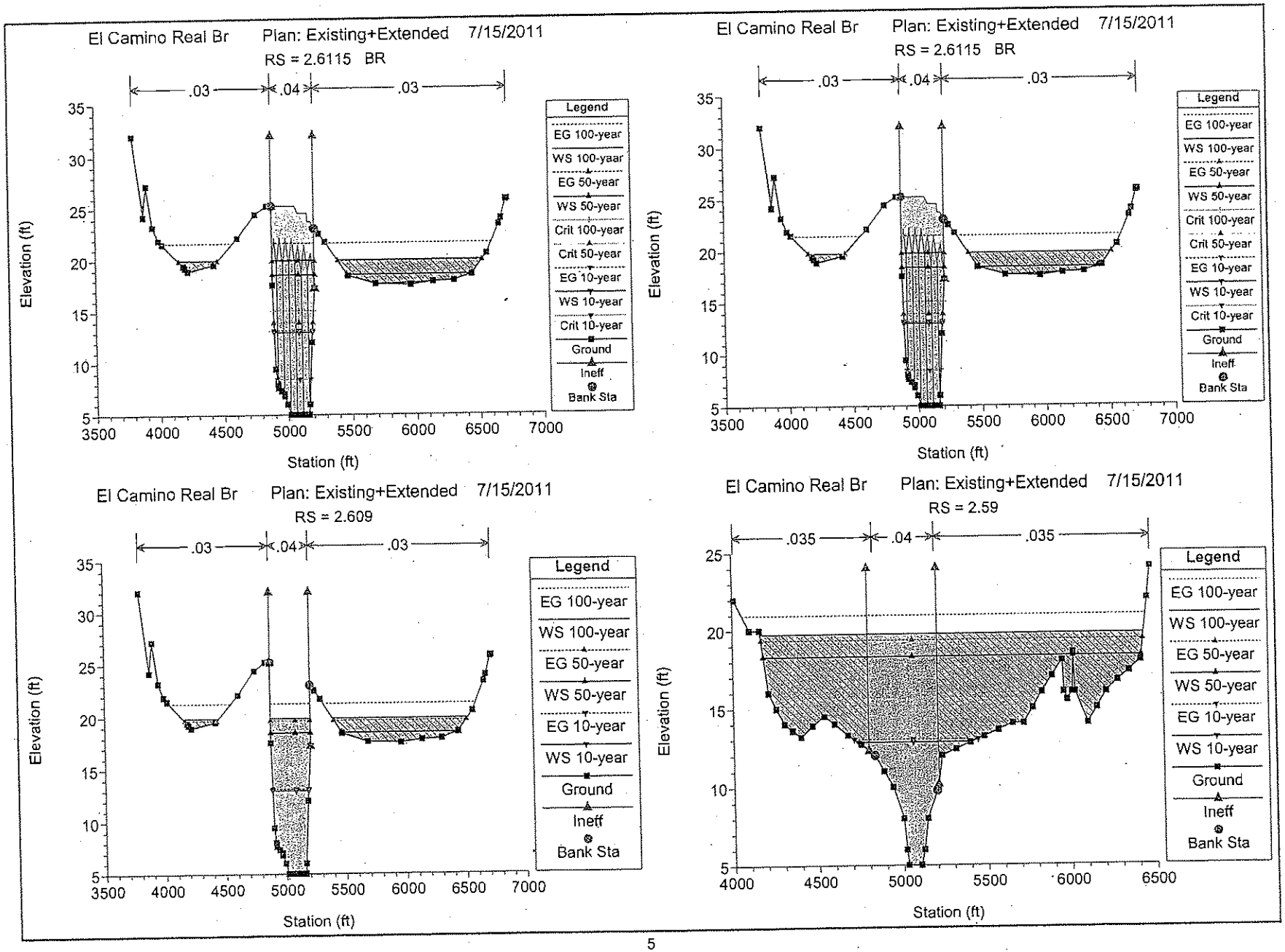
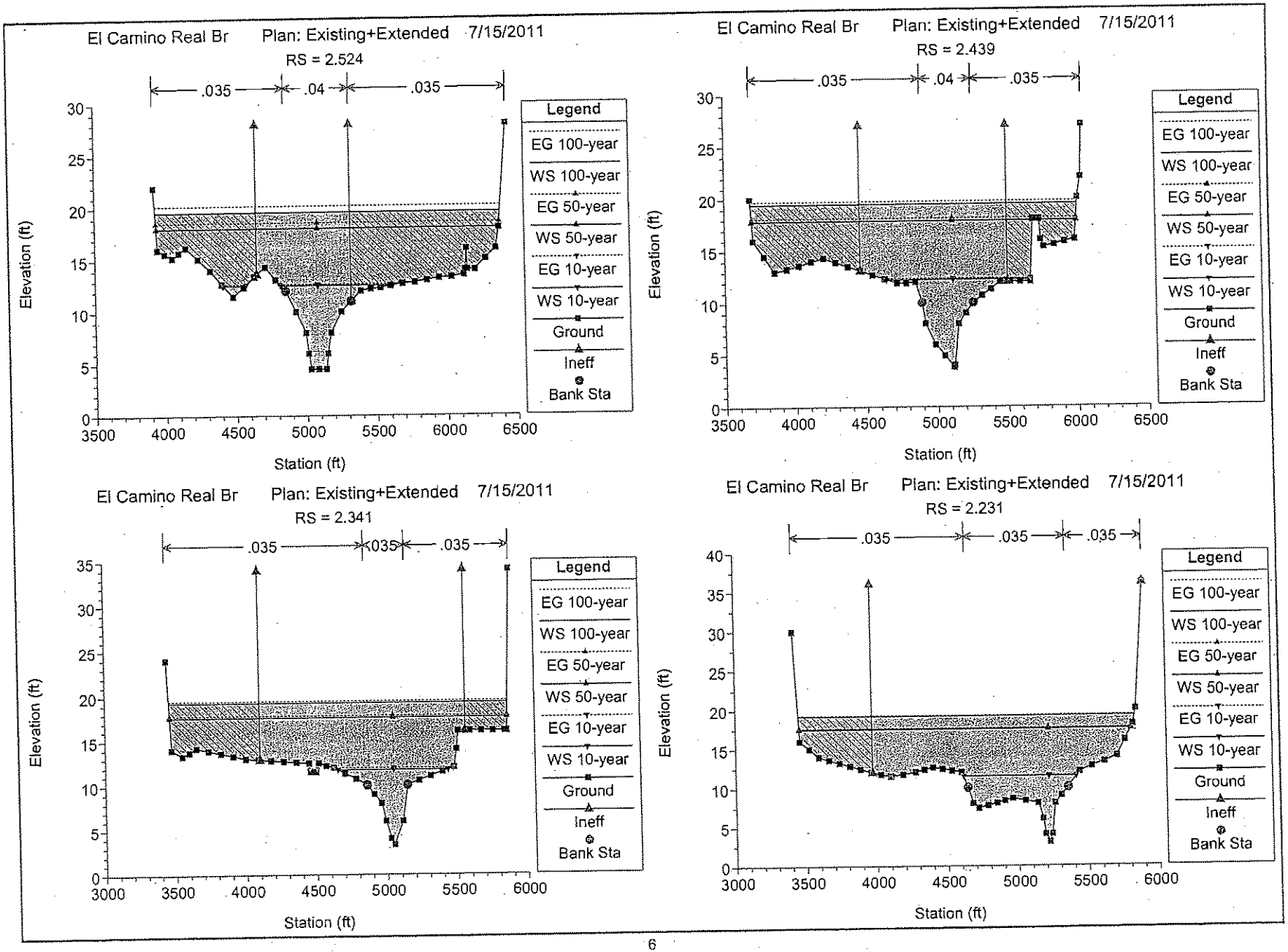
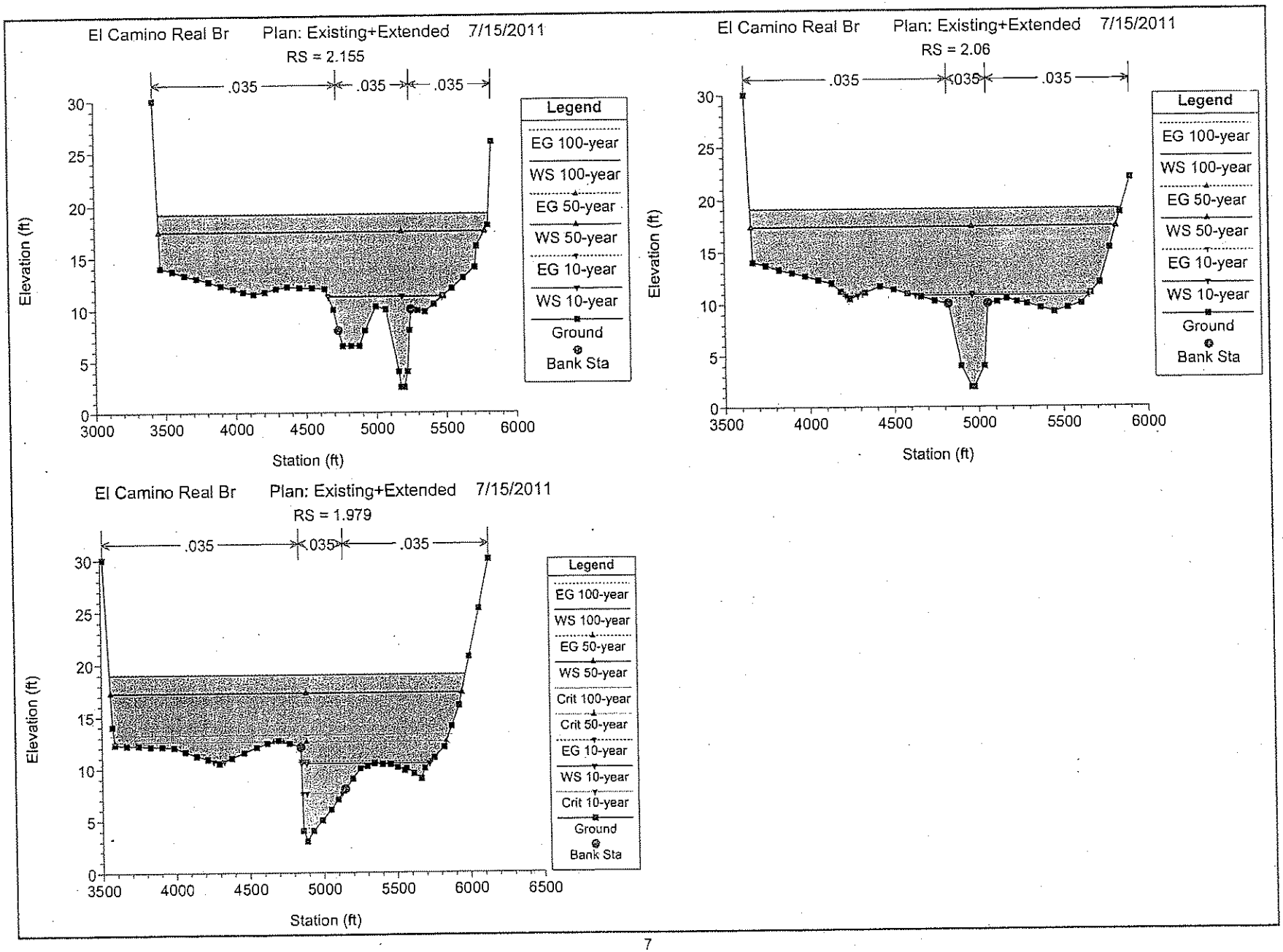
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.675
.045 .045 .035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.623
.045 .045 .035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.614
.03 .04 .03
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Ineff
Bank Sta


El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.6115 BR
.03 .04 .03
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-yaar
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.6115 BR
.03 .04 .03
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.609
.03 .04 .03
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.59
.035 .04 .035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta


El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.524
.035 .04 .035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.439
.035 .04 .035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.341
.035 .035 .035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.231
.035 .035 .035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta


El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.155
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 2.06
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Bank Sta
El Camino Real Br Plan: Existing+Extended 7/15/2011
RS = 1.979
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Bank Sta

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
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PROJECT DATA
Project Title: El Camino Real Br
Project File : Elcamino.prj
Run Date and Time: 7/15/2011 10:20:14 AM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
EXISTING CONDITIONS,
PROPOSED CONDITIONS
100-YR FLOOD

Note per 07/15/2011: Minor updates to area where proposed mitigation area will be, southwest of bridge, on left overbank to provide more detailed existing topographic data in order to match revised data in prop. condition (beyond limits of proposed mitigation grading).

Note per 04/04/2007: Updated all plans that included existing bridge to model the existing bridge pier using "pier editor" and not as ground points. This updates included debris factors as well.

Note per 03/13/2007: Updated number of bridge piers at CX 2.637 from 4 to 2 per the exhibit titled El Camino Real Road / Bridge Widening General Plan Brdige for Eastern Alignment (Figure 2-19). Pier width is 7' instead of 3' to take in account of the debris factors. The piers are stationed at 4937.5 and 5062.5. This revision was made in geometry files associated with plan (.p09), (.p11), and (.p13).

Note per 03/07/2007: Updated all plans that included Mitigation Area SW of bridge location to correct the ineffective flow area on the left overbank of CX 2.439, per Resource Agency comment.

PLAN - "Prop+Exist+Mitigation+Extended+Enhanced," (.p13) corresponds to enhanced preferred alternative that is eastern alignment with existing bridge removed.

An approximate 25-year Q was interpolated using the log sheet and now added to profile in steady flow file. The Q was interpolated between the given 10-year, 50-year, and 100-year Q from FIS. (dated: December 7, 2006)

PLAN - "Prop+Exist+Mitigation+Extended+Risk," (.p11) corresponds to risk assessment alternative that raise the via de la valle above the 100-year WSEL. (dated: April 11, 2006)

PLAN - "Prop+Exist+Mitigation+Extended," (.p09) is an extention to "Prop+Exist+Mitigation," (.p05). Cross sections 3-12 (imported from Fairbank) are now included in (.p09). (dated: April 5, 2006)

PLAN - "Existing+Extended," (.p12) is an extension to "Existing," (.p08) which was created by Dr. Howard Chang. "Existing+Extended," (.p12) imported cross-sections from 3 to 12 from the fairbank project. (dated: April 12, 2006)

PLAN - "Prop+Exist+Mitigation," (.p05) corresponds to Alternative 2a.
It assumes the existing bridge and the proposed bridge (eastern alignment) both in place and the proposed mitigation area just downstream on the southern overbank area. The mitigation includes a 10-foot berm (top width) separating the main mitigation area from the main channel, and also includes a smaller area of the overbank area that will be lowered on the north side of the berm. (BH)

The Hecras analysis prepared by Chang Consultants (Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River, revised June 2005) was revised to add the downstream mitigation areas into the model. In short, the proposed grading limits were added, the lowered overbank area north of the proposed berm was added, and the manning's n roughness coefficient was increased from n=.035 to n=.04 for the limit of mitigation area in each of four cross-sections. This revision was prepared by Rick Engineering Company, dated December 9, 2005.

PLAN DATA

Plan Title: Existing+Extended
Plan File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.p12

Geometry Title: Existing+Extended
Geometry File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.g08

Flow Title : Existing Flow 01

Flow File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.f01

Plan Summary Information:

Number of:	Cross Sections	= 25	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 1	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Existing Flow 01
Flow File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.f01

Flow Data (cfs)

River	Reach	RS	100-year	50-year	10-year
RIVER-1	Reach-1	12	42800	32500	5900
RIVER-1	Reach-1	2.844	42800	32500	5900
RIVER-1	Reach-1	2.732	42100	32500	5900
RIVER-1	Reach-1	2.675	41300	32500	5900
RIVER-1	Reach-1	2.623	40500	32500	5900
RIVER-1	Reach-1	2.614	40100	32500	5900
RIVER-1	Reach-1	2.524	40800	32500	5900
RIVER-1	Reach-1	2.439	41500	32500	5900
RIVER-1	Reach-1	2.341	42200	32500	5900
RIVER-1	Reach-1	2.231	42800	32500	5900
RIVER-1	Reach-1	2.155	42800	32500	5900

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	100-year	Known WS = 19	
RIVER-1	Reach-1	50-year	Known WS = 17.24	
RIVER-1	Reach-1	10-year	Known WS = 10.5	

GEOMETRY DATA

Geometry Title: Existing+Extended
Geometry File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.g08

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 12

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	35.6	1005.86	33.27	1013.08	31.83	1055.01	32.1	1099.25	30.47
1144.99	29.5	1176	31.58	1180.55	32.16	1224.52	29.29	1272.69	28.7
1321.29	25.1	1372.68	18.68	1498.17	18.68	1553.31	27.25	1584.04	26.05
1592.99	24.9	1603.16	24.7	1625.67	28.06	1665.26	25.4	1744.29	22.84
1791.24	20.4	1803.95	20.35	1815.94	20.71	1850.07	19.88	1852.08	20.1
1856.82	19.9	1878.37	20.77	1904.54	21.04	1951.26	20.01	1980.89	18.85
2021.94	18.8	2082.22	19.82	2177.87	19.99	2226.8	23.59	2260.35	26.81
2266.62	28	2276.55	28.01	2289.11	26.36	2341.63	24.48	2453.87	29.83
2463.88	30.9	2545.28	32.67	2603.12	30.76	2654	27.88	2670.13	26.1
2711.85	22.7	2774.21	20.74	2797.93	20.55	2877.43	22.79	2902.47	22.3
2935.73	27.6	2956.39	27.08	2981.85	25.02	3000.22	24.95	3060.28	26.72
3075.48	26.6	3122.59	24.89	3174.65	25.29	3205.29	26.8	3264.7	25.15
3287.43	17.9	3303.45	12.36	3319.08	11.84	3351.69	11.41	3622.04	11.32
3727.53	12.8	3734.46	13.1	3776.26	20.11	3778.5	20.05	3805.79	19.28
3830.09	19.1	3958.65	20.42	4161.16	20.39	4207.79	21.08	4296.23	20.35
4323.61	27.9	4332.48	29.22	4343.85	29.47	4369.91	29.17	4423.85	29.14
4453.69	28.6	4498.75	28.52	4531.82	27.51	4546.42	27.73	4568.52	27.35
4576.79	27.6	4591.03	27.38	4616.36	23.58	4679.05	22.34	4746.64	23.31
4773.16	23.1	4785.29	21.85	4818.03	17.15	4827.16	19.36	4857.86	29.1
4861.74	30.9	4871.15	31.21	4888.42	29.54	4905.42	28.94		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3287.43	.045	3778.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3287.43	3778.5	49.32	48	73.57	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3205.29		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 11.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	40.3	1017.77	32.69	1025.98	31.31	1068.34	31.84	1120.18	30.46
1125.95	30.8	1139.82	31.06	1186.39	30.89	1205.9	30.03	1215.36	29.19
1270.4	26.2	1319.99	23.06	1333.18	22.01	1387.97	22.58	1403.23	20.7
1427.05	20	1458.92	20.06	1475.5	21.56	1490.04	22.43	1501.97	21.59
1521.74	24.9	1544.11	27.77	1555.98	27.71	1576.39	27.13	1588.08	26.52
1592.53	25.6	1602.16	25.44	1644.13	31.55	1689.45	26.26	1716.32	25.39
1799.98	21	1821.54	19.32	1824.81	18.71	2071.33	18.71	2084.45	19.97
2148.41	20.8	2163.75	22.18	2190.78	24.07	2208.44	26.01	2245.42	28.48
2269.66	26.2	2324.04	22.89	2339.18	23.23	2497.01	28.39	2521.97	28.85

2546.84	30.3	2565.05	29.68	2587.75	28.39	2631.81	28.04	2662.57	28.41
2710.89	24.4	2807.45	21.06	2866.09	22.63	2901	26.32	2920.28	30.24
2940.22	29.2	2959.82	27.62	2964.07	27	2969.64	26.61	2989.81	27.21
3015.83	27.5	3041.11	28.24	3120.4	25.24	3169.54	25.37	3196.64	27.06
3260.42	25.6	3282.4	18.34	3300.55	12.14	3349.52	11.94	3381.12	11.52
3524.57	11.2	3619.7	11.39	3718.86	12.21	3738.3	13.08	3778.55	19.79
3849.99	19.6	3921.31	20.2	4036.71	20.5	4181.79	20.35	4194	20.53
4217.99	20	4243.34	19.95	4319.69	20.32	4337.47	20.86	4446.99	21.08
4496.05	20.9	4547.69	22.06	4563.82	21.98	4593.72	23.28	4605.59	23.35
4634.58	22.7	4681.06	22.26	4718.72	22.41	4726.07	21.78	4762.55	16.45
4772.93	19.9	4811.26	33.42	4821.04	32.65	4860.55	31.96		

Manning's n Valnes num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3282.4	.045	3778.55	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3282.4	3778.55	347.68	339	548.49	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3196.64		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 10.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	61.6	1065.1	31.55	1066.72	30.96	1078.56	28.81	1133.55	30.82
1144.36	30.8	1163.16	29.72	1174.61	27.9	1194.28	26.28	1220.63	25.97
1272.47	24.6	1290.82	24.66	1313.56	23.75	1322.01	23.03	1330.79	23.38
1346.64	24.6	1352.33	24.76	1372.19	24.37	1377.21	24.54	1396.08	23.58
1409	23.3	1437.64	23.91	1457.07	23.5	1471.34	24.16	1487.88	23.48
1489.88	23.6	1504.34	22.5	1520.03	23.02	1551.94	24.67	1568.23	25.86
1572.66	26	1598.72	27.62	1653.76	25.37	1772.86	22.14	1802.96	20.84
1830.99	20.5	1846.37	19.78	1904.05	18.71	2126.59	18.71	2143.98	20.6
2181.47	20.3	2213.13	20.54	2228.29	20.02	2260.47	22.45	2285.56	23.91
2292.62	25.6	2303	26.9	2317.41	25.97	2339.99	23.98	2349.03	22.8
2373.01	20.9	2453.68	19.32	2467.97	19.43	2507.32	22.2	2533.93	21.88
2540.85	21.2	2603.98	24.58	2655.3	24.99	2669.58	24.91	2697.53	25.59
2749	26.4	2774.29	26.56	2817.77	21.14	2825.25	20.46	2903.54	27.83
2922.14	28.7	2959.73	26.34	2998.12	24.68	3063.82	31.09	3131.8	27
3139.33	26.8	3159.32	25.3	3185.34	23.98	3210.78	16.78	3228.28	11.78
3244.48	11.9	3252.18	11.68	3344.18	11.39	3386.35	11.54	3552.31	10.72
3679.96	11.5	3702.75	12.08	3737.94	17.39	3742.94	17.35	3759.57	17.33
3876.38	19.1	3950.62	18.95	4016.25	19.2	4059.21	19.11	4185.85	19.68
4245.42	20.7	4246.74	20.53	4274.78	15.27	4315.06	25.27	4357.64	25.53
4403.81	29	4407.41	30.26	4426.73	42.03	4430.62	43.13		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3210.78	.045	3742.94	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3210.78	3742.94	585.6	450	556.91	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3063.82		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 9.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	37	1016.9	33.7	1073.58	32.94	1121.8	33.23	1152.75	31.65
1161.67	30.1	1171.71	29.36	1198.09	28.64	1256.09	24.45	1282.45	24.17
1321.64	25.1	1382.49	25.44	1446.9	25.01	1463.43	24.47	1528.47	28.12
1533.87	28.1	1544.3	29.93	1559.42	28.86	1567.3	27.86	1581.06	29.5
1593.41	27.7	1627.08	27.96	1648.62	28.99	1680.4	29.4	1703.36	27.5
1712.61	28	1721.47	28.98	1732.48	28.9	1751.89	31.06	1766.04	33.19
1782.94	31.2	1800.28	27.57	1848.38	22.39	1882.05	21.62	1921.82	26.96
1943.46	27.3	1956.53	27.14	1966.87	26.49	2013.05	20.39	2114.35	24.06
2135.36	23.6	2151	23.9	2237.13	22.08	2307.12	21.91	2377.04	22.97
2389.54	22.4	2468.87	22.81	2473.19	23.63	2480.05	23.05	2491.91	24.59
2515.92	22.9	2524.23	22.84	2581.98	19.02	2637.55	22.51	2657.34	25.17
2674.82	24.2	2715.26	23.38	2740.33	21.83	2743.51	22	2751.97	21.28
2767.57	23.4	2821.64	23.57	2834.98	23.08	2844.63	22.26	2932.59	22.26
2951.05	22.9	2966.41	25.46	2986.32	27.06	2992.2	28.44	3039.79	23.8
3070.69	14.2	3080.08	11.42	3106.55	11.02	3321.87	10.64	3400.49	11.49
3522.98	10.7	3576.78	11.11	3603.66	11.87	3631.39	15.44	3637.71	15.64
3650.43	16.1	3668.33	18.59	3674.22	19.28	3691.74	18.65	3725.46	19.86
3742.81	20	3832.93	22.46	3869.75	30.39	3884.99	32.22	3889	36.15
3903.88	45.7	3915.36	57.56	3922.06	60.21	3934.59	69.86	3942.4	73.97
3955.33	78.1	3964.35	83.07	3985.23	95.58	3988.22	97.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3070.69	.045	3637.71	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3070.69	3637.71	1127.52	452	287.85	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2992.2		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 8.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	28.6	1005.45	28.45	1024.27	33.23	1035.35	32.74	1041.71	32.87
1061.19	32.9	1083.84	32.75	1092.86	32.56	1121.25	32.64	1124.3	32.11
1131.29	31.8	1140.59	31.88	1164.62	31.19	1219.06	30.98	1239.9	29.91
1242.97	30.9	1255.6	30.95	1268.5	30.77	1302.14	28.93	1308.95	29.04
1332.76	27.9	1359.49	28.05	1365.6	30.06	1378.37	30.03	1393.75	30.12
1394.57	29.8	1400.54	25.66	1416.32	23.32	1419.41	23.16	1420.28	23.05

1433.25	20.9	1482.05	21.18	1502.76	23.35	1526.92	25.37	1557.55	26.22
1561.6	26.2	1564.42	26.18	1588.13	25.13	1595.86	24.52	1627.6	21.8
1633.43	21.9	1657.37	22.66	1671.61	23.28	1703.38	22.62	1750.91	20.6
1766.08	19.6	1786.31	18.96	1806.22	19.85	1834.37	20.97	1846.46	20.93
1861.46	20.2	1883.93	19.91	1955.91	21.79	1958.38	21.71	1965.3	21.71
2051.2	20	2121.94	17.86	2585.61	17.86	2628.16	21.64	2641.35	22.45
2649.73	23.1	2687.98	25.74	2697.64	26.82	2724.27	29.32	2737.82	29.24
2748.03	29.2	2759.02	27.76	2777.42	26.7	2794.59	25.17	2802.41	23.78
2827.53	15.9	2845.35	10.4	2848.93	10.33	2949.01	9.78	2990.53	9.84
3031.41	9.4	3047.38	9.32	3118.85	9.51	3158.36	10.28	3200.01	10.36
3237.46	10.2	3284.67	10.19	3336.84	10.23	3346.59	12.25	3386.84	18.59
3390.01	18.7	3403.66	19.41	3416.52	24.97	3420.62	26.92	3433.41	25.66
3439.42	25.1	3448.56	28.08	3468.3	34.15	3471.51	33.72	3481.4	33.27
3494.77	37.3	3511.58	42.12	3539.78	51.12	3556.19	52.41		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2827.53	.045	3390.01	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2827.53	3390.01	806.85	444	387.93	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2724.27		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 7.

INPUT
Description: Revised
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	29.8	1045	27.9	1085	27.6	1103	26.3	1115	26.3
1126	22	1135	17.5	1151	17.2	1163	19.7	1173	20.4
1225	17.8	1313	18.2	1329	18.8	1336	21.6	1351	23.1
1357	21.9	1361	20.1	1367	20.7	1371	19.5	1376	19.9
1380	19.2	1389	19.6	1392	20.4	1396	19.1	1438	19.4
1445	20.9	1452	23.1	1461	19.9	1533	18.8	1577	20.5
1588	21.6	1602	24.8	1609	24.8	1620	23.3	1632	19.9
1646	17.2	1729	15.7	1761	14.5	1784	14.8	1794	16
1802	16.3	1826	15.5	1839	14.5	1924	12.1	1953	9.1
1958	7.6	2017	7.7	2023	9.3	2037	11.2	2108	13.5
2143	20.2	2151	20.9	2167	20.7	2194	17	2237	14.7
2272	15.8	2284	17	2317	17.8	2341	17.7	2365	17.8
2415	17.3	2437	16.7	2468	17.4	2484	17.6	2523	18.4
2565	18.9	2578	19.6	2580	20	2586	20.1	2598	21.1
2647	24.9	2655	24.7	2675	26.8	2689	26.5	2767	22.9
2800	22.5	2807	22.2	2824	17.1	2835	13.3	2843	11
2878	10.1	2919	10	3013	9.5	3101	9.4	3222	10.6
3243	10.7	3296	10.3	3318	13.8	3349	18.8	3377	20.2
3397	19.3	3436	20.9	3465	22.1	3476	22.8	3490	25.5
3499	26.2	3505	26.3	3516	29	3524	30.8	3546	31.4
3585	37	3587	37.5	3590	37.1	3597	37.4	3613	37.9
3620	37.9	3625	38.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2835	.045	3318	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2835	3318	692.7	497	459.02	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2674.77		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 6.

INPUT
Description: Revised
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	34.8	1013	34.7	1055	33.7	1055	33.9	1078	33.7
1086	35	1129	35.1	1187	33.7	1237	31.2	1269	28.9
1296	26.3	1322	24.3	1338	23.7	1356	21.1	1366	18.9
1376	17.3	1387	23.1	1391	22.8	1400	23.7	1413	24.3
1433	22.4	1463	15.9	1478	15.5	1504	15.7	1523	15
1552	12.7	1580	12	1600	9.1	1612	8.6	1656	8.3
1676	7.7	1698	7.7	1751	8.5	1765	9.3	1771	9.3
1784	8.6	1787	8.8	1791	8.3	1794	8.4	1796	8.9
1807	9.8	1816	9.6	1818	9.2	1824	7.7	1937	7.7
1976	8.8	2014	7.8	2026	9.6	2088	11.3	2111	13.2
2122	13.2	2150	14.5	2161	14.6	2170	14.1	2186	15.2
2247	14.5	2318	14.5	2329	14.9	2349	14.3	2397	19
2402	19.3	2403	19.3	2405	19	2427	15.9	2433	15.4
2444	14.8	2447	14.8	2473	16.6	2509	16.5	2524	17
2556	20	2565	20.6	2569	20.7	2591	22.2	2612	22.6
2631	23.7	2652	25.1	2679	26.7	2689	25.5	2700	24.4
2718	23.6	2743	21.7	2749	19.8	2780	9.7	2806	9.2
2862	9.3	2907	8.8	2925	8.8	2998	9.7	3089	10
3165	8.1	3173	7.9	3185	7.7	3279	9.9	3319	8.8
3363	9.5	3390	15.5	3409	19.8	3418	20.3	3428	20.7
3441	22.8	3449	22.9	3464	23.2	3477	28.5	3482	29.7
3508	30.7	3517	32.9	3572	46.4	3598	50.5	3607	52.7
3628	59.1	3633	60.8	3673	77.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2780	.045	3165	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2780	3165	642.39	511	528.63	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2678.79		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 5.

INPUT
Description: Revised

Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	26.5	1002	26	1013	28.6	1024	32.7	1042	32
1135	31.8	1149	33.4	1163	32.7	1178	30.6	1194	26.7
1207	22.7	1259	16.3	1275	16	1297	19	1313	20.2
1322	19.4	1348	14	1357	14	1373	16.6	1389	16.7
1412	14.6	1499	12.7	1540	13.8	1579	17.2	1594	16.3
1640	7.7	1773	7.7	1800	9.3	1892	10.9	1943	8.5
1949	7.6	2006	7.6	2026	13.8	2035	15.6	2072	15.8
2089	14.9	2109	15.4	2147	18.4	2164	16.8	2176	17
2190	16	2204	17.5	2242	24.9	2253	25.5	2276	23.7
2295	23.9	2334	18.3	2408	18.3	2423	20.8	2445	22.5
2463	21	2470	19.5	2502	12.6	2514	9.1	2564	8.9
2593	8.6	2625	8.9	2694	9.2	2712	8.7	2807	7.9
2822	10.6	2842	14	2856	16.5	2864	16.5	2885	16.5
2901	16.8	2925	16.6	2942	16.6	2945	16.8	2962	16.6
3010	16.8	3053	16.5	3076	16.9	3091	17	3099	17.4
3120	17.4	3174	18.2	3238	18.2	3263	18.1	3281	18.2
3291	18.5	3333	18.7	3339	19.1	3350	20.7	3356	19.6
3361	18.6	3378	21.9	3430	29.7	3436	33		

Manning's n Values num= 3

Ste	n Val	Sta	n Val	Sta	n Val
1000	.045	2502	.045	2822	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2502	2822	578.02	495	791.59	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2446.02		T
3230	3436		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 4.

INPUT
Description: Revised
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	32.2	1007	27.6	1017	24.3	1053	24.2	1058	23.6
1073	24.4	1105	24.3	1120	24.9	1133	26.1	1146	25.4
1155	23.4	1173	16.9	1182	15.2	1210	14.1	1223	14.7
1240	13.1	1263	12.1	1345	11.3	1371	11.9	1391	13.7
1398	13.3	1409	11.5	1426	12.7	1437	16.1	1474	11.1
1494	10.7	1515	12.7	1533	15.8	1542	15.7	1571	13.6
1676	12.2	1699	10.5	1706	9.6	1713	7.6	1847	7.7
1851	7.7	1942	10.9	1970	13	2023	15.8	2053	15.5
2093	18.3	2111	20.1	2152	21.2	2159	22.3	2169	19
2178	13.4	2182	10.2	2186	8.8	2190	8.7	2197	12.8
2214	9.9	2225	8.1	2246	8	2278	7.8	2296	7.8
2454	7.5	2474	7.4	2482	7.3	2499	7.5	2527	7.5
2535	7.6	2557	11.9	2570	14.3	2573	14.9	2597	15.7
2610	15.3	2634	14.9	2638	14.8	2639	14.9	2701	17
2739	17.5	2798	18.7	2803	15.7	2804	15.7	2834	16.3
2887	16.2	2918	16.4	2982	16.5	2999	16.2	3115	16.2
3192	16.2	3279	16.5	3281	16.5	3346	16.2	3416	16.2
3418	16.2	3442	16.3	3451	16.4	3480	16.3	3497	15.9
3582	15.4	3675	16.7	3682	16.7	3687	16.9	3735	17.9
3756	18.3	3815	18.7	3830	18.6	3854	20	3856	20.2
3859	20.6	3871	25.3	3877	26.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2178	.045	2557	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2178	2557	537.07	495	500.63	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2155		T
3100	3877		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 3.

INPUT
Description: Revised
The X1 and GR information below is all generated from new sections cut from the topo received from Jas...saved as fairbanks.dtm. The X1 Id's currently indicate the station along the stream alignment, with the zero station of the stream at the upstream end. For this Hec-Clomr analysis, the X1 and GR information listed below is for all sections upstream of the Howard Chang CX 2.8444. CX geometry begins with Sta. 1000 at the left end

Date: 11-08-02

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	25.3	1039	23.4	1047	23	1055	22.6	1089	24.9
1105	25.2	1105	24.7	1139	25.7	1171	24.8	1171	25.3
1184	25.7	1191	27.6	1220	26.9	1232	25.5	1244	23.5
1256	19.6	1266	16.8	1277	13.6	1280	13.4	1288	13.7
1293	14.7	1320	14	1333	11.6	1358	7.4	1511	7.4
1527	9.7	1550	11.9	1577	13.1	1592	13.3	1650	10.4
1661	9.1	1669	7.6	1720	7.6	1770	7.6	1783	9
1792	8.9	1851	11.2	1876	12.5	1998	16.7	2056	22.7
2077	22.5	2083	21.6	2092	18.7	2101	13.2	2109	8
2115	8	2119	12.9	2120	13	2144	7	2182	7.3
2285	7	2326	7.1	2418	7	2444	7.1	2452	6.9
2474	10.9	2479	11.8	2496	14.6	2500	14.7	2520	14.9
2563	15.2	2594	15.4	2652	15.9	2666	16.3	2738	16.3
2756	16.4	2830	17.7	2832	17.4	2846	15.2	2871	15.5
2973	15.6	2987	15.6	3048	15.6	3060	15.6	3151	15.5
3256	14.5	3260	14.5	3330	15	3430	15.1	3431	15.1
3432	15.1	3570	13.6	3604	13.4	3693	13.1	3734	13.9
3765	14.9	3858	15.7	3868	15.8	3916	16.3	3934	19.3
3936	19.7	3946	20.2	4019	25.5	4039	26.3	4044	27.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2101	.045	2474	.035

Bank Sta: Left 2101 Right 2474 Lengths: Left 715 Channel 765 Right 795 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2065		T
3160	4044		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.844

INPUT
Description: Revised
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3745	45.5	3767	39	3803	36.6	3810	37.2	3821	40.4
3837	39.4	3850	40	3892	39.4	3910	39.5	3924	41.5
3934	41.5	3952	37.9	3977	30.9	3998	24.3	4010	21.3
4038	18.3	4046	16.4	4056	16.6	4086	13.9	4130	11.5
4187	11	4220	14.2	4232	16.3	4268	19.5	4281	21.4
4298	19.6	4313	15.6	4316	15.5	4327	15.3	4334	16.3
4350	15.9	4365	13	4392	10.1	4456	7.5	4559	8.3
4569	7.7	4587	8.5	4613	11.9	4632	15.5	4641	15.8
4652	14.5	4663	16.4	4690	16.3	4704	13.7	4733	13.6
4764	22.8	4770	22.1	4780	18.5	4790	13.4	4798	7.6
4807	7.4	4810	11.1	4845	7.4	4964	7.5	5141	7.6
5147	9.9	5153	13.4	5180	14	5185	15.7	5196	14.8
5287	14.4	5340	14.4	5427	14.6	5513	14.8	5600	15
5680	15	5760	15	5840	15	5920	15	6000	15
6060	14.7	6120	14.5	6200	15	6256	14.4	6312	13.8
6350	16.2	6366	16	6380	14	6455	13.9	6530	13.7
6599	13.9	6668	14	6716	16	6725	15	6742	16
6758	20	6822	22	6848	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3745	.045	4790	.045	5180	.035

Bank Sta: Left 4790 Right 5180 Lengths: Left 325 Channel 325 Right 325 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3745	4770		T
6090	6848		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6
3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8
4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6
4708	12.9	4727	12.4	4740	11	4763	7.7	4784	7.3
4823	7.1	4994	7.2	5165	7.2	5176	8.7	5184	12.4
5187	12.6	5212	12.8	5218	14.8	5230	14.2	5296	14.1
5326	14.2	5327	14.2	5400	14.5	5455	14.2	5510	14
5590	13.9	5670	13.8	5725	14	5780	14.2	5840	14
5900	13.8	5950	14	6000	14.2	6065	14	6130	13.8
6195	14.1	6260	14.3	6340	14	6420	13.8	6500	13.5
6563	13.7	6626	13.8	6690	14	6700	15.8	6718	15.5
6743	20								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3877	.045	4727	.045	5184	.035

Bank Sta: Left 4727 Right 5184 Lengths: Left 265 Channel 265 Right 265 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3877	4710		T
5870	6743		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.732

INPUT
Description: Revised
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3819	29.5	3837	29.1	3837	28.6	3856	28.8	3877	28.4
3877	28.9	3889	28.5	3904	28.6	3912	30.4	3929	29.3
3942	26.9	3949	25.1	3959	22	3967	20.7	3976	20.3
4012	16.6	4041	14.9	4118	12.9	4174	13	4214	13.8
4227	13.7	4277	15.2	4297	14.9	4320	16.8	4329	18.2
4368	13.3	4382	12.8	4405	10.2	4416	9.3	4425	9.2
4430	9.1	4445	10.3	4449	11	4454	11	4460	11.7
4488	11.7	4515	12.3	4541	11.5	4551	10.9	4560	9.3
4569	7.5	4649	7.5	4659	10.3	4695	18.2	4700	19
4714	22.1	4742	24.7	4758	22.5	4766	22.4	4780	18.3
4793	15.5	4818	11.5	4829	7.6	4854	7.2	4998	7.1
5171	7.1	5185	12.2	5211	12.3	5216	14.2	5250	13.9
5335	14	5365	13.5	5450	14.2	5525	13.9	5600	13.7
5675	13.4	5750	13.2	5827	13.5	5905	13.7	5982	14
6060	14.3	6148	14.1	6236	13.9	6324	13.8	6412	13.6
6500	13.4	6566	13.6	6633	13.8	6700	14	6720	12
6730	14	6758	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

3819	.045	4793	.045	5185	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	4793	5185		300	300	300	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3819	4740		T
5650	6758		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.675

INPUT
Description: Revised
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3836	28	3850	26	3887	25	3897	24.2	3898	24.7
3958	24.2	3984	19.6	3997	18.1	4011	17.3	4063	16
4077	15.9	4099	17.6	4104	17.7	4108	18.2	4160	15.5
4170	15.4	4210	13.9	4222	13	4235	12.7	4268	15
4279	15.5	4295	14	4310	11.7	4320	11	4334	10.6
4350	11.5	4373	12.2	4407	12.2	4458	9.7	4462	9.5
4482	9.1	4525	11.6	4633	13.4	4686	15.1	4707	17.2
4724	19.9	4733	22.1	4742	23	4755	21.8	4763	21.7
4782	16.1	4787	15.4	4806	14.6	4840	11.7	4852	11.6
4862	10.7	4873	7.3	4893	6.9	5018	6.8	5119	6.8
5149	7.2	5151	7.8	5157	8	5168	9.7	5171	9.7
5174	10.3	5190	12	5204	12	5212	11.5	5219	13
5224	14.6	5228	13.4	5346	13.8	5370	13.5	5450	14.3
5533	13.9	5616	13.4	5700	13	5782	13.5	5865	14
5943	13.7	6021	13.3	6100	13	6186	13.4	6273	13.7
6360	14.1	6430	13.8	6500	13.5	6555	13.8	6610	14.1
6660	13.9	6673	14	6700	16	6736	22	6758	24
6818	26	6822	28						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3836	.045	4787	.045	5219	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	4787	5219		285	273	250	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3836	4745		T
5410	6822		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.623

INPUT
Description: Revised
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3806	30	3813	28	3874	26	3894	24	3950	22
3973	22	4027	21.6	4027	22.1	4075	21.4	4081	22.6
4095	20.4	4264	18.2	4392	17.9	4446	19.2	4477	17
4488	16.9	4532	16.4	4541	17.7	4555	18.3	4559	19.4
4561	18.2	4601	19.2	4608	22.5	4610	19.9	4613	19.7
4616	20.8	4622	19.3	4627	20.3	4632	20	4636	20.8
4647	20.6	4650	21.8	4654	20.3	4659	20.3	4663	22.1
4668	19.9	4674	22.4	4681	21.6	4686	19.3	4701	19.9
4710	18.4	4719	19.7	4744	18.3	4745	18.9	4750	17.7
4754	18.8	4759	23	4765	22.7	4769	19.2	4775	20.7
4778	20.6	4783	18.5	4783	17.6	4854	16.4	4866	10.5
4880	5.9	5019	6.1	5135	6.2	5161	13.1	5198	20.1
5215	18.9	5229	15	5272	10.5	5296	11.9	5340	13
5350	11.5	5415	13	5480	14.5	5540	13.2	5600	12
5675	12	5750	12	5825	12	5900	12	5975	12.2
6050	12.5	6124	12.8	6198	13.1	6272	13.4	6346	13.7
6420	14	6485	13.8	6550	13.6	6625	14	6655	12
6670	11	6711	24						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3806	.045	4854	.045	5198	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	4854	5198		90	51	35	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3806	4765		T
5229	6711		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.614

INPUT
Description: This is a REPEATED section.
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3
4965.8	7	4967	6.8	4990.4	6	5013.8	5	5015	5
5038.4	5	5061.8	5	5063	5	5086.4	5	5109.8	5
5111	5	5134.4	5	5157.8	5	5159	5	5163.4	6
5185.6	12	5212	17.2	5212.1	17.2	5212.2	23	5247.2	22.5
5295.1	21.7	5472.7	18.4	5687.5	17.6	5961	17.5	6135.9	17.8
6300	17.9	6439.2	18.5	6558	20.5	6654.5	23.3	6671.4	23.9
6711.2	25.7	6711.8	25.8	6721.8	25.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	4881.3	5212.2		27	27	27	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T

5212	6721.8	T

BRIDGE

RIVER: RIVER-1
REACH: Reach-1 RS: 2.6115

INPUT
Description: Bridge #1
Distance from Upstream XS = .1
Deck/Roadway Width = 26.8
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Upstream Bridge Cross Section Data
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3
4965.8	7	4967	6.8	4990.4	6	5013.8	5	5015	5
5038.4	5	5061.8	5	5063	5	5086.4	5	5109.8	5
5111	5	5134.4	5	5157.8	5	5159	5	5163.4	6
5185.6	12	5212	17.2	5212.1	17.2	5212.2	23	5247.2	22.5
5295.1	21.7	5472.7	18.4	5687.5	17.6	5961	17.5	6135.9	17.8
6300	17.9	6439.2	18.5	6558	20.5	6654.5	23.3	6671.4	23.9
6711.2	25.7	6711.8	25.8	6721.8	25.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
4881.3	5212.2	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

Downstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Downstream Bridge Cross Section Data
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3
4965.8	7	4967	6.8	4990.4	6	5013.8	5	5015	5
5038.4	5	5061.8	5	5063	5	5086.4	5	5109.8	5
5111	5	5134.4	5	5157.8	5	5159	5	5163.4	6
5185.6	12	5212	17.2	5212.1	17.2	5212.2	23	5247.2	22.5
5295.1	21.7	5472.7	18.4	5687.5	17.6	5961	17.5	6135.9	17.8
6300	17.9	6439.2	18.5	6558	20.5	6654.5	23.3	6671.4	23.9
6711.2	25.7	6711.8	25.8	6721.8	25.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
4881.3	5212.2	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95

```
Elevation at which weir flow begins          =    17.6
Energy head used in spillway design          =
Spillway height used in design               =
Weir crest shape                             = Broad Crested

Number of Piers =  7

Pier Data
Pier Station     Upstream=  4918.4    Downstream=  4918.4
Upstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22
Downstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22

Pier Data
Pier Station     Upstream=  4918.4    Downstream=  4918.4
Upstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22
Downstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22

Pier Data
Pier Station     Upstream=  4966.4    Downstream=  4966.4
Upstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22
Downstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22

Pier Data
Pier Station     Upstream=  5014.4    Downstream=  5014.4
Upstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22
Downstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22

Pier Data
Pier Station     Upstream=  5062.4    Downstream=  5062.4
Upstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22
Downstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22

Pier Data
Pier Station     Upstream=  5110.4    Downstream=  5110.4
Upstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22
Downstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22
```

```
Pier Data
Pier Station     Upstream=  5158.4    Downstream=  5158.4
Upstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22
Downstream     num=       2
    Width   Elev    Width   Elev
       3       5       3      22

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
Selected Low Flow Methods = Energy

High Flow Method
      Energy Only

Additional Bridge Parameters
      Add Friction component to Momentum
      Do not add Weight component to Momentum
      Class B flow critical depth computations use critical depth
          inside the bridge at the upstream end
      Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.609

INPUT
Description:
Station Elevation Data     num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  3793.5      32  3875.1    24.2  3900.8    27.2  3948.4    23.2  3992.5    21.9
  4020.9    21.5  4185.9    19.4  4198.6    19.2  4220.2    18.9  4424.6    19.5
  4613.1    22.1  4752.2    24.4  4842.8    25.2  4881.3    25.2  4881.4    17.5
  4899.6     9.4  4913.3       8  4917.8     7.8    4919     7.6  4942.4     7.3
  4965.8       7    4967     6.8  4990.4       6  5013.8       5    5015       5
  5038.4       5  5061.8       5    5063       5  5086.4       5  5109.8       5
    5111       5  5134.4       5  5157.8       5    5159       5  5163.4       6
  5185.6      12    5212    17.2  5212.1    17.2  5212.2      23  5247.2    22.5
  5295.1    21.7  5472.7    18.4  5687.5    17.6    5961    17.5  6135.9    17.8
    6300    17.9  6439.2    18.5    6558    20.5  6654.5    23.3  6671.4    23.9
  6711.2    25.7  6711.8    25.8  6721.8    25.8

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  3793.5     .03  4881.3     .04  5212.2     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4881.3  5212.2              100     100      90             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  3793.5    4881            T
    5212  6721.8            T

CROSS SECTION
```

RIVER: RIVER-1
REACH: Reach-1 RS: 2.59

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4010	22	4100	20	4160	20	4210	16	4256	15
4303	14	4351	13.6	4400	13.2	4470	13.9	4540	14.5
4600	14	4678	13.3	4756	12.7	4835	12	4887	11
4940	10	5000	8	5016	6	5025	5	5100	5
5120	6	5142	8	5200	9.76	5208	10	5232	12
5316	12.4	5401	12.8	5485	13.2	5570	13.6	5655	14
5720	14	5775	15	5830	16	5891	17	5953	18
5960	16	5980	15.5	6010	16	6017	18.5	6027	16
6100	14	6155	15	6210	16	6278	16.7	6346	17.3
6415	18	6455	22	6475	24				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4010	.035	4835	.04	5200	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4835	5200	345	345	340	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4010	4800		T
5210	6475		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.524

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3920	22	3945	16	3997	15.6	4050	15.2	4098	15.7
4147	16.2	4233	15.1	4320	14	4400	12.7	4480	11.5
4556	12.4	4633	13.4	4710	14.3	4783	13.1	4856	12
4926	10	4997	8	5013	6	5030	4.5	5085	4.5
5140	4.5	5150	6	5175	8	5250	10	5320	11
5390	12	5460	12.2	5530	12.3	5600	12.5	5686	12.7
5773	12.8	5859	13	5946	13.2	6033	13.3	6120	13.5
6130	14	6140	16	6146	14	6200	14	6275	15
6350	16	6373	18	6430	28				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3920	.035	4856	.04	5320	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4856	5320	450	450	450	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3920	4650		T
5320	6430		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.439

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3680	20	3700	16	3775	14.5	3850	13	3937	13.3
4025	13.6	4112	14	4200	14.3	4286	13.9	4373	13.5
4459	13.1	4546	12.7	4633	12.3	4720	11.9	4785	11.9
4850	12	4895	10	4917	8	4985	6	5050	4.9
5115	3.8	5120	4	5152	8	5204	9	5256	10
5320	10.7	5384	11.3	5448	12	5519	12	5590	12
5662	12	5685	18	5730	18	5740	16	5760	15.3
5834	15.5	5908	15.8	5982	16	6003	20	6027	22
6037	27								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3680	.035	4895	.04	5256	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4895	5256	520	520	520	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3680	4460		T
5500	6037		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.341

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3440	24	3473	14	3550	13.3	3600	13.7	3650	14.2
3737	13.9	3825	13.6	3912	13.3	4000	13	4090	12.9
4180	12.8	4270	12.7	4360	12.6	4450	12.5	4460	11.5
4500	11.5	4520	12.5	4573	12.2	4626	12	4704	11.3
4782	10.7	4860	10	4910	9	4960	8	4990	6
5025	4	5050	3.3	5110	6	5147	10	5229	10.5
5312	11	5394	11.5	5477	12	5496	14	5508	16
5591	16	5674	16	5757	16	5840	16	5855	16
5885	34								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3440	.035	4860	.035	5147	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4860	5147	550	580	600	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3440	4100		T
5560	5885		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.231

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3413	.035	4644	.035	5355	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4644	5355	300	400	430	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3413	3970		T
5900	5900		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.155

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5
4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4
5175	2.5	5200	2.5	5222	4	5238	8	5250	10
5300	9.9	5350	9.8	5415	10.5	5480	11.3	5545	12
5626	13	5708	14	5722	16	5803	18	5834	26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3422	.035	4728	.035	5250	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4728	5250	330	500	450	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.06

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3622	30	3666	14	3743	13.7	3821	13.3	3899	13
3976	12.7	4054	12.3	4132	12	4186	11.2	4240	10.5
4330	11.1	4420	11.7	4501	11.4	4582	11	4663	10.7
4744	10.3	4825	10	4897	4	4958	2	4974	2
5035	4	5058	10	5114	10.2	5170	10.5	5230	10.2
5290	10	5370	9.6	5450	9.2	5530	9.6	5610	10
5665	11	5720	12	5781	15.3	5843	18.7	5905	22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3622	.035	4825	.035	5058	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4825	5058	480	430	330	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 1.979

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3516	30	3572	14	3588	12.3	3668	12.2	3749	12.2
3830	12.1	3911	12.1	3992	12	4069	11.6	4146	11.2
4223	10.9	4300	10.5	4384	11	4468	11.5	4553	12
4626	12.4	4700	12.7	4776	12.4	4852	12	4863	4
4890	3	4933	4	4993	5	5053	6	5101	7
5150	8	5202	9	5254	10	5302	10.2	5350	10.5
5405	10.4	5460	10.4	5507	10.1	5555	9.8	5568	10
5619	9.5	5670	9	5693	10	5759	11	5826	12
5878	14	5930	16	6000	20.7	6070	25.3	6140	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3516	.035	4852	.035	5150	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4852	5150	400	400	400	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3

Reach-1	12	.045	.045	.035
Reach-1	11.	.045	.045	.035
Reach-1	10.	.045	.045	.035
Reach-1	9.	.045	.045	.035
Reach-1	8.	.045	.045	.035
Reach-1	7.	.045	.045	.035
Reach-1	6.	.045	.045	.035
Reach-1	5.	.045	.045	.035
Reach-1	4.	.045	.045	.035
Reach-1	3.	.045	.045	.035
Reach-1	2.844	.045	.045	.035
Reach-1	2.782	.045	.045	.035
Reach-1	2.732	.045	.045	.035
Reach-1	2.675	.045	.045	.035
Reach-1	2.623	.045	.045	.035
Reach-1	2.614	.03	.04	.03
Reach-1	2.6115	Bridge		
Reach-1	2.609	.03	.04	.03
Reach-1	2.59	.035	.04	.035
Reach-1	2.524	.035	.04	.035
Reach-1	2.439	.035	.04	.035
Reach-1	2.341	.035	.035	.035
Reach-1	2.231	.035	.035	.035
Reach-1	2.155	.035	.035	.035
Reach-1	2.06	.035	.035	.035
Reach-1	1.979	.035	.035	.035

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	12	49.32	48	73.57
Reach-1	11.	347.68	339	548.49
Reach-1	10.	585.6	450	556.91
Reach-1	9.	1127.52	452	287.85
Reach-1	8.	806.85	444	387.93
Reach-1	7.	692.7	497	459.02
Reach-1	6.	642.39	511	528.63
Reach-1	5.	578.02	495	791.59
Reach-1	4.	537.07	495	500.63
Reach-1	3.	715	765	795
Reach-1	2.844	325	325	325
Reach-1	2.782	265	265	265
Reach-1	2.732	300	300	300
Reach-1	2.675	285	273	250
Reach-1	2.623	90	51	35
Reach-1	2.614	27	27	27
Reach-1	2.6115	Bridge		
Reach-1	2.609	100	100	90
Reach-1	2.59	345	345	340
Reach-1	2.524	450	450	450
Reach-1	2.439	520	520	520
Reach-1	2.341	550	580	600
Reach-1	2.231	300	400	430
Reach-1	2.155	330	500	450
Reach-1	2.06	480	430	330
Reach-1	1.979	400	400	400

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	12	.1	.3
Reach-1	11.	.1	.3
Reach-1	10.	.1	.3
Reach-1	9.	.1	.3
Reach-1	8.	.1	.3
Reach-1	7.	.1	.3
Reach-1	6.	.1	.3
Reach-1	5.	.1	.3
Reach-1	4.	.1	.3
Reach-1	3.	.1	.3
Reach-1	2.844	.1	.3
Reach-1	2.782	.1	.3
Reach-1	2.732	.1	.3
Reach-1	2.675	.2	.4
Reach-1	2.623	.3	.5
Reach-1	2.614	.3	.5
Reach-1	2.6115	Bridge	
Reach-1	2.609	.3	.5
Reach-1	2.59	.2	.4
Reach-1	2.524	.1	.3
Reach-1	2.439	.1	.3
Reach-1	2.341	.1	.3
Reach-1	2.231	.1	.3
Reach-1	2.155	.1	.3
Reach-1	2.06	.1	.3
Reach-1	1.979	.1	.3

APPENDIX B

HEC-RAS Output for the Preferred Alternative

HEC-RAS Plan: Pr+Ex+M+Ext River: RIVER-1 Reach: Reach-1

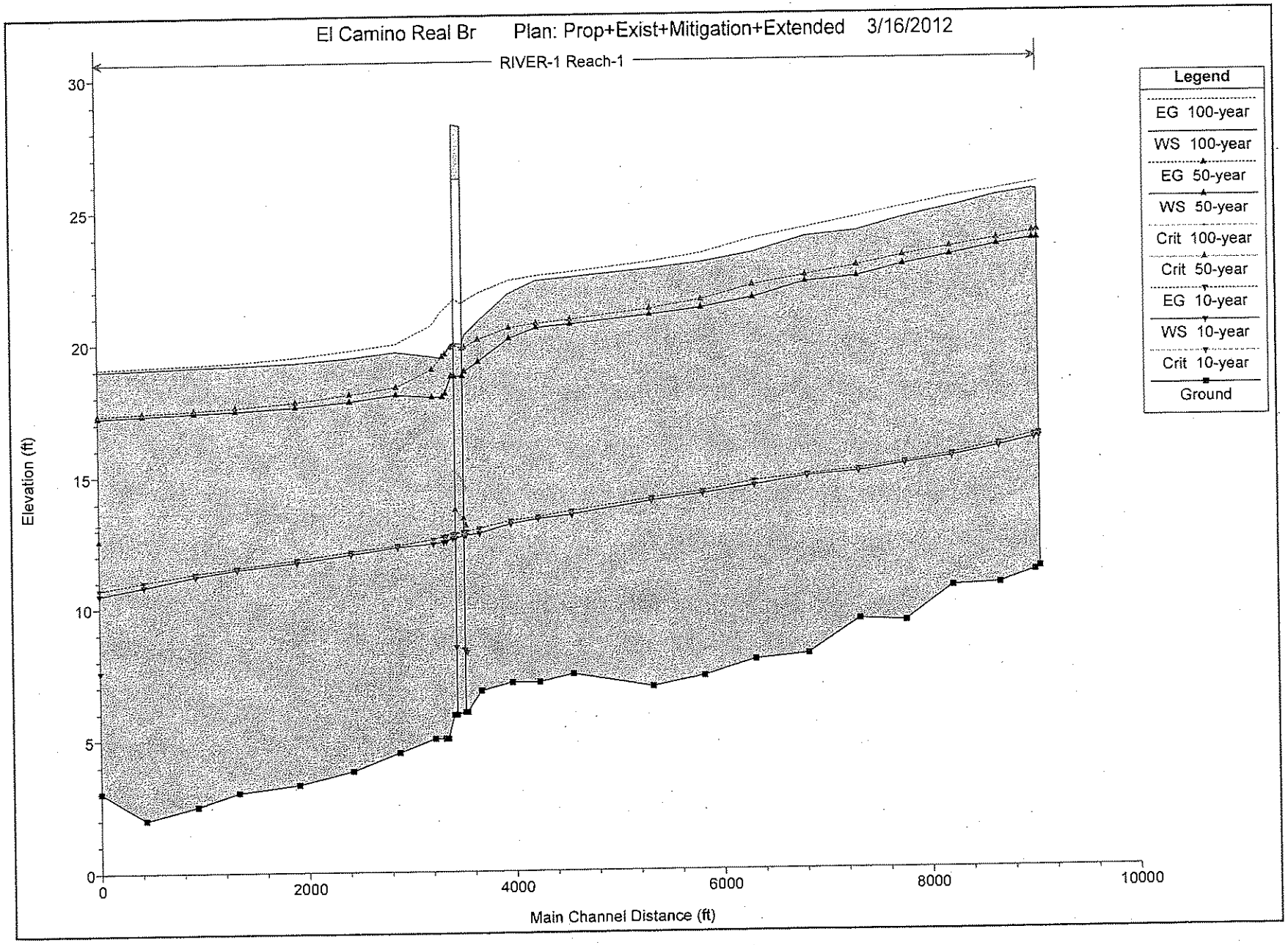
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	12	100-year	42800.00	11.32	25.60		25.89	0.000659	4.77	10302.67	2571.83	0.23
Reach-1	12	50-year	32500.00	11.32	23.74		24.05	0.000786	4.72	7929.18	2188.26	0.24
Reach-1	12	10-year	5900.00	11.32	16.24		16.37	0.001042	2.88	2049.85	460.99	0.24
Reach-1	11.	100-year	42800.00	11.20	25.61		25.84	0.000538	4.33	11644.82	2675.26	0.21
Reach-1	11.	50-year	32500.00	11.20	23.74		23.99	0.000689	4.43	8798.10	2352.54	0.23
Reach-1	11.	10-year	5900.00	11.20	16.19		16.32	0.001043	2.86	2062.23	468.31	0.24
Reach-1	10.	100-year	42800.00	10.72	25.38		25.63	0.000508	4.26	11055.54	2615.41	0.20
Reach-1	10.	50-year	32500.00	10.72	23.53		23.75	0.000553	4.03	8941.41	2058.48	0.21
Reach-1	10.	10-year	5900.00	10.72	15.89		15.99	0.000878	2.62	2255.18	519.82	0.22
Reach-1	9.	100-year	42800.00	10.64	24.98		25.34	0.000694	5.00	9028.73	1971.82	0.24
Reach-1	9.	50-year	32500.00	10.64	23.15		23.45	0.000685	4.51	7561.70	1525.96	0.23
Reach-1	9.	10-year	5900.00	10.64	15.53		15.62	0.000742	2.40	2461.04	567.99	0.20
Reach-1	8.	100-year	42800.00	9.32	24.57		25.01	0.000773	5.34	8135.69	1802.78	0.25
Reach-1	8.	50-year	32500.00	9.32	22.80		23.14	0.000703	4.66	7056.97	1677.86	0.23
Reach-1	8.	10-year	5900.00	9.32	15.28		15.35	0.000491	2.16	2729.00	536.25	0.17
Reach-1	7.	100-year	42800.00	9.40	24.10		24.62	0.000947	5.90	7720.42	2242.81	0.28
Reach-1	7.	50-year	32500.00	9.40	22.36		22.78	0.000897	5.25	6478.94	2107.71	0.26
Reach-1	7.	10-year	5900.00	9.40	14.99		15.09	0.000691	2.50	2368.10	831.01	0.20
Reach-1	6.	100-year	42800.00	8.10	23.90		24.23	0.000505	4.43	9465.20	2043.18	0.20
Reach-1	6.	50-year	32500.00	8.10	22.18		22.43	0.000436	3.78	8211.19	1893.89	0.19
Reach-1	6.	10-year	5900.00	8.10	14.84		14.89	0.000232	1.57	3408.65	1417.22	0.12
Reach-1	5.	100-year	42800.00	7.90	23.31		23.85	0.001042	6.32	7566.06	2117.19	0.29
Reach-1	5.	50-year	32500.00	7.90	21.60		22.07	0.001084	5.93	6229.62	2052.31	0.29
Reach-1	5.	10-year	5900.00	7.90	14.51		14.67	0.000925	3.19	1871.27	924.67	0.24
Reach-1	4.	100-year	42800.00	7.30	22.96		23.31	0.000660	5.09	9335.94	2708.82	0.23
Reach-1	4.	50-year	32500.00	7.30	21.23		21.54	0.000686	4.78	7706.59	2689.60	0.23
Reach-1	4.	10-year	5900.00	7.30	14.21		14.31	0.000543	2.55	2322.25	1103.36	0.18
Reach-1	3.	100-year	42800.00	6.90	22.73		23.00	0.000509	4.53	10588.91	2739.01	0.20
Reach-1	3.	50-year	32500.00	6.90	20.98		21.22	0.000539	4.30	8696.78	2659.40	0.21

HEC-RAS Plan: Pr+Ex+M+Ext River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	3.	10-year	5900.00	6.90	13.96		14.06	0.000466	2.44	2427.66	1203.66	0.17
Reach-1	2.844	100-year	42800.00	7.40	22.44		22.63	0.000390	3.79	12317.92	2815.08	0.18
Reach-1	2.844	50-year	32500.00	7.40	20.65		20.82	0.000437	3.66	10011.57	2733.13	0.18
Reach-1	2.844	10-year	5900.00	7.40	13.47		13.60	0.000791	2.89	2039.79	743.21	0.22
Reach-1	2.782	100-year	42800.00	7.10	22.32		22.51	0.000346	3.70	12285.55	2812.53	0.17
Reach-1	2.782	50-year	32500.00	7.10	20.53		20.69	0.000356	3.44	10279.45	2748.40	0.17
Reach-1	2.782	10-year	5900.00	7.10	13.32		13.39	0.000433	2.22	2684.99	993.77	0.16
Reach-1	2.732	100-year	42800.00	7.10	21.84		22.34	0.000915	5.82	7622.49	2676.18	0.27
Reach-1	2.732	50-year	32500.00	7.10	20.12		20.52	0.000884	5.25	6490.97	2640.18	0.26
Reach-1	2.732	10-year	5900.00	7.10	13.13		13.25	0.000683	2.74	2168.15	775.99	0.20
Reach-1	2.675	100-year	42800.00	6.80	20.78		21.86	0.002346	8.37	5149.03	2660.81	0.43
Reach-1	2.675	50-year	32500.00	6.80	19.27		20.09	0.002128	7.29	4480.63	2632.01	0.40
Reach-1	2.675	10-year	5900.00	6.80	12.79		12.96	0.001334	3.34	1768.16	689.52	0.27
Reach-1	2.649	100-year	42800.00	6.00	20.24	14.51	21.55	0.002031	9.18	4663.97	354.88	0.45
Reach-1	2.649	50-year	32500.00	6.00	18.89	13.08	19.83	0.001648	7.76	4187.45	350.80	0.40
Reach-1	2.649	10-year	5900.00	6.00	12.72	8.27	12.85	0.000485	2.83	2084.89	320.17	0.20
Reach-1	2.637		Bridge									
Reach-1	2.625	100-year	42800.00	5.90	19.96		21.51	0.002474	10.00	4280.95	331.09	0.49
Reach-1	2.625	50-year	32500.00	5.90	18.72		19.81	0.001959	8.39	3873.77	327.88	0.43
Reach-1	2.625	10-year	5900.00	5.90	12.60		12.75	0.000585	3.07	1920.66	299.80	0.21
Reach-1	2.614	100-year	40100.00	5.00	19.55		21.29	0.003009	10.60	3784.32	1661.87	0.54
Reach-1	2.614	50-year	32500.00	5.00	18.08		19.56	0.002973	9.77	3327.62	1092.86	0.52
Reach-1	2.614	10-year	5900.00	5.00	12.50		12.69	0.000881	3.54	1664.42	286.08	0.26
Reach-1	2.609	100-year	40100.00	5.00	19.42		21.20	0.003116	10.71	3742.77	1603.65	0.54
Reach-1	2.609	50-year	32500.00	5.00	17.95		19.47	0.003089	9.88	3287.92	1027.94	0.53
Reach-1	2.609	10-year	5900.00	5.00	12.47		12.67	0.000893	3.56	1656.99	285.96	0.26
Reach-1	2.59	100-year	40100.00	5.00	19.48		20.65	0.001981	8.96	4683.88	2010.17	0.44
Reach-1	2.59	50-year	32500.00	5.00	17.94		18.97	0.002063	8.39	4056.24	1967.75	0.44

HEC-RAS Plan: Pr+Ex+M+Ext River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.59	10-year	5900.00	5.00	12.40		12.57	0.000819	3.34	1844.69	630.54	0.25
Reach-1	2.524	100-year	33415.00	4.50	19.66		19.97	0.000522	4.49	7516.40	2469.13	0.23
Reach-1	2.524	50-year	27307.00	4.50	18.04		18.32	0.000565	4.24	6486.12	2444.73	0.23
Reach-1	2.524	10-year	5900.00	4.50	12.28		12.34	0.000369	2.05	2887.96	1430.90	0.17
Reach-1	2.439	100-year	34115.00	3.80	19.44		19.73	0.000525	4.43	7983.31	2270.74	0.23
Reach-1	2.439	50-year	27307.00	3.80	17.79		18.05	0.000587	4.24	6720.67	2200.10	0.23
Reach-1	2.439	10-year	5900.00	3.80	12.02		12.12	0.000660	2.64	2361.34	1398.96	0.22
Reach-1	2.341	100-year	34815.00	3.30	19.28		19.48	0.000353	3.96	9741.34	2383.65	0.20
Reach-1	2.341	50-year	27307.00	3.30	17.59		17.78	0.000399	3.83	8031.78	2376.63	0.21
Reach-1	2.341	10-year	5900.00	3.30	11.72		11.83	0.000492	2.65	2400.63	786.51	0.22
Reach-1	2.231	100-year	42800.00	3.00	19.18		19.30	0.000220	3.19	15687.33	2385.53	0.17
Reach-1	2.231	50-year	32500.00	3.00	17.46		17.58	0.000255	3.08	12516.73	2352.97	0.17
Reach-1	2.231	10-year	5900.00	3.00	11.46		11.54	0.000477	2.22	2703.15	803.13	0.20
Reach-1	2.155	100-year	42800.00	2.50	19.13		19.22	0.000170	2.89	18701.15	2354.14	0.15
Reach-1	2.155	50-year	32500.00	2.50	17.40		17.49	0.000209	2.89	14640.56	2320.43	0.16
Reach-1	2.155	10-year	5900.00	2.50	11.22		11.32	0.000609	2.64	2413.61	813.86	0.23
Reach-1	2.06	100-year	42800.00	2.00	19.05		19.15	0.000169	3.27	18250.76	2197.55	0.15
Reach-1	2.06	50-year	32500.00	2.00	17.31		17.40	0.000201	3.27	14444.65	2160.70	0.16
Reach-1	2.06	10-year	5900.00	2.00	10.82		11.00	0.000638	3.63	2098.52	1097.07	0.26
Reach-1	1.979	100-year	42800.00	3.00	19.00	13.18	19.08	0.000145	2.90	19913.77	2420.18	0.14
Reach-1	1.979	50-year	32500.00	3.00	17.24	12.57	17.32	0.000176	2.91	15682.74	2387.81	0.15
Reach-1	1.979	10-year	5900.00	3.00	10.50	7.56	10.70	0.000844	3.65	1887.90	871.94	0.28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3/16/2012
RIVER-1 Reach-1
Legend
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WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
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5
10
15
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25
30
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8000
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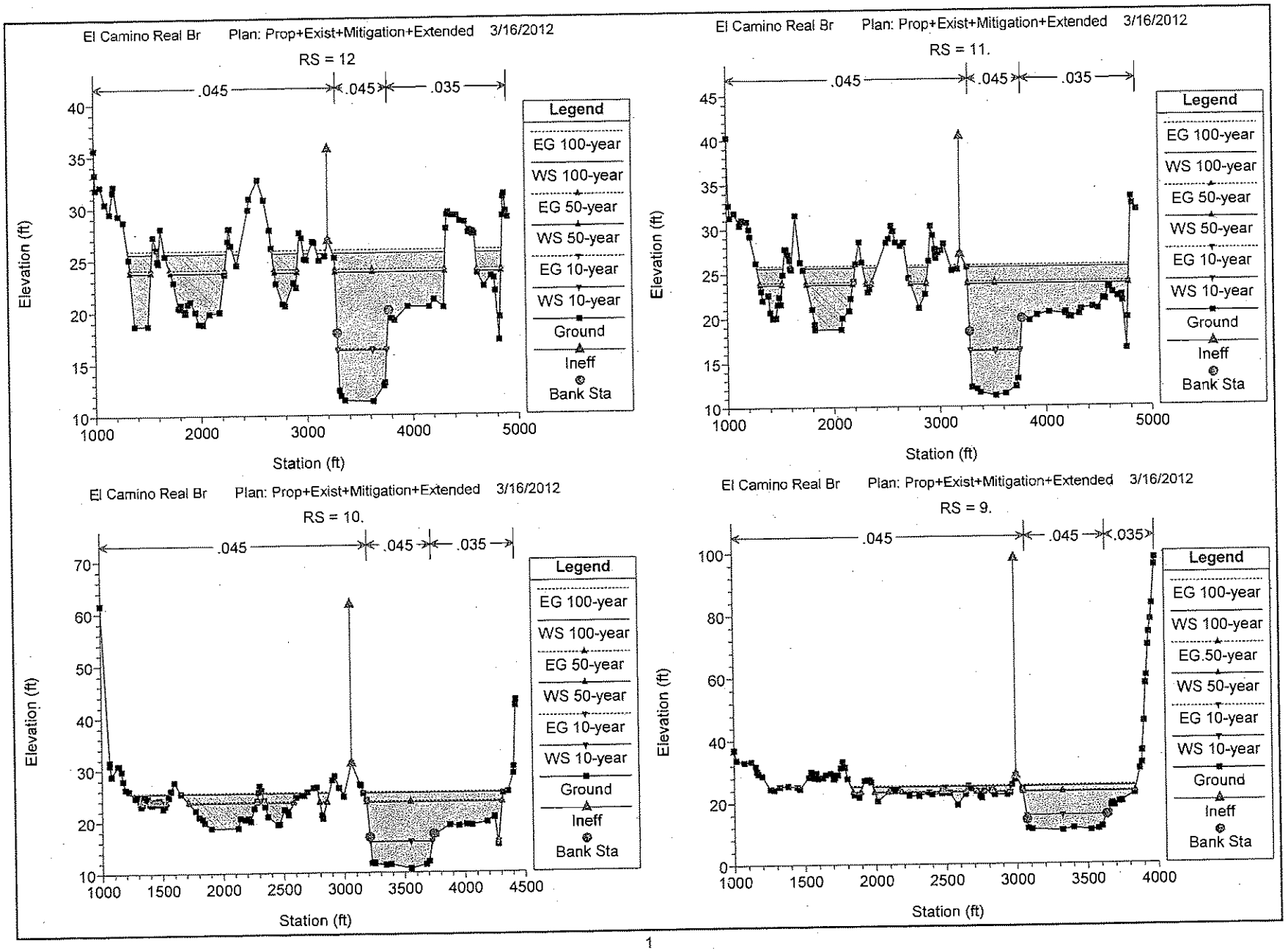
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Station (ft)
Legend
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WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
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Elevation (ft)
Station (ft)
Legend
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WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
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Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
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Elevation (ft)
Station (ft)
Legend
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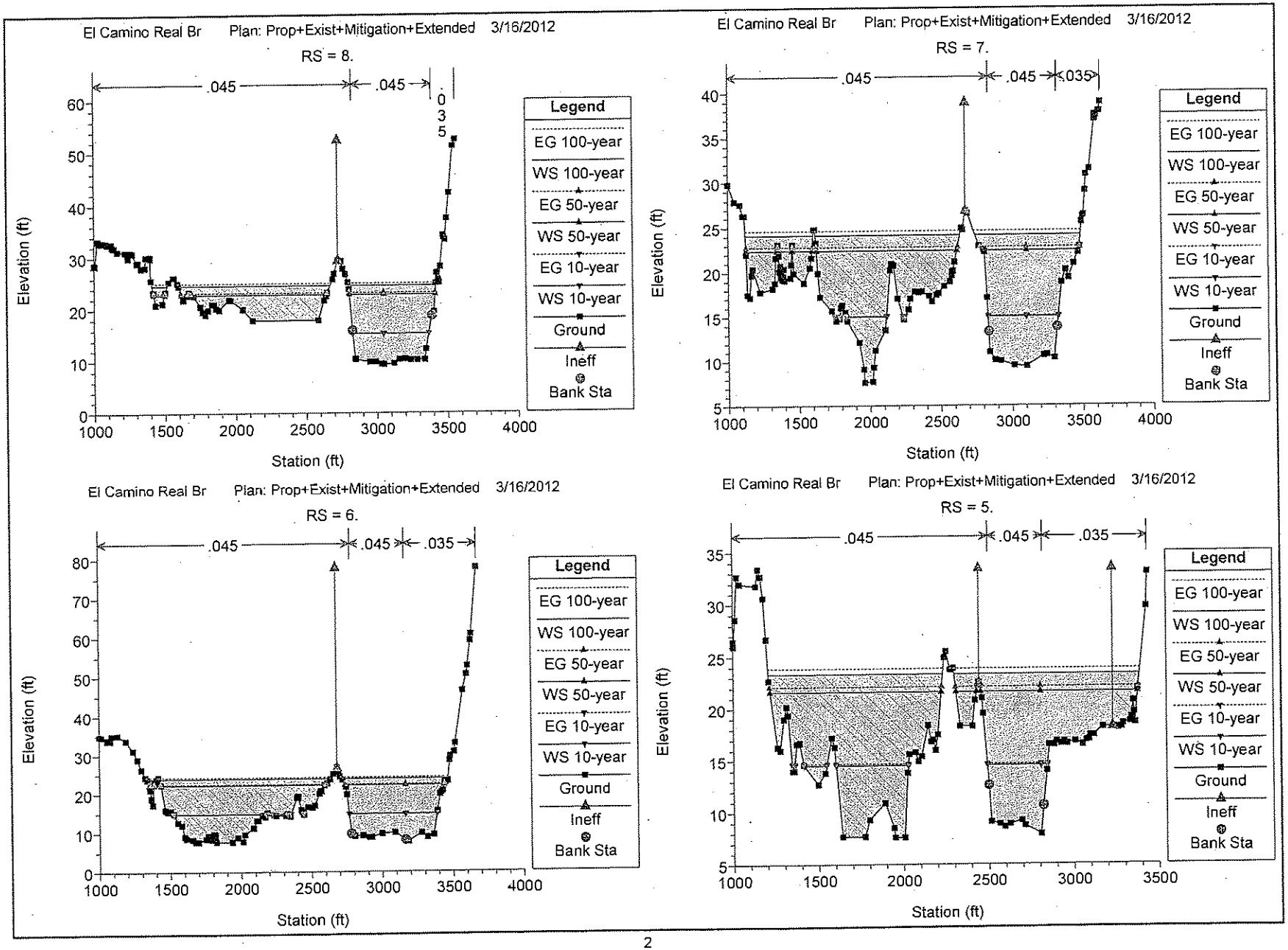
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
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.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
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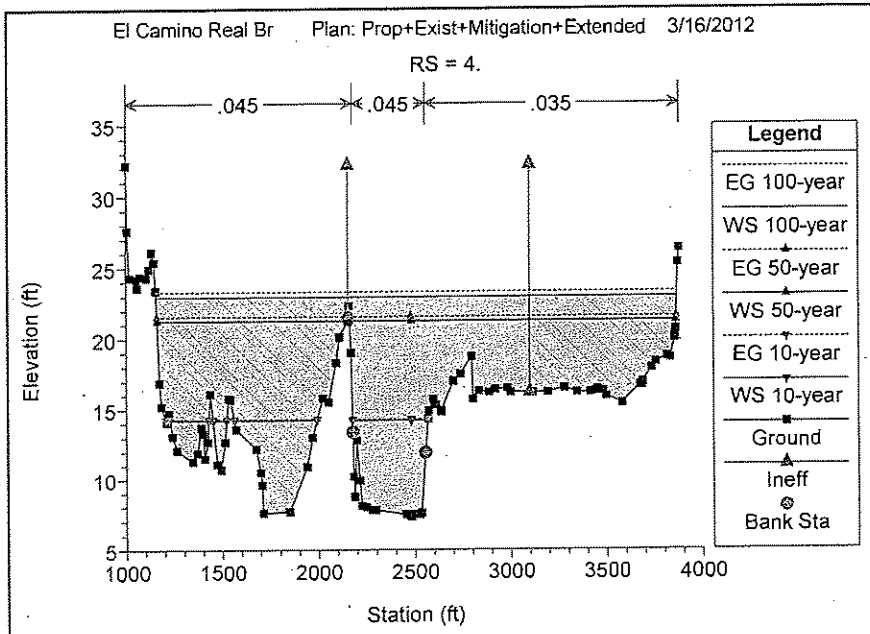
RS = 6.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 5.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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Station (ft)
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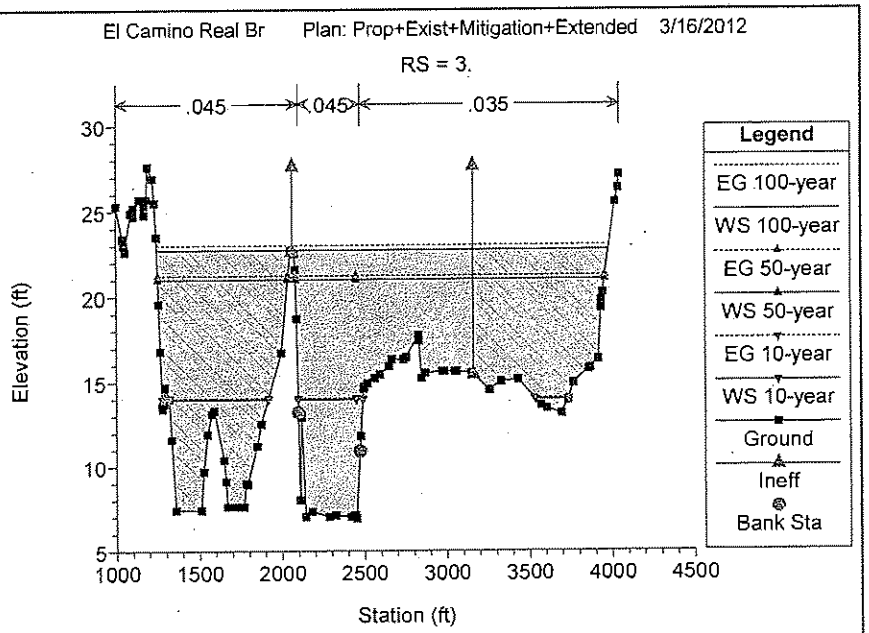
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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Elevation (ft)
Station (ft)
Legend
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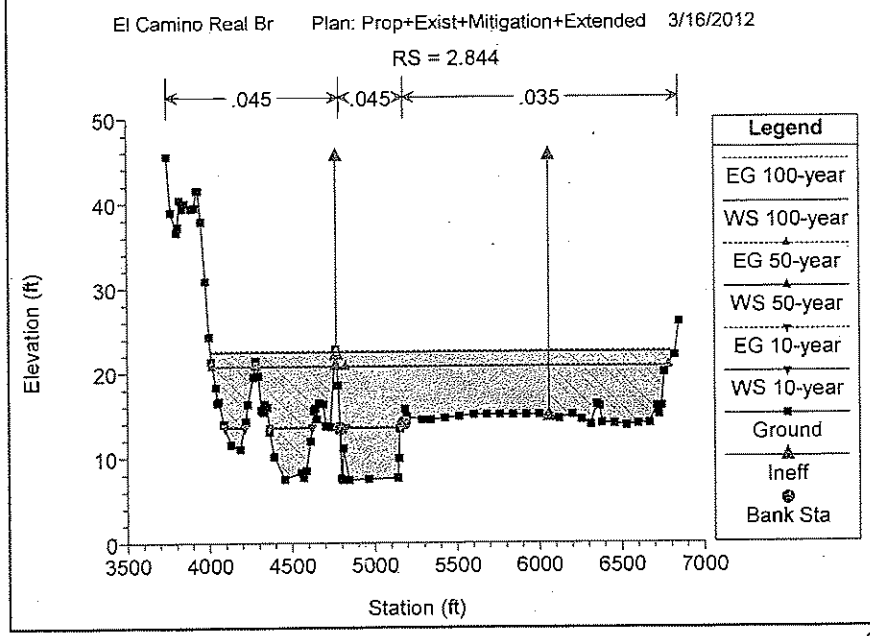
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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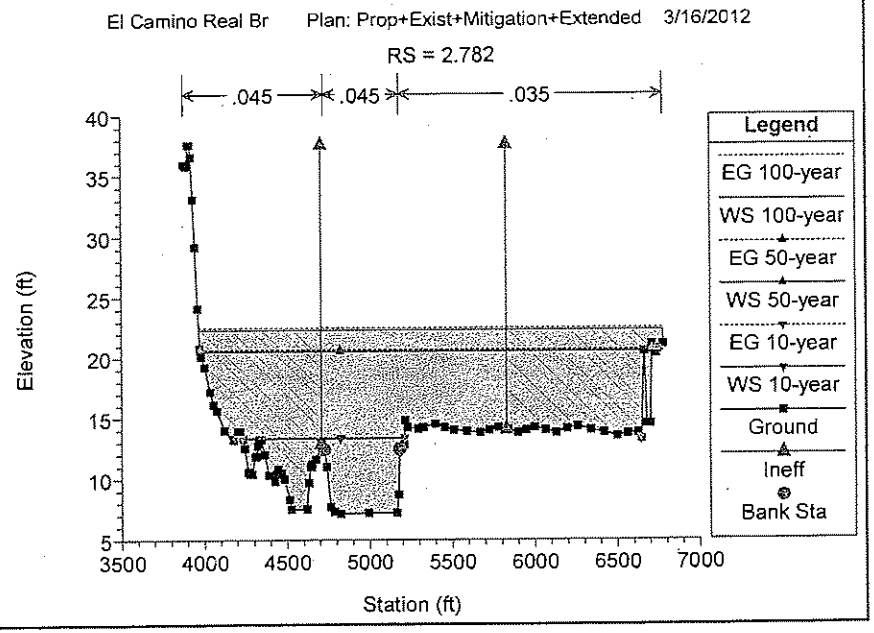
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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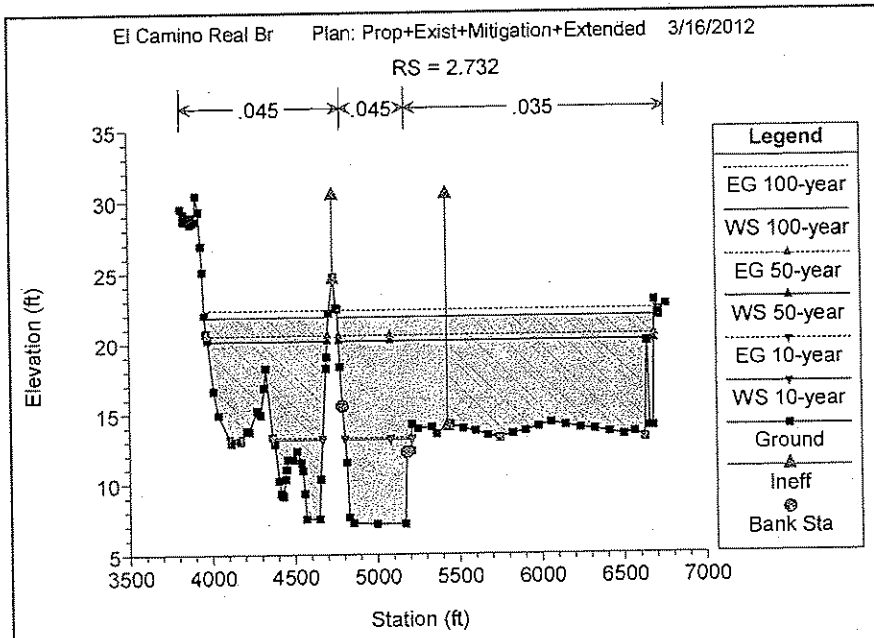
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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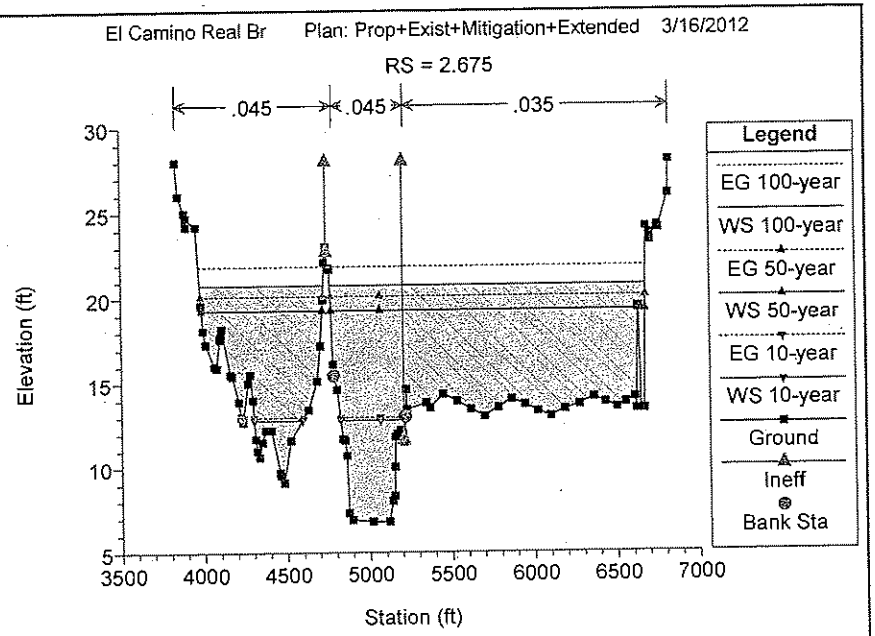
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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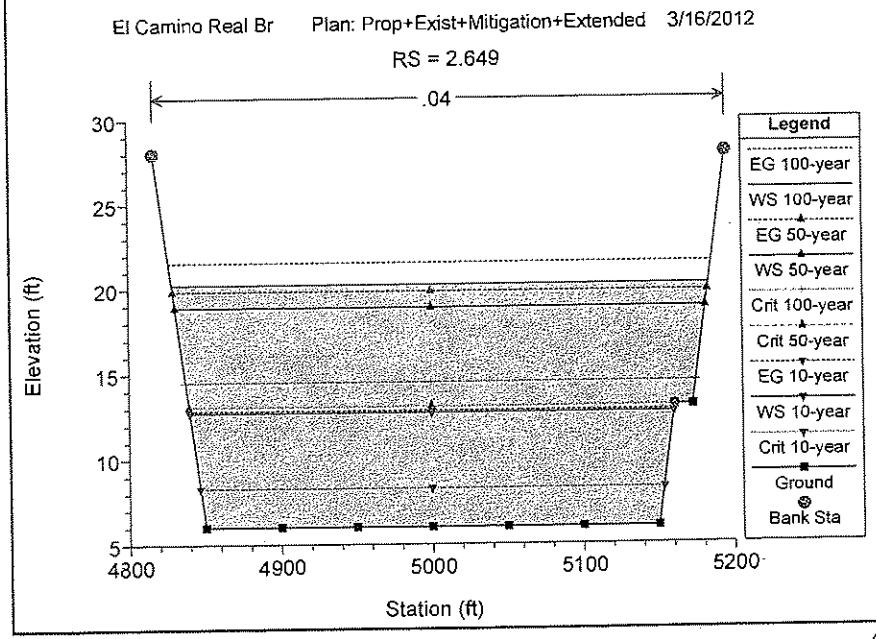
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta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Elevation (ft)
Station (ft)
Legend
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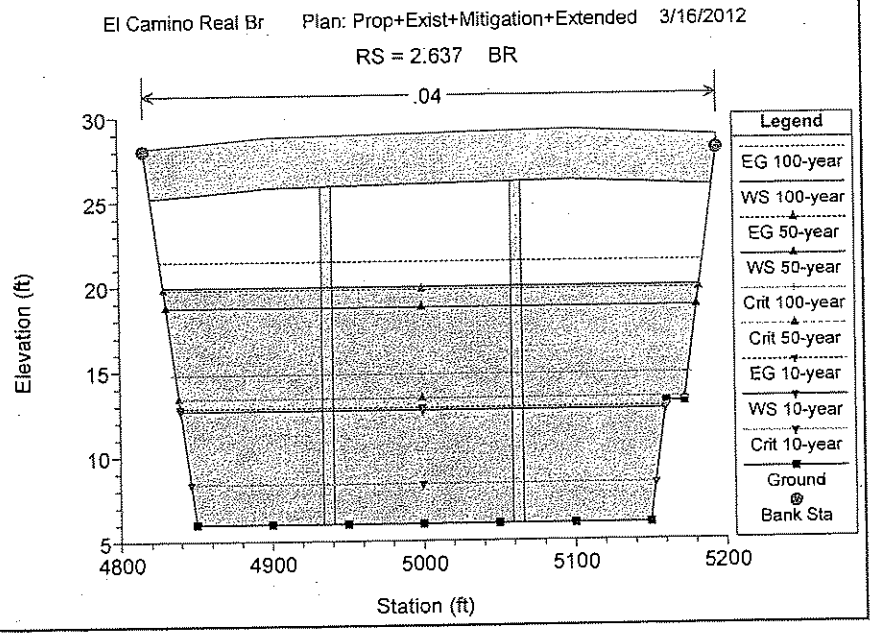
WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Bank Sta


El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.637 BR
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Elevation (ft)
Station (ft)
Legend
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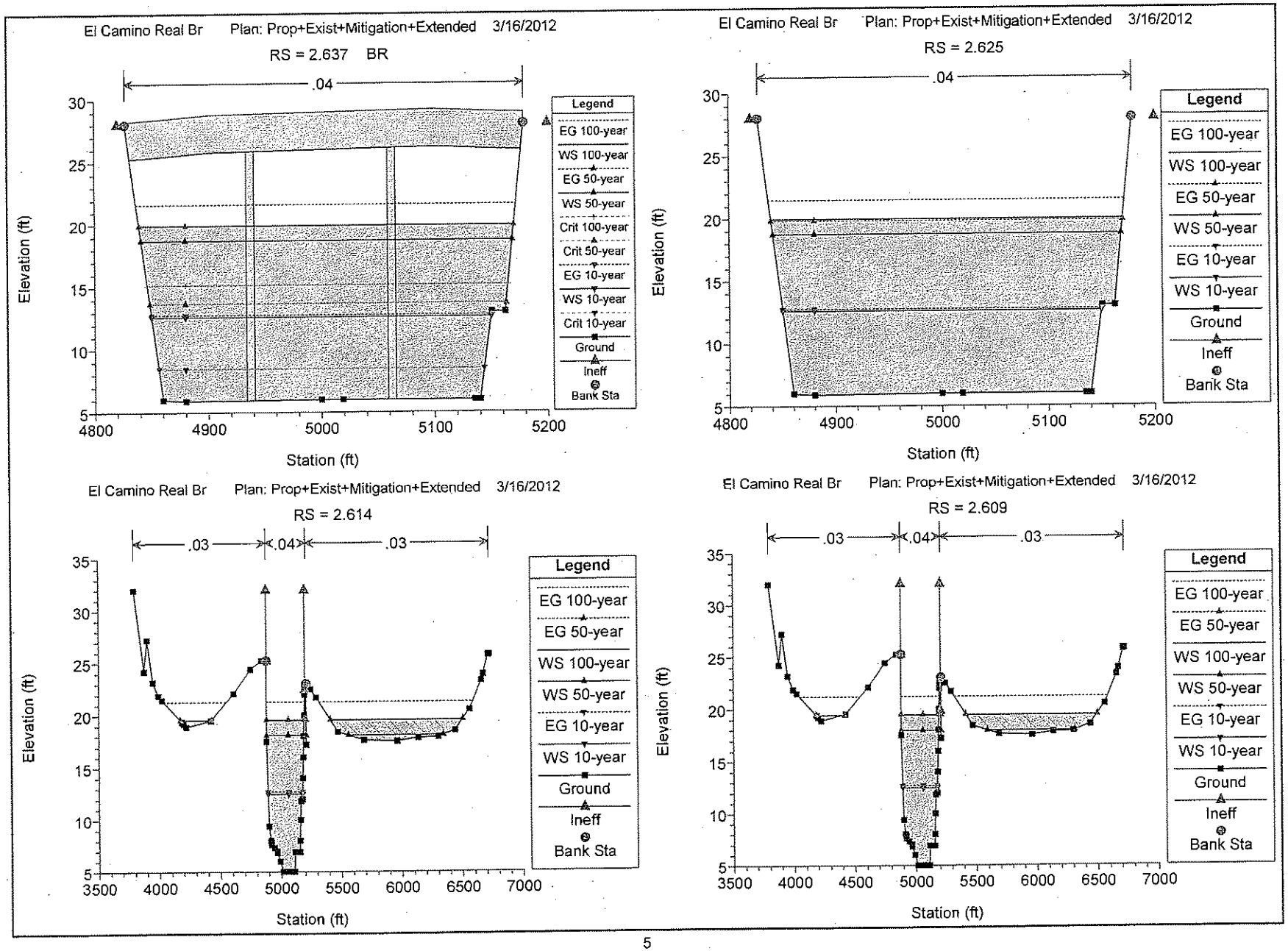
WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Bank Sta


El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.637 BR
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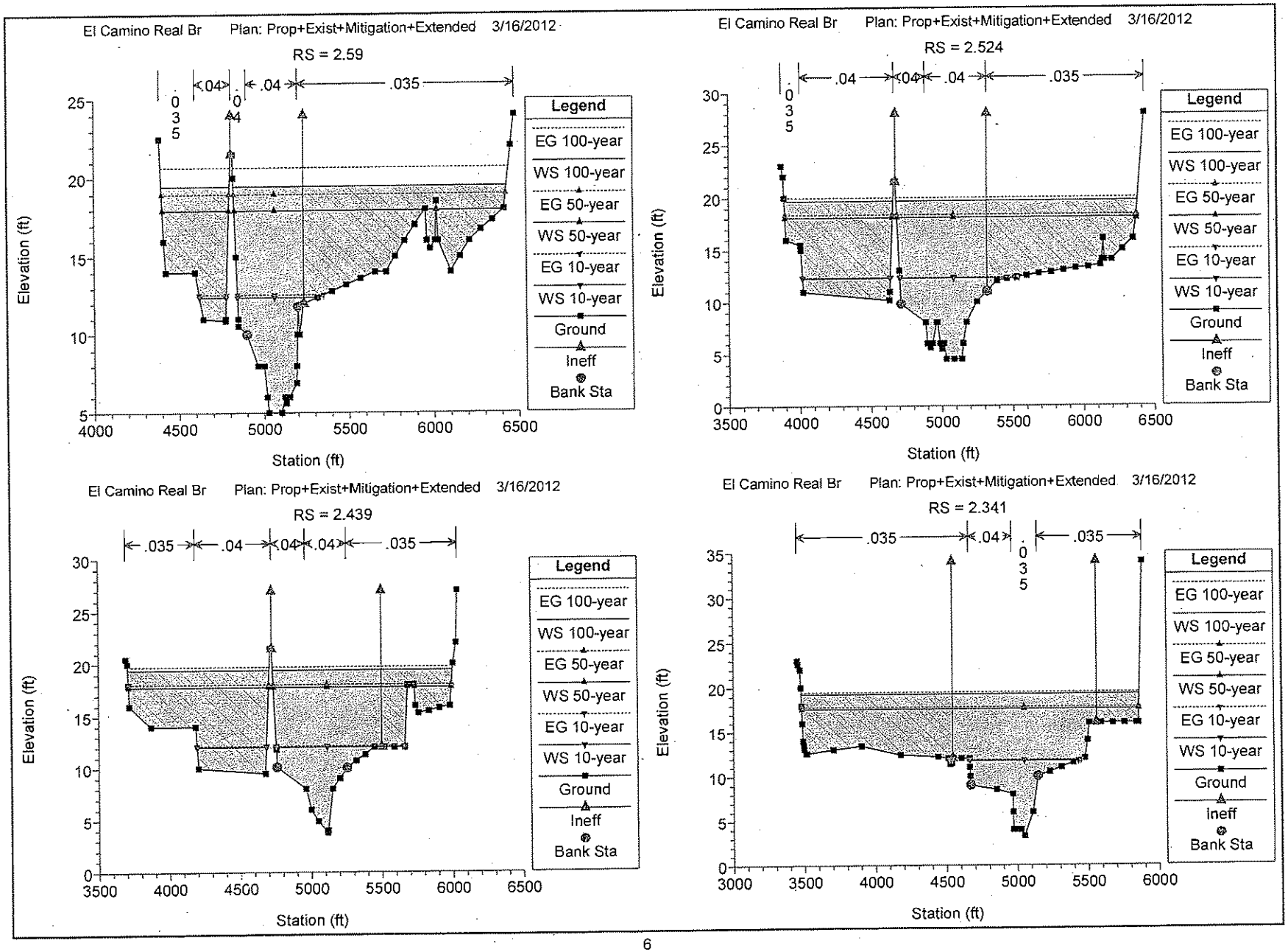
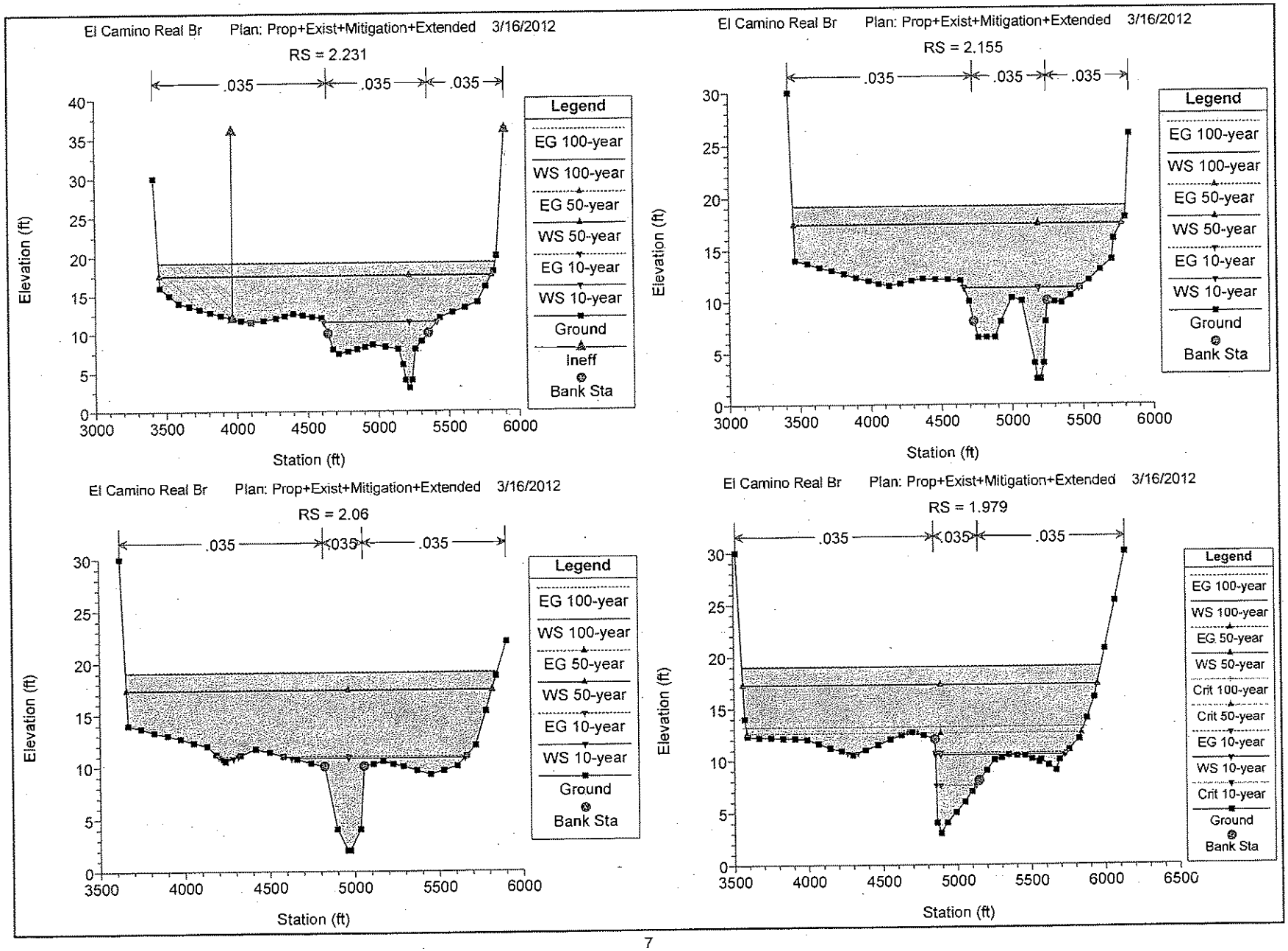
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.625
.04
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.614
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
EG 100-year
EG 50-year
WS 100-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.609
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
EG 100-year
EG 50-year
WS 100-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta


El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.59
.035
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.524
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.439
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.341
.035
.04
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta


El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.231
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Ineff
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.155
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 2.06
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
EG 10-year
WS 10-year
Ground
Bank Sta
El Camino Real Br Plan: Prop+Exist+Mitigation+Extended 3/16/2012
RS = 1.979
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
EG 100-year
WS 100-year
EG 50-year
WS 50-year
Crit 100-year
Crit 50-year
EG 10-year
WS 10-year
Crit 10-year
Ground
Bank Sta

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: El Camino Real Br
Project File : Elcamino.prj
Run Date and Time: 3/16/2012 9:58:52 AM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
EXISTING CONDITIONS,
PROPOSED CONDITIONS
100-YR FLOOD

Note per 07/15/2011: Minor updates to area where proposed mitigation area will be, southwest of bridge, on left overbank to provide more detailed existing topographic data in order to match revised data in prop. condition (beyond limits of proposed mitigation grading).

Note per 04/04/2007: Updated all plans that included existing bridge to model the existing bridge pier using "pier editor" and not as ground points. This updates included debris factors as well.

Note per 03/13/2007: Updated number of bridge piers at CX 2.637 from 4 to 2 per the exhibit titled El Camino Real Road / Bridge Widening General Plan Brdige for Eastern Alignment (Figure 2-19). Pier width is 7' instead of 3' to take in account of the debris factors. The piers are stationed at 4937.5 and 5062.5. This revision was made in geometry files associated with plan (.p09), (.p11), and (.p13).

Note per 03/07/2007: Updated all plans that included Mitigation Area SW of bridge location to correct the ineffective flow area on the left overbank of CX 2.439, per Resource Agency comment.

PLAN - "Prop+Exist+Mitigation+Extended+Enhanced," (.p13) corresponds to enhanced preferred alternative that is eastern alignment with existing bridge removed. An approximate 25-year Q was interpolated using the log sheet and now added to profile in steady flow file. The Q was interpolated between the given 10-year, 50-year, and 100-year Q from FIS. (dated: December 7, 2006)

PLAN - "Prop+Exist+Mitigation+Extended+Risk," (.p11) corresponds to risk assessment alternative that raise the via de la valle above the 100-year WSEL. (dated: April 11, 2006)

PLAN - "Prop+Exist+Mitigation+Extended," (.p09) is an extention to "Prop+Exist+Mitigation," (.p05). Cross sections 3-12 (imported from Fairbank) are now included in (.p09). (dated: April 5, 2006)

PLAN - "Existing+Extended," (.p12) is an extension to "Existing," (.p08) which was created by Dr. Howard Chang. "Existing+Extended," (.p12) imported cross-sections from 3 to 12 from the fairbank project. (dated: April 12, 2006)

PLAN - "Prop+Exist+Mitigation," (.p05) corresponds to Alternative 2a. It assumes the existing bridge and the proposed bridge (eastern alignment) both in place and the proposed mitigation area just downstream on the southern overbank area. The mitigation includes a 10-foot berm (top width) separating the main mitigation area from the main channel, and also

includes
a smaller area of the overbank area that will be lowered on the north side
of the berm. (BH)

The Hecras analysis prepared by Chang Consultants (Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River, revised June 2005) wes revised to add the downstream mitigation areas into the model. In short, the proposed grading limits were added, the lowered overbank area north of the proposed berm was added, and the manning's n roughness coefficient was increased from n=.035 to n=.04 for the limit of mitigation area in each of four cross-sections. This revision was prepared by Rick Engineering Company, dated December 9, 2005.

PLAN - "Prop+Exist+Mitigation+Extended," (.p09) was modified. Old El Camino Real Bridge was removed. Cross-sections u/s and d/s have to be revised in the future (when new grading will be available). per AG (20120302)

PLAN DATA

Plan Title: Prop+Exist+Mitigation+Extended
Plan File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.p09

Geometry Title: Prop+Exist+Mitigation+Extended
Geometry File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.g06

Flow Title : Prop+Exis+Mitigation(weirs)+Extended
Flow File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.f05

Plan Summary Information:

Number of:	Cross Sections	= 26	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 1	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Prop+Exis+Mitigation(weirs)+Extended
Flow File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.f05

Flow Data (cfs)

River	Reach	RS	100-year	50-year	10-year
RIVER-1	Reach-1	12	42800	32500	5900
RIVER-1	Reach-1	2.844	42800	32500	5900
RIVER-1	Reach-1	2.732	42800	32500	5900
RIVER-1	Reach-1	2.675	42800	32500	5900
RIVER-1	Reach-1	2.625	42800	32500	5900
RIVER-1	Reach-1	2.614	40100	32500	5900
RIVER-1	Reach-1	2.524	33415	27307	5900
RIVER-1	Reach-1	2.439	34115	27307	5900
RIVER-1	Reach-1	2.341	34815	27307	5900
RIVER-1	Reach-1	2.231	42800	32500	5900
RIVER-1	Reach-1	2.155	42800	32500	5900

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	100-year	Known WS = 19	
RIVER-1	Reach-1	50-year	Known WS = 17.24	
RIVER-1	Reach-1	10-year	Known WS = 10.5	

GEOMETRY DATA

Geometry Title: Prop+Exist+Mitigation+Extended
Geometry File : w:\14752-B\hydro\Hydraulics\Hec-Ras\Elcamino.g06

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 12

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	35.6	1005.86	33.27	1013.08	31.83	1055.01	32.1	1099.25	30.47
1144.99	29.5	1176	31.58	1180.55	32.16	1224.52	29.29	1272.69	28.7
1321.29	25.1	1372.68	18.68	1498.17	18.68	1553.31	27.25	1584.04	26.05
1592.99	24.9	1603.16	24.7	1625.67	28.06	1665.26	25.4	1744.29	22.84
1791.24	20.4	1803.95	20.35	1815.94	20.71	1850.07	19.88	1852.08	20.1
1856.82	19.9	1878.37	20.77	1904.54	21.04	1951.26	20.01	1980.89	18.85
2021.94	18.8	2082.22	19.82	2177.87	19.99	2226.8	23.59	2260.35	26.81
2266.62	28	2276.55	28.01	2289.11	26.36	2341.63	24.48	2453.87	29.83
2463.88	30.9	2545.28	32.67	2603.12	30.76	2654	27.88	2670.13	26.1
2711.85	22.7	2774.21	20.74	2797.93	20.55	2877.43	22.79	2902.47	22.3
2935.73	27.6	2956.39	27.08	2981.85	25.02	3000.22	24.95	3060.28	26.72
3075.48	26.6	3122.59	24.89	3174.65	25.29	3205.29	26.8	3264.7	25.15
3287.43	17.9	3303.45	12.36	3319.08	11.84	3351.69	11.41	3622.04	11.32
3727.53	12.8	3734.46	13.1	3776.26	20.11	3778.5	20.05	3805.79	19.28
3830.09	19.1	3958.65	20.42	4161.16	20.39	4207.79	21.08	4296.23	20.35
4323.61	27.9	4332.48	29.22	4343.85	29.47	4369.91	29.17	4423.85	29.14
4453.69	28.6	4498.75	28.52	4531.82	27.51	4546.42	27.73	4568.52	27.35
4576.79	27.6	4591.03	27.38	4616.36	23.58	4679.05	22.34	4746.64	23.31
4773.16	23.1	4785.29	21.85	4818.03	17.15	4827.16	19.36	4857.86	29.1
4861.74	30.9	4871.15	31.21	4888.42	29.54	4905.42	28.94		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3287.43	.045	3778.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3287.43	3778.5	49.32	48	73.57	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3205.29		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 11.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	40.3	1017.77	32.69	1025.98	31.31	1068.34	31.84	1120.18	30.46
1125.95	30.8	1139.82	31.06	1186.39	30.89	1205.9	30.03	1215.36	29.19
1270.4	26.2	1319.99	23.06	1333.18	22.01	1387.97	22.58	1403.23	20.7
1427.05	20	1458.92	20.06	1475.5	21.56	1490.04	22.43	1501.97	21.59
1521.74	24.9	1544.11	27.77	1555.98	27.71	1576.39	27.13	1588.08	26.52
1592.53	25.6	1602.16	25.44	1644.13	31.55	1689.45	26.26	1716.32	25.39
1799.98	21	1821.54	19.32	1824.81	18.71	2071.33	18.71	2084.45	19.97
2148.41	20.8	2163.75	22.18	2190.78	24.07	2208.44	26.01	2245.42	28.48
2269.66	26.2	2324.04	22.89	2339.18	23.23	2497.01	28.39	2521.97	28.85
2546.84	30.3	2565.05	29.68	2587.75	28.39	2631.81	28.04	2662.57	28.41
2710.89	24.4	2807.45	21.06	2866.09	22.63	2901	26.32	2920.28	30.24
2940.22	29.2	2959.82	27.62	2964.07	27	2969.64	26.61	2989.81	27.21
3015.83	27.5	3041.11	28.24	3120.4	25.24	3169.54	25.37	3196.64	27.06

```
 3260.42    25.6  3282.4   18.34 3300.55   12.14 3349.52   11.94 3381.12
11.52
 3524.57    11.2  3619.7   11.39 3718.86   12.21  3738.3   13.08 3778.55
19.79
 3849.99    19.6 3921.31    20.2 4036.71    20.5 4181.79   20.35    4194
20.53
 4217.99      20 4243.34   19.95 4319.69   20.32 4337.47   20.86 4446.99
21.08
 4496.05    20.9 4547.69   22.06 4563.82   21.98 4593.72   23.28 4605.59
23.35
 4634.58    22.7 4681.06   22.26 4718.72   22.41 4726.07   21.78 4762.55
16.45
 4772.93    19.9 4811.26   33.42 4821.04   32.65 4860.55   31.96

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045  3282.4    .045 3778.55    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       3282.4 3778.55            347.68     339  548.49              .1
.3
Ineffective Flow      num=       1
   Sta L   Sta R    Elev  Permanent
    1000 3196.64               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 10.

INPUT
Description:
Station Elevation Data     num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000    61.6  1065.1   31.55 1066.72   30.96 1078.56   28.81 1133.55
30.82
 1144.36    30.8 1163.16   29.72 1174.61    27.9 1194.28   26.28 1220.63
25.97
 1272.47    24.6 1290.82   24.66 1313.56   23.75 1322.01   23.03 1330.79
23.38
 1346.64    24.6 1352.33   24.76 1372.19   24.37 1377.21   24.54 1396.08
23.58
    1409    23.3 1437.64   23.91 1457.07    23.5 1471.34   24.16 1487.88
23.48
 1489.88    23.6 1504.34    22.5 1520.03   23.02 1551.94   24.67 1568.23
25.86
 1572.66      26 1598.72   27.62 1653.76   25.37 1772.86   22.14 1802.96
20.84
 1830.99    20.5 1846.37   19.78 1904.05   18.71 2126.59   18.71 2143.98
20.6
```

```
 2181.47    20.3 2213.13   20.54 2228.29   20.02 2260.47   22.45 2285.56
23.91
 2292.62    25.6    2303    26.9 2317.41   25.97 2339.99   23.98 2349.03
22.8
 2373.01    20.9 2453.68   19.32 2467.97   19.43 2507.32    22.2 2533.93
21.88
 2540.85    21.2 2603.98   24.58  2655.3   24.99 2669.58   24.91 2697.53
25.59
    2749    26.4 2774.29   26.56 2817.77   21.14 2825.25   20.46 2903.54
27.83
 2922.14    28.7 2959.73   26.34 2998.12   24.68 3063.82   31.09  3131.8
27
 3139.33    26.8 3159.32    25.3 3185.34   23.98 3210.78   16.78 3228.28
11.78
 3244.48    11.9 3252.18   11.68 3344.18   11.39 3386.35   11.54 3552.31
10.72
 3679.96    11.5 3702.75   12.08 3737.94   17.39 3742.94   17.35 3759.57
17.33
 3876.38    19.1 3950.62   18.95 4016.25    19.2 4059.21   19.11 4185.85
19.68
 4245.42    20.7 4246.74   20.53 4274.78   15.27 4315.06   25.27 4357.64
25.53
 4403.81      29 4407.41   30.26 4426.73   42.03 4430.62   43.13

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 3210.78    .045 3742.94    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       3210.78 3742.94            585.6     450  556.91              .1
.3
Ineffective Flow      num=       1
   Sta L   Sta R    Elev  Permanent
    1000 3063.82               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 9.

INPUT
Description:
Station Elevation Data     num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000      37  1016.9    33.7 1073.58   32.94  1121.8   33.23 1152.75
31.65
 1161.67    30.1 1171.71   29.36 1198.09   28.64 1256.09   24.45 1282.45
24.17
 1321.64    25.1 1382.49   25.44  1446.9   25.01 1463.43   24.47 1528.47
28.12
```

```
 1533.87    28.1  1544.3   29.93 1559.42   28.86  1567.3   27.86 1581.06
29.5
 1593.41    27.7 1627.08   27.96 1648.62   28.99  1680.4    29.4 1703.36
27.5
 1712.61      28 1721.47   28.98 1732.48    28.9 1751.89   31.06 1766.04
33.19
 1782.94    31.2 1800.28   27.57 1848.38   22.39 1882.05   21.62 1921.82
26.96
 1943.46    27.3 1956.53   27.14 1966.87   26.49 2013.05   20.39 2114.35
24.06
 2135.36    23.6    2151    23.9 2237.13   22.08 2307.12   21.91 2377.04
22.97
 2399.54    22.4 2468.87   22.81 2473.19   23.63 2480.05   23.05 2491.91
24.59
 2515.92    22.9 2524.23   22.84 2581.98   19.02 2637.55   22.51 2657.34
25.17
 2674.82    24.2 2715.26   23.38 2740.33   21.83 2743.51      22 2751.97
21.28
 2767.57    23.4 2821.64   23.57 2834.98   23.08 2844.63   22.26 2932.59
22.26
 2951.05    22.9 2966.41   25.46 2986.32   27.06  2992.2   28.44 3039.79
23.8
 3070.69    14.2 3080.08   11.42 3106.55   11.02 3321.87   10.64 3400.49
11.49
 3522.98    10.7 3576.78   11.11 3603.66   11.87 3631.39   15.44 3637.71
15.64
 3650.43    16.1 3668.33   18.59 3674.22   19.28 3691.74   18.65 3725.46
19.86
 3742.81      20 3832.93   22.46 3869.75   30.39 3884.99   32.22    3889
36.15
 3903.88    45.7 3915.36   57.56 3922.06   60.21 3934.59   69.86  3942.4
73.97
 3955.33    78.1 3964.35   83.07 3985.23   95.58 3988.22   97.89

Manning's n Values          num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 3070.69    .045 3637.71    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       3070.69 3637.71          1127.52     452  287.85              .1
.3
Ineffective Flow      num=        1
   Sta L   Sta R    Elev  Permanent
    1000  2992.2                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 8.

INPUT
Description:
```

```
Station Elevation Data     num=       99
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
    1000    28.6 1005.45   28.45 1024.27   33.23 1035.35   32.74 1041.71
32.87
 1061.19    32.9 1083.84   32.75 1092.86   32.56 1121.25   32.64  1124.3
32.11
 1131.29    31.8 1140.59   31.88 1164.62   31.19 1219.06   30.98  1239.9
29.91
 1242.97    30.9  1255.6   30.95  1268.5   30.77 1302.14   28.93 1308.95
29.04
 1332.76    27.9 1359.49   28.05  1365.6   30.06 1378.37   30.03 1393.75
30.12
 1394.57    29.8 1400.54   25.66 1416.32   23.32 1419.41   23.16 1420.28
23.05
 1433.25    20.9 1482.05   21.18 1502.76   23.35 1526.92   25.37 1557.55
26.22
   1561.6   26.2 1564.42   26.18 1588.13   25.13 1595.86   24.52  1627.6
21.8
 1633.43    21.9 1657.37   22.66 1671.61   23.28 1703.38   22.62 1750.91
20.6
 1766.08    19.6 1786.31   18.96 1806.22   19.85 1834.37   20.97 1846.46
20.93
 1861.46    20.2 1883.93   19.91 1955.91   21.79 1958.38   21.71  1965.3
21.71
  2051.2      20 2121.94   17.86 2585.61   17.86 2628.16   21.64 2641.35
22.45
 2649.73    23.1 2687.98   25.74 2697.64   26.82 2724.27   29.32 2737.82
29.24
 2748.03    29.2 2759.02   27.76 2777.42    26.7 2794.59   25.17 2802.41
23.78
 2827.53    15.9 2845.35    10.4 2848.93   10.33 2949.01    9.78 2990.53
9.84
 3031.41     9.4 3047.38    9.32 3118.85    9.51 3158.36   10.28 3200.01
10.36
 3237.46    10.2 3284.67   10.19 3336.84   10.23 3346.59   12.25 3386.84
18.59
 3390.01    18.7 3403.66   19.41 3416.52   24.97 3420.62   26.92 3433.41
25.66
 3439.42    25.1 3448.56   28.08  3468.3   34.15 3471.51   33.72  3481.4
33.27
 3494.77    37.3 3511.58   42.12 3539.78   51.12 3556.19   52.41

Manning's n Values          num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 2827.53    .045 3390.01    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       2827.53 3390.01           806.85     444  387.93              .1
.3
Ineffective Flow      num=        1
   Sta L   Sta R    Elev  Permanent
    1000 2724.27                T
```

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 7.

INPUT
Description: Revised
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	29.8	1045	27.9	1085	27.6	1103	26.3	1115	26.3
1126	22	1135	17.5	1151	17.2	1163	19.7	1173	20.4
1225	17.8	1313	18.2	1329	18.8	1336	21.6	1351	23.1
1357	21.9	1361	20.1	1367	20.7	1371	19.5	1376	19.9
1380	19.2	1389	19.6	1392	20.4	1396	19.1	1438	19.4
1445	20.9	1452	23.1	1461	19.9	1533	18.8	1577	20.5
1588	21.6	1602	24.8	1609	24.8	1620	23.3	1632	19.9
1646	17.2	1729	15.7	1761	14.5	1784	14.8	1794	16
1802	16.3	1826	15.5	1839	14.5	1924	12.1	1953	9.1
1958	7.6	2017	7.7	2023	9.3	2037	11.2	2108	13.5
2143	20.2	2151	20.9	2167	20.7	2194	17	2237	14.7
2272	15.8	2284	17	2317	17.8	2341	17.7	2365	17.8
2415	17.3	2437	16.7	2468	17.4	2484	17.6	2523	18.4
2565	18.9	2578	19.6	2580	20	2586	20.1	2598	21.1
2647	24.9	2655	24.7	2675	26.8	2689	26.5	2767	22.9
2800	22.5	2807	22.2	2824	17.1	2835	13.3	2843	11
2878	10.1	2919	10	3013	9.5	3101	9.4	3222	10.6
3243	10.7	3296	10.3	3318	13.8	3349	18.8	3377	20.2
3397	19.3	3436	20.9	3465	22.1	3476	22.8	3490	25.5
3499	26.2	3505	26.3	3516	29	3524	30.8	3546	31.4
3585	37	3587	37.5	3590	37.1	3597	37.4	3613	37.9
3620	37.9	3625	38.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2835	.045	3318	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2835	3318	692.7	497	459.02	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2674.77		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 6.

INPUT
Description: Revised
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	34.8	1013	34.7	1055	33.7	1055	33.9	1078	33.7
1086	35	1129	35.1	1187	33.7	1237	31.2	1269	28.9
1296	26.3	1322	24.3	1338	23.7	1356	21.1	1366	18.9
1376	17.3	1387	23.1	1391	22.8	1400	23.7	1413	24.3
1433	22.4	1463	15.9	1478	15.5	1504	15.7	1523	15
1552	12.7	1580	12	1600	9.1	1612	8.6	1656	8.3
1676	7.7	1698	7.7	1751	8.5	1765	9.3	1771	9.3
1784	8.6	1787	8.8	1791	8.3	1794	8.4	1796	8.9
1807	9.8	1816	9.6	1818	9.2	1824	7.7	1937	7.7
1976	8.8	2014	7.8	2026	9.6	2088	11.3	2111	13.2
2122	13.2	2150	14.5	2161	14.6	2170	14.1	2186	15.2
2247	14.5	2318	14.5	2329	14.9	2349	14.3	2397	19
2402	19.3	2403	19.3	2405	19	2427	15.9	2433	15.4
2444	14.8	2447	14.8	2473	16.6	2509	16.5	2524	17

```
    2556      20    2565    20.6    2569    20.7    2591    22.2    2612
22.6
    2631    23.7    2652    25.1    2679    26.7    2689    25.5    2700
24.4
    2718    23.6    2743    21.7    2749    19.8    2780     9.7    2806
9.2
    2862     9.3    2907     8.8    2925     8.8    2998     9.7    3089
10
    3165     8.1    3173     7.9    3185     7.7    3279     9.9    3319
8.8
    3363     9.5    3390    15.5    3409    19.8    3418    20.3    3428
20.7
    3441    22.8    3449    22.9    3464    23.2    3477    28.5    3482
29.7
    3508    30.7    3517    32.9    3572    46.4    3598    50.5    3607
52.7
    3628    59.1    3633    60.8    3673    77.8

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045    2780    .045    3165    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          2780    3165            642.39     511  528.63            .1
.3
Ineffective Flow      num=        1
   Sta L   Sta R    Elev  Permanent
    1000 2678.79               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 5.

INPUT
Description: Revised
Station Elevation Data      num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000    26.5    1002      26    1013    28.6    1024    32.7    1042
32
    1135    31.8    1149    33.4    1163    32.7    1178    30.6    1194
26.7
    1207    22.7    1259    16.3    1275      16    1297      19    1313
20.2
    1322    19.4    1348      14    1357      14    1373    16.6    1389
16.7
    1412    14.6    1499    12.7    1540    13.8    1579    17.2    1594
16.3
    1640     7.7    1773     7.7    1800     9.3    1892    10.9    1943
8.5
```

```
    1949     7.6    2006     7.6    2026    13.8    2035    15.6    2072
15.8
    2089    14.9    2109    15.4    2147    18.4    2164    16.8    2176
17
    2190      16    2204    17.5    2242    24.9    2253    25.5    2276
23.7
    2295    23.9    2334    18.3    2408    18.3    2423    20.8    2445
22.5
    2463      21    2470    19.5    2502    12.6    2514     9.1    2564
8.9
    2593     8.6    2625     8.9    2694     9.2    2712     8.7    2807
7.9
    2822    10.6    2842      14    2856    16.5    2864    16.5    2885
16.5
    2901    16.8    2925    16.6    2942    16.6    2945    16.8    2962
16.6
    3010    16.8    3053    16.5    3076    16.9    3091      17    3099
17.4
    3120    17.4    3174    18.2    3238    18.2    3263    18.1    3281
18.2
    3291    18.5    3333    18.7    3339    19.1    3350    20.7    3356
19.6
    3361    18.6    3378    21.9    3430    29.7    3436      33

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045    2502    .045    2822    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          2502    2822            578.02     495  791.59            .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
    1000 2446.02               T
    3230    3436               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 4.

INPUT
Description: Revised
Station Elevation Data      num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000    32.2    1007    27.6    1017    24.3    1053    24.2    1058
23.6
    1073    24.4    1105    24.3    1120    24.9    1133    26.1    1146
25.4
    1155    23.4    1173    16.9    1182    15.2    1210    14.1    1223
14.7
```

1240	13.1	1263	12.1	1345	11.3	1371	11.9	1391	13.7
1398	13.3	1409	11.5	1426	12.7	1437	16.1	1474	11.1
1494	10.7	1515	12.7	1533	15.8	1542	15.7	1571	13.6
1676	12.2	1699	10.5	1706	9.6	1713	7.6	1847	7.7
1851	7.7	1942	10.9	1970	13	2023	15.8	2053	15.5
2093	18.3	2111	20.1	2152	21.2	2159	22.3	2169	19
2178	13.4	2182	10.2	2186	8.8	2190	8.7	2197	12.8
2214	9.9	2225	8.1	2246	8	2278	7.8	2296	7.8
2454	7.5	2474	7.4	2482	7.3	2499	7.5	2527	7.5
2535	7.6	2557	11.9	2570	14.3	2573	14.9	2597	15.7
2610	15.3	2634	14.9	2638	14.8	2639	14.9	2701	17
2739	17.5	2798	18.7	2803	15.7	2804	15.7	2834	16.3
2887	16.2	2918	16.4	2982	16.5	2999	16.2	3115	16.2
3192	16.2	3279	16.5	3281	16.5	3346	16.2	3416	16.2
3418	16.2	3442	16.3	3451	16.4	3480	16.3	3497	15.9
3582	15.4	3675	16.7	3682	16.7	3687	16.9	3735	17.9
3756	18.3	3815	18.7	3830	18.6	3854	20	3856	20.2
3859	20.6	3871	25.3	3877	26.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2178	.045	2557	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2178	2557	537.07	495	500.63	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2155		T
3100	3877		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 3.

INPUT
Description: Revised
The X1 and GR information below is all generated from new sections cut from
the topo received from Jas...saved as fairbanks.dtm. The X1 Id's
currently indicate the station along the stream alignment, with the zero
station of the stream at the upstream end. For this Hec-Clomr analysis,
the X1 and GR information listed below is for all sections upstream of the
Howard Chang CX 2.8444. CX geometry begins with Sta. 1000 at the left end

Date: 11-08-02

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	25.3	1039	23.4	1047	23	1055	22.6	1089	24.9
1105	25.2	1105	24.7	1139	25.7	1171	24.8	1171	25.3
1184	25.7	1191	27.6	1220	26.9	1232	25.5	1244	23.5
1256	19.6	1266	16.8	1277	13.6	1280	13.4	1288	13.7
1293	14.7	1320	14	1333	11.6	1358	7.4	1511	7.4
1527	9.7	1550	11.9	1577	13.1	1592	13.3	1650	10.4
1661	9.1	1669	7.6	1720	7.6	1770	7.6	1783	9
1792	8.9	1851	11.2	1876	12.5	1998	16.7	2056	22.7
2077	22.5	2083	21.6	2092	18.7	2101	13.2	2109	8
2115	8	2119	12.9	2120	13	2144	7	2182	7.3
2285	7	2326	7.1	2418	7	2444	7.1	2452	6.9
2474	10.9	2479	11.8	2496	14.6	2500	14.7	2520	14.9
2563	15.2	2594	15.4	2652	15.9	2666	16.3	2738	16.3
2756	16.4	2830	17.7	2832	17.4	2846	15.2	2871	15.5
2973	15.6	2987	15.6	3048	15.6	3060	15.6	3151	15.5
3256	14.5	3260	14.5	3330	15	3430	15.1	3431	15.1
3432	15.1	3570	13.6	3604	13.4	3693	13.1	3734	13.9

3765	14.9	3858	15.7	3868	15.8	3916	16.3	3934
19.3								
3936	19.7	3946	20.2	4019	25.5	4039	26.3	4044
27.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2101	.045	2474	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2101	2474	715	765	795	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2065		T
3160	4044		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.844

INPUT
Description: Revised
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3745	45.5	3767	39	3803	36.6	3810	37.2	3821	40.4
3837	39.4	3850	40	3892	39.4	3910	39.5	3924	41.5
3934	41.5	3952	37.9	3977	30.9	3998	24.3	4010	21.3
4038	18.3	4046	16.4	4056	16.6	4086	13.9	4130	11.5
4187	11	4220	14.2	4232	16.3	4268	19.5	4281	21.4
4298	19.6	4313	15.6	4316	15.5	4327	15.3	4334	16.3
4350	15.9	4365	13	4392	10.1	4456	7.5	4559	8.3
4569	7.7	4587	8.5	4613	11.9	4632	15.5	4641	15.8
4652	14.5	4663	16.4	4690	16.3	4704	13.7	4733	13.6
4764	22.8	4770	22.1	4780	18.5	4790	13.4	4798	7.6
4807	7.4	4810	11.1	4845	7.4	4964	7.5	5141	7.6
5147	9.9	5153	13.4	5180	14	5185	15.7	5196	14.8
5287	14.4	5340	14.4	5427	14.6	5513	14.8	5600	15
5680	15	5760	15	5840	15	5920	15	6000	15
6060	14.7	6120	14.5	6200	15	6256	14.4	6312	13.8
6350	16.2	6366	16	6380	14	6455	13.9	6530	13.7
6599	13.9	6668	14	6716	16	6725	15	6742	16
6758	20	6822	22	6848	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3745	.045	4790	.045	5180	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4790	5180	325	325	325	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3745	4770		T
6060	6848		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6
3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8
4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6

```
    4708     12.9     4727     12.4     4740      11     4763      7.7     4784
7.3
    4823      7.1     4994      7.2     5165      7.2     5176      8.7     5184
12.4
    5187     12.6     5212     12.8     5218     14.8     5230     14.2     5296
14.1
    5326     14.2     5327     14.2     5400     14.5     5455     14.2     5510
14
    5590     13.9     5670     13.8     5725      14      5780     14.2     5840
14
    5900     13.8     5950      14      6000     14.2     6065      14      6130
13.8
    6195     14.1     6260     14.3     6340      14      6420     13.8     6500
13.5
    6563     13.7     6626     13.8     6648     13.3     6663     20.5     6666
20.5
    6678     14.5     6701     14.5     6711     21.1     6733     20.7     6735
20.3
    6780     21.1

Manning's n Values          num=        3
     Sta    n Val      Sta    n Val      Sta    n Val
    3877     .045     4727     .045     5184     .035

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
          4727     5184                265      265      265              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
    3877     4710                 T
    5830     6780                 T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 2.732

INPUT
Description: Revised_4-10-2006
Station Elevation Data      num=        86
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
    3819     29.5     3837     29.1     3837     28.6     3856     28.8     3877
28.4
    3877     28.9     3889     28.5     3904     28.6     3912     30.4     3929
29.3
    3942     26.9     3949     25.1     3959      22      3967     20.7     3976
20.3
    4012     16.6     4041     14.9     4118     12.9     4174      13      4214
13.8
    4227     13.7     4277     15.2     4297     14.9     4320     16.8     4329
18.2
```

```
    4368     13.3     4382     12.8     4405     10.2     4416      9.3     4425
9.2
    4430      9.1     4445     10.3     4449      11      4454      11      4460
11.7
    4488     11.7     4515     12.3     4541     11.5     4551     10.9     4560
9.3
    4569      7.5     4649      7.5     4659     10.3     4695     18.2     4700
19
    4714     22.1     4742     24.7     4758     22.5     4766     22.4     4780
18.3
    4793     15.5     4818     11.5     4829      7.6     4854      7.2     4998
7.1
    5171      7.1     5185     12.2     5211     12.3     5216     14.2     5250
13.9
    5335      14      5365     13.5     5450     14.2     5525     13.9     5600
13.7
    5675     13.4     5750     13.2     5827     13.5     5905     13.7     5982
14
    6060     14.3     6148     14.1     6236     13.9     6324     13.8     6412
13.6
    6500     13.4     6566     13.6     6628     13.2     6642      20      6645
20
    6657      14      6679      14      6690     22.9     6713     22.2     6715
21.8
    6760     22.6

Manning's n Values          num=        3
     Sta    n Val      Sta    n Val      Sta    n Val
    3819     .045     4793     .045     5185     .035

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
          4793     5185                300      300      300              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
    3819     4740                 T
    5430     6760                 T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 2.675

INPUT
Description: Revised_4-10-2006
Station Elevation Data      num=        92
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
    3836      28      3850      26      3887      25      3897     24.2     3898
24.7
    3958     24.2     3984     19.6     3997     18.1     4011     17.3     4063
16
```

```
    4077     15.9     4099     17.6     4104     17.7     4108     18.2     4160
15.5
    4170     15.4     4210     13.9     4222       13     4235     12.7     4268
15
    4279     15.5     4295       14     4310     11.7     4320       11     4334
10.6
    4350     11.5     4373     12.2     4407     12.2     4458      9.7     4462
9.5
    4482      9.1     4525     11.6     4633     13.4     4686     15.1     4707
17.2
    4724     19.9     4733     22.1     4742       23     4755     21.8     4763
21.7
    4782     16.1     4787     15.4     4806     14.6     4840     11.7     4852
11.6
    4862     10.7     4873      7.3     4893      6.9     5018      6.8     5119
6.8
  5139.2        8   5152.1      8.3   5155.6       10   5159.1     11.8   5171.2
12
  5178.4       12   5190.1     12.2     5204       12     5212     11.5     5219
13
    5224     14.6     5228     13.4     5346     13.8     5370     13.5     5450
14.3
    5533     13.9     5616     13.4     5700       13     5782     13.5     5865
14
    5943     13.7     6021     13.3     6100       13     6186     13.4     6273
13.7
    6360     14.1     6430     13.8     6500     13.5     6555     13.8     6610
14.1
    6618     13.4     6630     19.4     6634     19.4     6645     13.4     6667
13.4
    6681     24.1     6703     23.7     6705     23.3     6750     24.2     6758
24
    6818       26     6822       28

Manning's n Values          num=        3
     Sta    n Val      Sta    n Val      Sta    n Val
    3836     .045     4787     .045     5219     .035

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
          4787     5219                160      133      105              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev  Permanent
    3836     4745                T
    5210     6822                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 2.649

INPUT
```

```
Description:
Station Elevation Data     num=       11
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
    4817       28     4850        6     4900        6     4950        6     5000
6
    5050        6     5100        6     5150        6  5160.65     13.1  5172.65
13.1
  5195.3       28

Manning's n Values          num=        3
     Sta    n Val      Sta    n Val      Sta    n Val
    4817     .045     4817      .04   5195.3     .035

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
          4817   5195.3                128      128      128              .3
.5

BRIDGE


RIVER: RIVER-1
REACH: Reach-1              RS: 2.637

INPUT
Description:
Distance from Upstream XS =        20
Deck/Roadway Width        =        80
Weir Coefficient          =       2.6
Upstream  Deck/Roadway Coordinates
    num=        7
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
    4814    28.16    25.16     4850     28.4     25.4     4900     28.8     25.8
    5000       29       26     5100     29.2     26.2     5150       29       26
    5200     28.8     25.8

Upstream Bridge Cross Section Data
Station Elevation Data     num=       11
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
    4817       28     4850        6     4900        6     4950        6     5000
6
    5050        6     5100        6     5150        6  5160.65     13.1  5172.65
13.1
  5195.3       28

Manning's n Values          num=        3
     Sta    n Val      Sta    n Val      Sta    n Val
    4817     .045     4817      .04   5195.3     .035

Bank Sta: Left    Right     Coeff Contr.    Expan.
          4817   5195.3              .3        .5
```

```
Downstream  Deck/Roadway Coordinates
    num=        7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4814   28.16   25.16    4850    28.4    25.4    4900    28.8    25.8
    5000      29      26    5100    29.2    26.2    5150      29      26
    5250    28.8    25.8

Downstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    4827      28    4860       6    4880     5.9    5000       6    5019
6
    5135       6    5140       6  5150.5      13  5162.5      13    5179
28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4827    .045    4827     .04    5179    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179            .3        .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
    4827    4820                T
    5200    5179                T

Upstream Embankment side slope                =       0 horiz. to 1.0
vertical
Downstream Embankment side slope              =       0 horiz. to 1.0
vertical
Maximum allowable submergence for weir flow =      .95
Elevation at which weir flow begins           =
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=  4937.5    Downstream=  4937.5
Upstream     num=       2
    Width   Elev    Width   Elev
        7      5        7     28
Downstream     num=       2
    Width   Elev    Width   Elev
        7      5        7     28

Pier Data
Pier Station     Upstream=  5062.5    Downstream=  5062.5
Upstream     num=       2
    Width   Elev    Width   Elev
        7      5        7     28
Downstream     num=       2
```

```
    Width   Elev    Width   Elev
        7      5        7     28

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Yarnell                  KVal =      1.2
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 2.625

INPUT
Description: Revised
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    4827      28    4860       6    4880     5.9    5000       6    5019
6
    5135       6    5140       6  5150.5      13  5162.5      13    5179
28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4827    .045    4827     .04    5179    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4827    5179               40      58      80              .3
.5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
    4827    4820                T
    5200    5179                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 2.614
```

INPUT
Description: This is a REPEATED section.
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3
4965.8	7	4967	6.8	4990.4	6	5013.8	5	5015	5
5038.4	5	5061.8	5	5063	5	5086.4	5	5109.8	5
5111	5	5114.1	6.9	5155.3	6.9	5157.6	8	5161.7	10
5165.3	11.8	5177.7	12	5181.8	14	5185.9	16	5190	18
5194.1	20	5198.2	22	5200.2	22.6	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5212.2	27	27	27	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5199.8	6721.8		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.609

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3
4965.8	7	4967	6.8	4990.4	6	5013.8	5	5015	5
5038.4	5	5061.8	5	5063	5	5086.4	5	5109.8	5
5111	5	5114.1	6.9	5155.3	6.9	5157.6	8	5161.7	10
5165.3	11.8	5177.7	12	5181.8	14	5185.9	16	5190	18
5194.1	20	5198.2	22	5200.2	22.6	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5212.2	100	100	90	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5206.4	6721.8		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.59

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4386.7	22.5	4409.3	16	4422.7	14	4594.7	14	4642.3	11

```
    4773    10.89   4774.2      11   4806.4    21.5   4816.4    21.5    4821
20
    4836       15     4848      11   4848.3   10.57   4897.7    10.1    4898
10
    4962        8     5000       8     5016       6     5025       5    5100
5
    5120        6   5129.5     5.6   5148.6       6     5190     6.9  5192.3
8
  5196.4       10     5200    11.8     5208      10     5232      12    5316
12.4
    5401     12.8     5485    13.2     5570    13.6     5655      14    5720
14
    5775       15     5830      16     5891      17     5953      18    5960
16
    5980     15.5     6010      16     6017    18.5     6027      16    6100
14
    6155       15     6210      16     6278    16.7     6346    17.3    6415
18
    6455       22     6475      24

Manning's n Values          num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta
n Val
  4386.7    .035  4594.7     .04  4806.4     .04    4898     .04    5200
.035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4898    5200               345     345     340              .2
.4
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
  4386.7  4806.4                 T
  5234.4    6475                 T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 2.524

INPUT
Description:
Station Elevation Data     num=       47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    3871      23    3885      22    3891      20    3904      16    4004
15.5
    4006      15    4024      11    4632   10.17    4634      11    4666
21.5
    4676    21.5    4702      13    4712     9.8    4886       8    4897
6
    4919     5.6    4934       6    4964       8    4969       8    4987
6
```

```
    5000     5.5    5013       6    5030     4.5    5085     4.5    5140
4.5
    5150       6    5175       8    5250      10    5320      11    5390
12
    5460    12.2    5530    12.3    5600    12.5    5686    12.7    5773
12.8
    5859      13    5946    13.2    6033    13.3    6120    13.5    6130
14
    6140      16    6146      14    6200      14    6275      15    6350
16
    6373      18    6430      28

Manning's n Values          num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta
n Val
    3871    .035    4004     .04    4666     .04    4886     .04    5320
.035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4712    5320               450     450     450              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
    3871    4676                 T
    5320    6430                 T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 2.439

INPUT
Description:
Station Elevation Data     num=       37
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    3692    20.5    3705      20    3711      18    3718      16    3871
14
    4186      14    4204      10    4678     9.5    4715    21.5    4725
21.5
    4754      12    4755    11.8    4760    10.1    4964       8    5000
6
    5050     4.9    5115     3.8    5120       4    5152       8    5204
9
    5256      10    5320    10.7    5384    11.3    5448      12    5519
12
    5590      12    5662      12    5685      18    5730      18    5740
16
    5760    15.3    5834    15.5    5908    15.8    5982      16    6003
20
    6027      22    6037      27
```

```
Manning's n Values          num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta
n Val
    3692    .035    4186     .04    4725     .04    4964     .04    5256
.035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4760    5256              520     520     520              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
    3692    4725                T
    5500    6037                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.341

INPUT
Description:
Station Elevation Data     num=       47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
  3449.9      23    3455    22.6    3470      22    3475      20    3480
18
    3485      16    3490      14    3495   13.52    3498    13.1    3511
12.6
    3518    12.6    3705      13    3903    13.4    4177    12.4    4442
12.2
    4514      12    4522      12    4527   11.35    4540   11.45    4545
12
    4548      12    4606      12    4662      12    4665      11    4668
10
    4671       9    4853     8.5    4966       8    4968       6    4970
4
    5000       4    5025       4    5050     3.3    5110       6    5147
10
    5229    10.5    5312      11    5394    11.5    5477      12    5496
14
    5508      16    5591      16    5674      16    5757      16    5840
16
    5855      16    5885      34

Manning's n Values          num=        4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  3449.9    .035    4662     .04    4966    .035    5147    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4671    5147              550     580     600              .1
.3
```

```
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
  3449.9    4545                T
    5560    5885                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.231

INPUT
Description:
Station Elevation Data     num=       42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    3413      30    3456      16    3523      15    3590      14    3664
13.6
    3738    13.2    3813    12.8    3887    12.4    3962      12    4031
11.7
    4100    11.5    4189    11.7    4278      12    4339    12.3    4400
12.6
    4466    12.4    4533    12.2    4600      12    4644      10    4680
8
    4720     7.4    4785     7.7    4850       8    4905     8.3    4960
8.6
    5050     8.3    5140       8    5173       6    5190       4    5220
3
    5237       4    5260       8    5307       9    5355      10    5437
12
    5526    12.7    5615    13.3    5704      14    5762      16    5820
18
    5840      20    5900      36

Manning's n Values          num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
    3413    .035    4644    .035    5355    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4644    5355              300     400     430              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
    3413    3970                T
    5900    5900                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.155

INPUT
```

Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5
4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4
5175	2.5	5200	2.5	5222	4	5238	8	5250	10
5300	9.9	5350	9.8	5415	10.5	5480	11.3	5545	12
5626	13	5708	14	5722	16	5803	18	5834	26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3422	.035	4728	.035	5250	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4728	5250	330	500	450	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.06

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3622	30	3666	14	3743	13.7	3821	13.3	3899	13
3976	12.7	4054	12.3	4132	12	4186	11.2	4240	10.5
4330	11.1	4420	11.7	4501	11.4	4582	11	4663	10.7
4744	10.3	4825	10	4897	4	4958	2	4974	2
5035	4	5058	10	5114	10.2	5170	10.5	5230	10.2
5290	10	5370	9.6	5450	9.2	5530	9.6	5610	10
5665	11	5720	12	5781	15.3	5843	18.7	5905	22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3622	.035	4825	.035	5058	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4825	5058	480	430	330	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 1.979

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3516	30	3572	14	3588	12.3	3668	12.2	3749	12.2
3830	12.1	3911	12.1	3992	12	4069	11.6	4146	11.2
4223	10.9	4300	10.5	4384	11	4468	11.5	4553	12
4626	12.4	4700	12.7	4776	12.4	4852	12	4863	4
4890	3	4933	4	4993	5	5053	6	5101	7
5150	8	5202	9	5254	10	5302	10.2	5350	10.5
5405	10.4	5460	10.4	5507	10.1	5555	9.8	5568	10
5619	9.5	5670	9	5693	10	5759	11	5826	12
5878	14	5930	16	6000	20.7	6070	25.3	6140	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3516	.035	4852	.035	5150	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4852	5150	400	400	400	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3	n4	n5
Reach-1	12	.045	.045	.035		
Reach-1	11.	.045	.045	.035		
Reach-1	10.	.045	.045	.035		
Reach-1	9.	.045	.045	.035		
Reach-1	8.	.045	.045	.035		
Reach-1	7.	.045	.045	.035		
Reach-1	6.	.045	.045	.035		
Reach-1	5.	.045	.045	.035		
Reach-1	4.	.045	.045	.035		
Reach-1	3.	.045	.045	.035		
Reach-1	2.844	.045	.045	.035		
Reach-1	2.782	.045	.045	.035		
Reach-1	2.732	.045	.045	.035		
Reach-1	2.675	.045	.045	.035		
Reach-1	2.649	.045	.04	.035		
Reach-1	2.637	Bridge				
Reach-1	2.625	.045	.04	.035		
Reach-1	2.614	.03	.04	.03		
Reach-1	2.609	.03	.04	.03		
Reach-1	2.59	.035	.04	.04	.04	.035
Reach-1	2.524	.035	.04	.04	.04	.035
Reach-1	2.439	.035	.04	.04	.04	.035
Reach-1	2.341	.035	.04	.035	.035	
Reach-1	2.231	.035	.035	.035		
Reach-1	2.155	.035	.035	.035		
Reach-1	2.06	.035	.035	.035		
Reach-1	1.979	.035	.035	.035		

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	12	49.32	48	73.57
Reach-1	11.	347.68	339	548.49
Reach-1	10.	585.6	450	556.91
Reach-1	9.	1127.52	452	287.85
Reach-1	8.	806.85	444	387.93
Reach-1	7.	692.7	497	459.02
Reach-1	6.	642.39	511	528.63
Reach-1	5.	578.02	495	791.59
Reach-1	4.	537.07	495	500.63
Reach-1	3.	715	765	795
Reach-1	2.844	325	325	325
Reach-1	2.782	265	265	265
Reach-1	2.732	300	300	300
Reach-1	2.675	160	133	105
Reach-1	2.649	128	128	128
Reach-1	2.637	Bridge		
Reach-1	2.625	40	58	80
Reach-1	2.614	27	27	27
Reach-1	2.609	100	100	90
Reach-1	2.59	345	345	340
Reach-1	2.524	450	450	450
Reach-1	2.439	520	520	520
Reach-1	2.341	550	580	600
Reach-1	2.231	300	400	430
Reach-1	2.155	330	500	450
Reach-1	2.06	480	430	330
Reach-1	1.979	400	400	400

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	12	.1	.3
Reach-1	11.	.1	.3
Reach-1	10.	.1	.3
Reach-1	9.	.1	.3
Reach-1	8.	.1	.3
Reach-1	7.	.1	.3
Reach-1	6.	.1	.3
Reach-1	5.	.1	.3
Reach-1	4.	.1	.3
Reach-1	3.	.1	.3
Reach-1	2.844	.1	.3
Reach-1	2.782	.1	.3
Reach-1	2.732	.1	.3
Reach-1	2.675	.1	.3
Reach-1	2.649	.3	.5
Reach-1	2.637	Bridge	
Reach-1	2.625	.3	.5
Reach-1	2.614	.3	.5
Reach-1	2.609	.3	.5
Reach-1	2.59	.2	.4
Reach-1	2.524	.1	.3
Reach-1	2.439	.1	.3
Reach-1	2.341	.1	.3
Reach-1	2.231	.1	.3

Reach-1	2.155	.1	.3
Reach-1	2.06	.1	.3
Reach-1	1.979	.1	.3

MAP POCKET 1

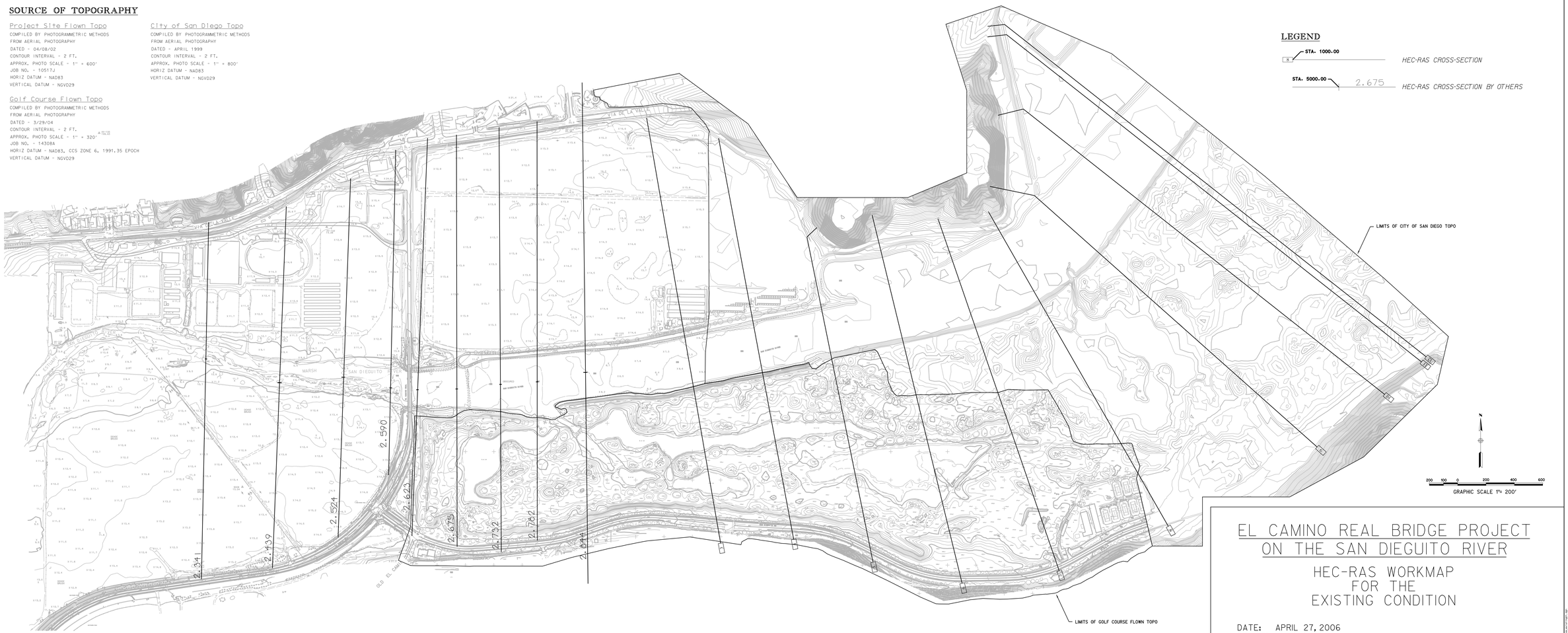
HEC-RAS Work Map for the Existing Condition

SOURCE OF TOPOGRAPHY

Project Site Flown Topo
COMPILED BY PHOTOGRAMMETRIC METHODS
FROM AERIAL PHOTOGRAPHY
DATED - 04/08/02
CONTOUR INTERVAL - 2 FT.
APPROX. PHOTO SCALE - 1" = 600'
JOB NO. - 10517J
HORIZ DATUM - NAD83
VERTICAL DATUM - NGVD29

City of San Diego Topo
COMPILED BY PHOTOGRAMMETRIC METHODS
FROM AERIAL PHOTOGRAPHY
DATED - APRIL 1999
CONTOUR INTERVAL - 2 FT.
APPROX. PHOTO SCALE - 1" = 800'
HORIZ DATUM - NAD83
VERTICAL DATUM - NGVD29

Golf Course Flown Topo
COMPILED BY PHOTOGRAMMETRIC METHODS
FROM AERIAL PHOTOGRAPHY
DATED - 3/29/04
CONTOUR INTERVAL - 2 FT.
APPROX. PHOTO SCALE - 1" = 320'
JOB NO. - 14308A
HORIZ DATUM - NAD83, CCS ZONE 6, 1991.35 EPOCH
VERTICAL DATUM - NGVD29



LEGEND

STA. 1000.00 — HEC-RAS CROSS-SECTION

STA. 5000.00 — 2.675 — HEC-RAS CROSS-SECTION BY OTHERS

EL CAMINO REAL BRIDGE PROJECT ON THE SAN DIEGUITO RIVER

HEC-RAS WORKMAP FOR THE EXISTING CONDITION

DATE: APRIL 27, 2006
REVISED: JULY 29, 2011
REVISED: MARCH 12, 2012
J - 14752B

RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
FAX619.291.4165
rickengineering.com
San Diego
Riverside · Orange · San Luis Obispo · Bakersfield · Sacramento · Phoenix · Tucson

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MAP POCKET 2

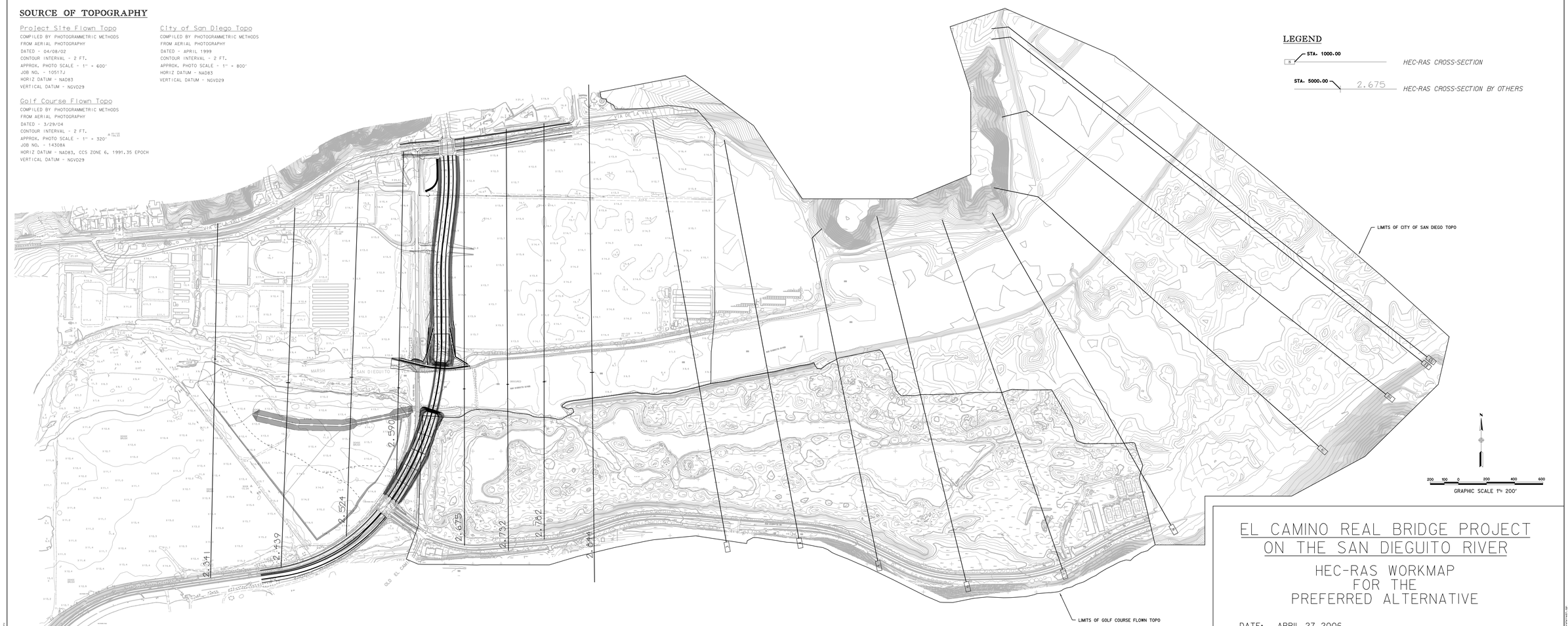
HEC-RAS Work Map for the Preferred Alternative

SOURCE OF TOPOGRAPHY

Project Site Flown Topo
COMPILED BY PHOTOGRAMMETRIC METHODS
FROM AERIAL PHOTOGRAPHY
DATED - 04/08/02
CONTOUR INTERVAL - 2 FT.
APPROX. PHOTO SCALE - 1" = 600'
JOB NO. - 10517J
HORIZ DATUM - NAD83
VERTICAL DATUM - NGVD29

City of San Diego Topo
COMPILED BY PHOTOGRAMMETRIC METHODS
FROM AERIAL PHOTOGRAPHY
DATED - APRIL 1999
CONTOUR INTERVAL - 2 FT.
APPROX. PHOTO SCALE - 1" = 800'
HORIZ DATUM - NAD83
VERTICAL DATUM - NGVD29

Golf Course Flown Topo
COMPILED BY PHOTOGRAMMETRIC METHODS
FROM AERIAL PHOTOGRAPHY
DATED - 3/29/04
CONTOUR INTERVAL - 2 FT.
APPROX. PHOTO SCALE - 1" = 320'
JOB NO. - 14308A
HORIZ DATUM - NAD83, CCS ZONE 6, 1991.35 EPOCH
VERTICAL DATUM - NGVD29



LEGEND

STA. 1000.00 — HEC-RAS CROSS-SECTION

STA. 5000.00 — 2.675 — HEC-RAS CROSS-SECTION BY OTHERS

EL CAMINO REAL BRIDGE PROJECT ON THE SAN DIEGUITO RIVER

HEC-RAS WORKMAP FOR THE PREFERRED ALTERNATIVE

DATE: APRIL 27, 2006
REVISED: JULY 29, 2011
REVISED: MARCH 12, 2012
J - 14752B

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
FAX619.291.4165
rickengineering.com
Riverside · Orange · San Luis Obispo · Bakersfield · Sacramento · Phoenix · Tucson

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ATTACHMENT 1

"Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Chang Consultants, dated June 2005.

Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River

Prepared for
Rick Engineering Company
5620 Friars Road
San Diego, CA 92110-2596

Prepared by
Howard H. Chang, Ph.D.,P.E.

November 2004, Revised June 2005

CHANG Consultants *Hydraulic and Hydrologic Engineering* *Erosion and Sedimentation*	P.O. Box 9492 6001 Avenida Alteras Rancho Santa Fe, CA 92067-4492 TEL: (858) 756-9050, (858) 692-0760 FAX: (858) 756-9460

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- Flow Velocities at Bridge Crossing

REFERENCES

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APPENDIX B – PLOTTED CROSS-SECTIONAL PROFILES FOR THE PROPOSED CONDITIONS

APPENDIX C – HEC-RAS REPORT FOR THE EXISTING CONDITIONS

APPENDIX D – HEC-RAS REPORT FOR THE PROPOSED CONDITIONS

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APPENDIX F – HYDRAULIC STUDY FOR THE CENTRAL ALIGNMENT

HYDROLOGIC STUDY FOR
EL CAMINO REAL BRIDGE PROJECT
ON THE SAN DIEGUITO RIVER

I. INTRODUCTION

This report was prepared for Rick Engineering Company presenting a hydrologic study of the San Dieguito River for the proposed El Camino Real Bridge project in the City of San Diego, see Figs. 1 and 2. The hydrologic study covers the bridge hydraulics as well as hydrologic impacts of the bridge project that include flood discharge, flood level, erosion, sedimentation and groundwater. The wetland restoration project by the Joint Power Authorization (JPA) and the Southern California Edison (SCE) Company is located along the San Dieguito River in the downstream vicinity of the El Camino Real Bridge crossing. This report provides an analysis of the bridge project impacts on the JPA/SCE wetland restoration project.

II. HYDROLOGY OF THE LOWER SAN DIEGUITO RIVER

The FEMA-adopted flood discharges for the San Dieguito River at the project site are from the report "Flood Insurance Study@ (FEMA, 1997); they are listed in Table 1.

Table 1. Summary of floods for the San Dieguito River at project site

Floods	Peak discharges, cfs
10-yr	5,900
50-yr	32,500
100-yr	42,800

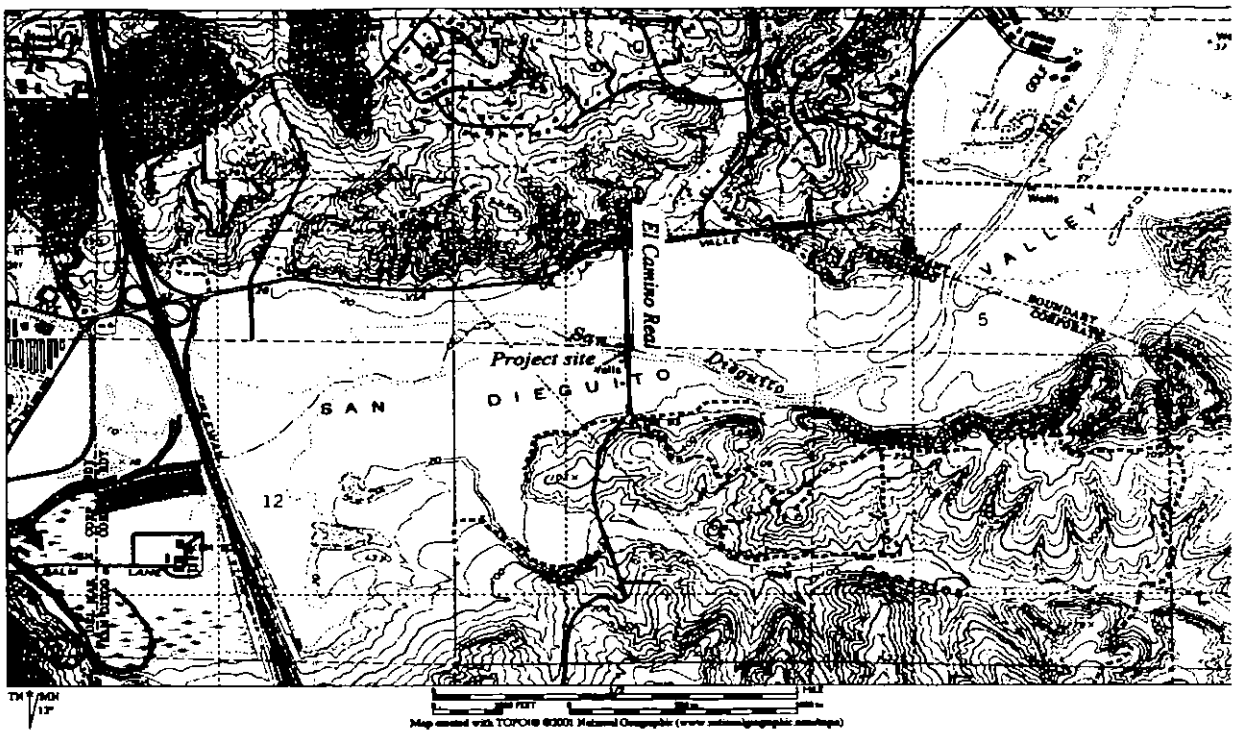


Fig. 1. Map of the San Dieguito River near El Camino Real

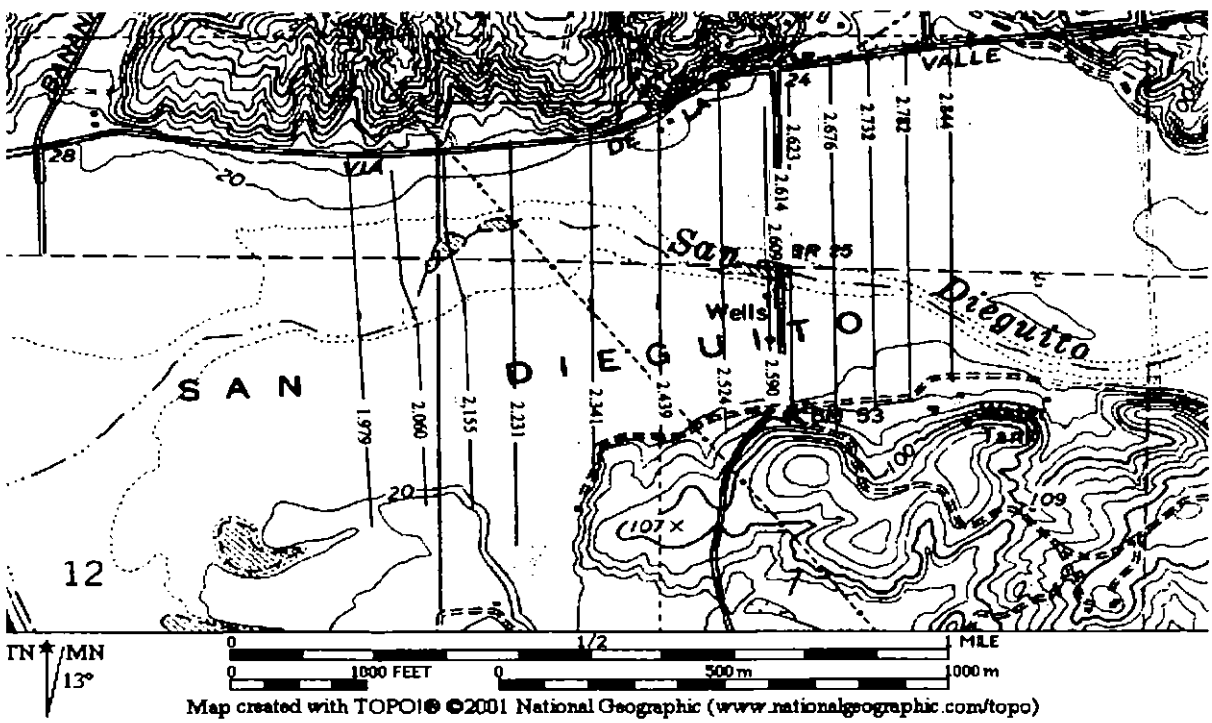


Fig. 2. Map of the San Dieguito River with locations of cross sections used for hydraulic study

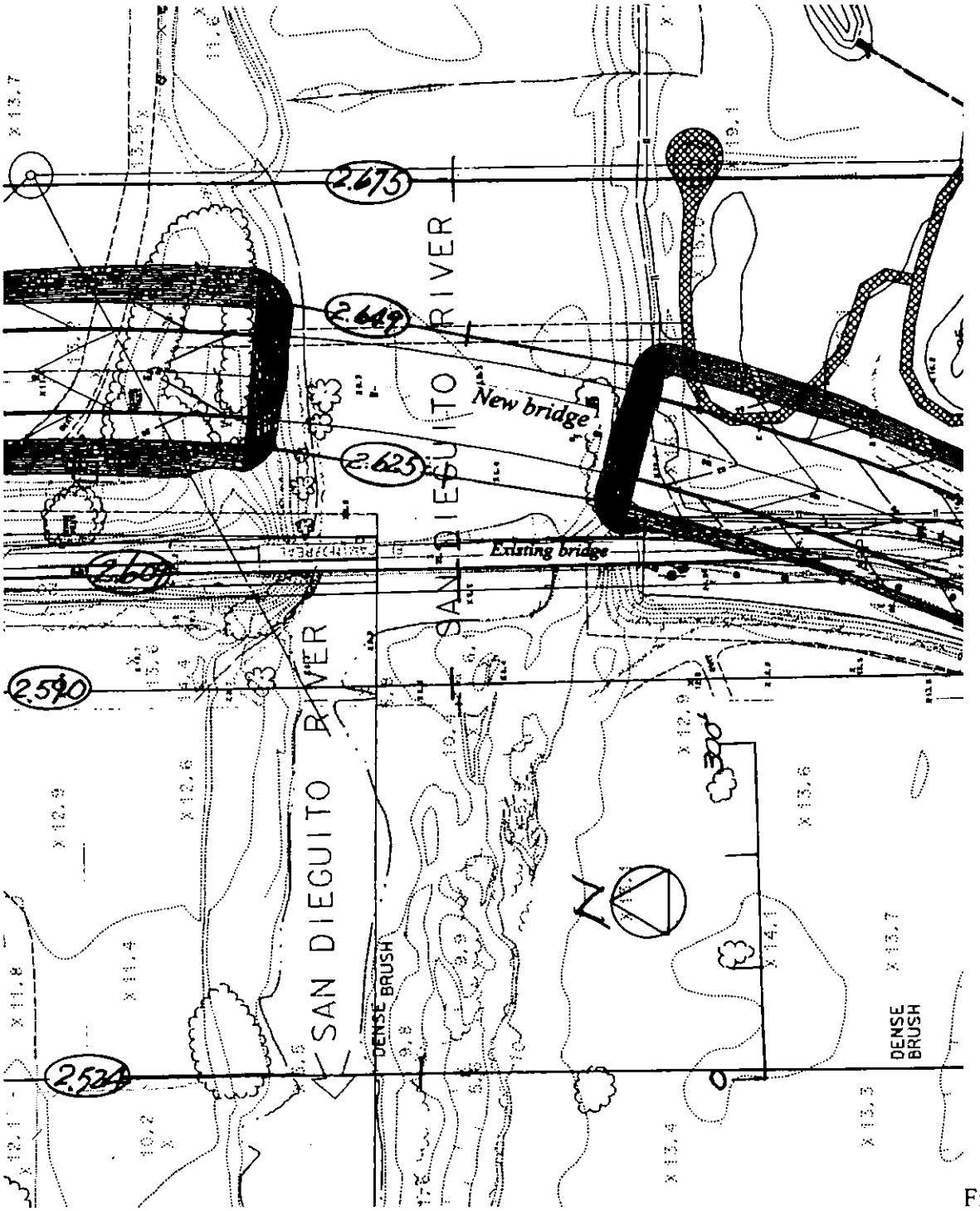


Fig. 2(continued). Map of the San Dieguito River with locations of cross sections used for hydraulic study

III. BRIDGE HYDRAULICS

The existing El Camino Real Bridge has been found inadequate to pass the 100-yr flood, as the flow also overtops the road embankment of El Camino Real. A new bridge has been proposed to replace the existing bridge. The purpose of this study was to determine the hydraulic geometry of the bridge. In addition, this study provides hydraulic calculations for flood levels and flow velocities under the 50-yr, 100-yr, and overtopping floods as required in the hydrologic data summary.

Water-surface profiles and flow velocities for the bridge were computed using the HEC-RAS program (U. S. Army Corps of Engineers, 2001) for existing conditions and proposed conditions. It was the purpose to keep the computed 100-yr water-surface elevations for proposed conditions closely similar to those for existing conditions. It was also the purpose to avoid any adverse flooding effects on neighboring properties. At the same time, it is necessary to pass the design flood through the bridge opening without overtopping.

For the hydraulic design of the bridge, hydraulic computations were performed using HEC-RAS to provide:

(1) Water-surface elevations,

(2) Flow velocities, and

(3) Overtopping flow.

The selected design must meet the requirements, regulations, and policies set by FEMA, and the Executive Order 11988 (Federal Policy on Floodplain Management), including:

(1) Conveyance of the base flood, Q_{100}.

(2) Backwater caused by the bridge encroachment with that caused by all other obstructions is limited to one foot above the surface of the base flood. However, this condition does not apply if the backwater does not affect neighboring properties.

The design flood for the bridge was determined in accordance with Caltrans Local Assistance Manual, Chapter 11 "Design Standards@ and the Highway Design Manual, Section 821.3 ASelection of Design Flood@. The 50-yr and 100-yr floods were included in hydraulic computations for the existing channel conditions as well as the proposed conditions.

IV. HYDRAULIC DESIGN AND ANALYSIS

Locations of cross sections selected for the hydraulic analysis are shown in Fig. 2. The cross sections are numbered in river miles measured from the river mouth. Cross-sectional profiles for the existing and proposed conditions are included in Appendix A. Cross-sectional data for the channel were digitized from recent survey information provided by Rick Engineering Company. Sections of interest and their respective locations are listed in Table 2.

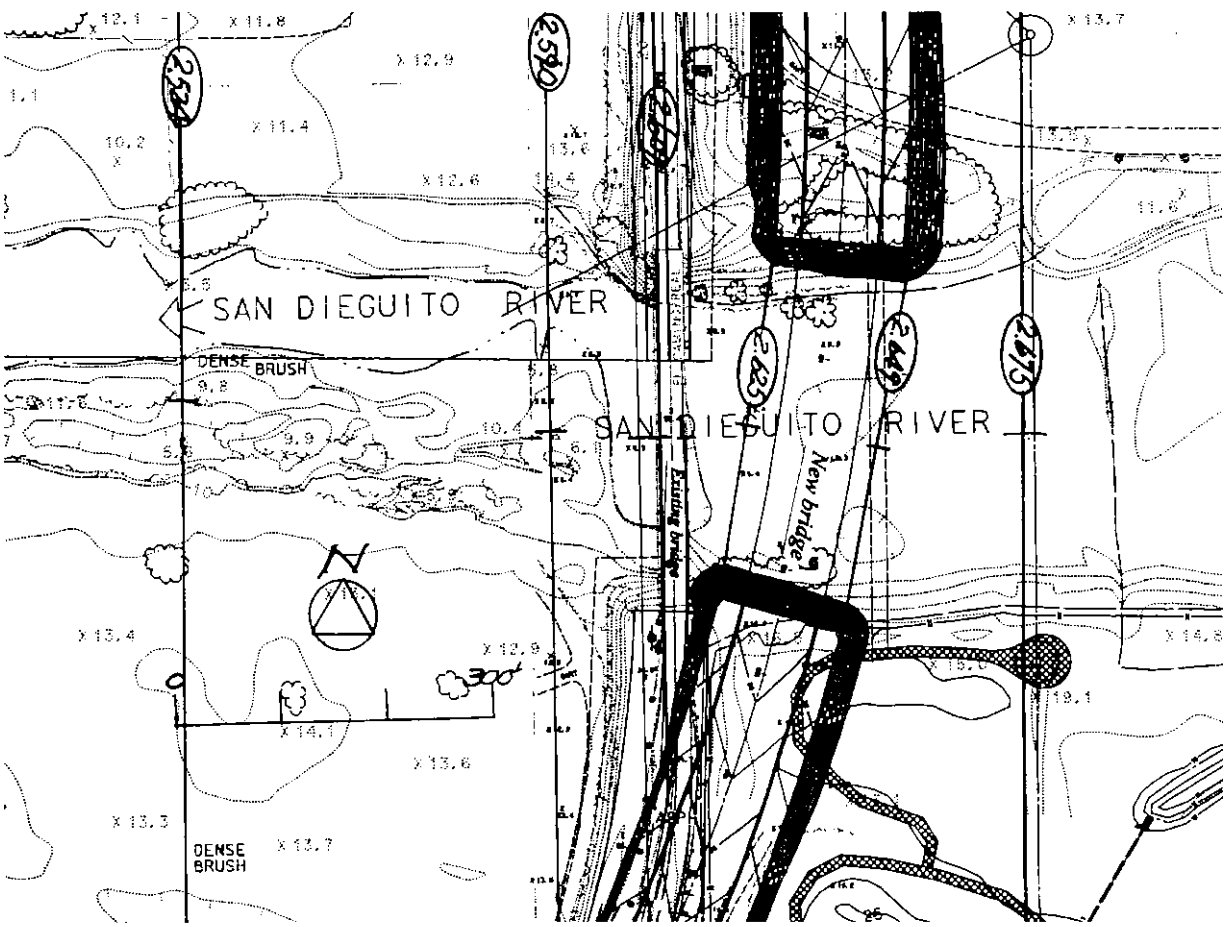


Fig. 3. Map of San Dieguito River showing the alignments of existing and proposed bridges

Hydraulic Geometries of Bridge - A cross-sectional view of the existing bridge is shown in Appendix A for Section 2.6115. The bridge has eight piers and nine panels with a total span of 340 feet. The bridge roadway width is 26 feet. The adjacent road embankment of El Camino Real is subject to overtopping during the 100-yr flood. One of the objectives of the proposed bridge project is to eliminate roadway flooding.

Table 2. Selected cross sections and their locations

Section Number	Locations
1.979	Downstream limit of hydraulic study
2.609	Downstream edge of exiting bridges
2.614	Upstream edge of existing bridge
2.623	Upstream edge of proposed bridge
2.625	Downstream edge of proposed bridge embankment
2.649	Upstream edge of proposed bridge embankment
2.844	Upstream limit of hydraulic study

Under the proposed improvement plan, the roadway of El Camino Real will be raised to eliminate overtopping flow during the 100-yr flood. For full widened roadway cross section alternatives, the bridge will be widened to approximately 94 feet. The bridge alignment would be in the same location as the existing bridge for most alternatives. The new alignment for the Eastern Alignment Alternative would be as shown in Fig. 3. The geometric features for the new bridge for all alternatives with a full widened roadway cross section are described below.

Hydraulic Geometry of Proposed Bridge - Under the proposed plan, the existing bridge will be removed and a new bridge will be constructed. The alignment of the new bridge as shown in Fig. 3 for the Eastern Alignment is at a short distance east of the existing bridge. The channel geometry for the bridge is defined at two channel sections. Among them, Section 2.625 is along the downstream edge of the road embankment and Section 2.649 is along the upstream edge of the road embankment. The geometric features of the proposed new bridge are as follow:

Bridge low chord (soffit) elevation:	25 feet or higher
Bridge total width:	Approximately 94 feet
Piers/bents:	Columns with 5-foot diamter
Channel bed elevation at bridge crossing:	6 feet same as existing
Channel bed width at downstream edge of proposed bridge embankment:	280 feet
Channel bed width at upstream edge of proposed bridge embankment:	300 feet
Abutment slope:	Sloping lower abutments from channel bed to the elevation of 20 feet with 1.5 horizontal units to 1 vertical unit; vertical upper abutments from elevation 20 feet to bridge low chord.
Trail:	A 12-foot wide trail will be installed on the north bridge abutment with its floor elevation at 13 feet.

Hydraulic Analysis - The HEC-RAS computer program was used to compute water-surface profiles and velocities in the stream channel for the existing conditions as well as the proposed conditions. The HEC-RAS study reach starts from downstream at Section 1.979 and ends upstream at Sec. 2.844.

Under existing conditions, the 100-yr flood overtops the roadway of El Camino Real as weir flow. For the 100-yr flood of 42,800 cfs, the discharge passing through the bridge opening was computed to 40,100 cfs and the remaining 2,700 cfs overtops the roadway as weir flow.

Because of the small bridge opening in the broad floodplain, it was necessary to specify ineffective flow areas in the downstream and upstream vicinities of the El Camino Real road embankment. Boundaries of effective flow are shown in the cross-sectional drawings in Appendices A and B for the affected cross sections.

Results of the HEC-RAS computation are described below. Detailed output listings of HEC-RAS runs are given in Appendices C and D for the existing and proposed conditions, respectively.

Water-Surface Profiles for Stream Channel - Water-surface profiles for existing and proposed alternatives were computed based on the 10-yr, 50-yr, and 100-yr floods. Fig. 4 shows the water-surface and channel-bed profiles for the existing conditions. The HEC-RAS report containing the detailed input and output parameters for the existing conditions are given in Appendix C. Fig. 5 shows the water-surface and channel-bed profiles for the proposed conditions. The HEC-RAS report containing the detailed input and output parameters for the proposed conditions are given in Appendix D. Computed 100-yr water-surface elevations for the two conditions are also listed in Table 3 for comparison. It can be seen from the table that the proposed bridge project will result in no backwater effects in flood level.

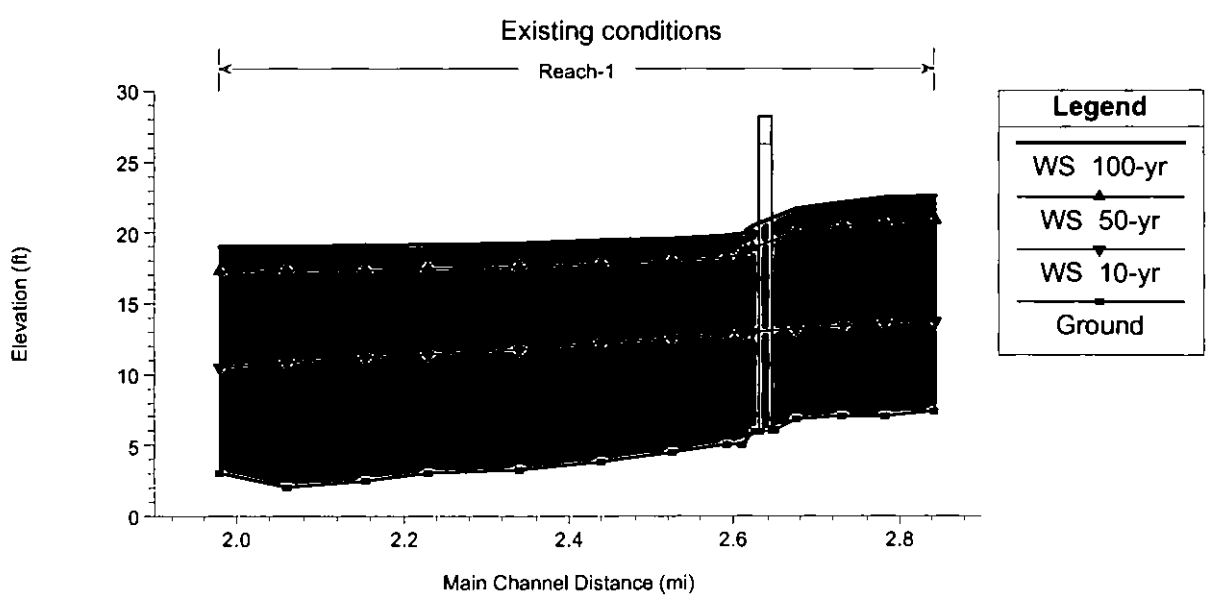


Fig. 4. Water-surface and channel-bed profiles for existing conditions

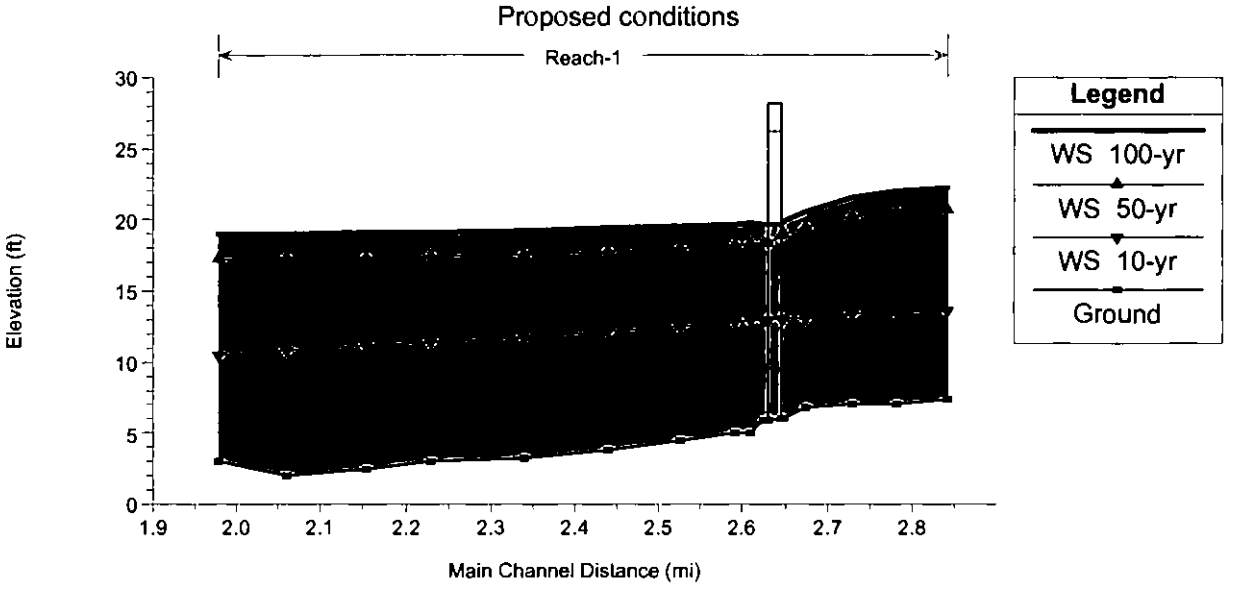


Fig. 5. Water-surface and channel-bed profiles for proposed bridge

Table 3. Computed water-surface elevations for the 100-yr flood

SECTION NUMBER RIVER MILES	COMPUTED WATER-SURFACE ELEVATION, FEET	
	Existing conditions	Proposed conditions
1.979	19.0	19.0
2.060	19.1	19.1
2.155	19.1	19.1
2.231	19.2	19.2
2.341	19.3	19.3
2.439	19.5	19.5
2.524	19.6	19.6
2.590	19.8	19.7
2.609	19.9	19.8
2.614	20.2	
2.623	20.6	
2.625		19.7
2.649		20.0
2.675	21.9	20.6

2.732	22.3	21.6
2.782	22.5	22.1
2.844	22.6	22.3

Flow Velocities at Bridge Crossing - Cross-sectionally averaged velocities at the proposed bridge opening were computed to be 8.7 feet per second for the 50-yr flood and 10.2 feet per second for the 100-yr flood.

Hydrologic Data Summary - The hydrologic data include characteristics of the design flood, the base flood, the record flow and the overtopping flood. The design flood is the peak discharge selected for the design of the bridge located within a base floodplain. By definition, through lanes will not be overtopped by the design flood. The base flood is the 100-yr flood for which the exceedance probability is one percent in any given year. The record flood is the greatest recorded flood in the drainage basin; its value is not available. The hydrologic data summary is given in Tables 4 and 5. The overtopping flood is determined based on the minimum roadway elevation for the approach road embankments. Under a discharge exceeding the design discharge, the roadway will be overtopped.

Table 4. Hydrologic Data Summary for Proposed El Camino Real Bridge in English Units

Hydrologic Summary	Flood of Record	Standard flood		Over-topping flood	Design Flood
Frequency (Yrs.)	N/A	50	100	130	50
Discharge (CFS)	N/A	32,500	42,800	45,000	32,500
Water-Surface Elev. (Ft)	N/A	19.1	20.0	20.5	19.1
Velocity (FPS)	N/A	8.6	10.2	10.8	8.7

Table 5. Hydrologic Data Summary for Proposed El Camino Real Bridge in S-I units

Hydrologic Summary	Flood of Record	Standard flood		Over-topping flood	Design Flood
Frequency (Yrs.)	N/A	50	100	130	50
Discharge (CMS)	N/A	920	1,212	1,274	920
Water-Surface Elev. (M)	N/A	5.82	6.10	6.25	5.82
Velocity (MPS)	N/A	2.62	3.08	3.29	2.62

V. HYDROLOGIC EFFECTS OF THE PROPOSED BRIDGE

In proposing the new El Camino Real Bridge on the San Dieguito River to replace the existing bridge, four alternatives were considered for the bridge project; these were:

(1) Maintaining the existing bridge span and channel width,

(2) Increasing the bridge span coupled with channel widening along the south bank,

(3) Increasing the bridge span coupled with channel widening along the north bank, and

(4) Increasing the bridge span coupled with channel widening along the south and north banks.

At a meeting held on July 14, 2004 attended by permitting agencies for the project, concern was expressed regarding potential impacts of the proposed bridge/roadway project on the downstream San Dieguito Lagoon Wetlands Restoration Project being implemented by Southern California Edison and the San Dieguito River Park Joint Powers Authority (JPA). The following analysis discusses how the City of San Diego's El Camino Real Road/Bridge Project could affect the Edison/JPA project and the downstream river system in general, in terms of river high and low flows, groundwater recharge, and sediment transport.

The roadway of El Camino Real is subject to overtopping under existing conditions. For the new bridge project, the roadway will be raised, the overtopping flow will be eliminated, and the entire 100-yr flood discharge will pass through the bridge opening. Such a change would raise the upstream flood level unless improvements are made to the bridge.

Hydrology of the River Channel – Discharges of major floods, including the 10-, 50-, and 100-yr events have already been determined in a previous hydrology study. The flood discharge is related to the drainage basin size and physical characteristics. Lake Hodges, which controls 83 % of the drainage basin area, has important effects on the flood discharge in the lower San Dieguito River. The floodwater storage effects of Lake Hodges result in flood discharge reduction downstream. For small floods such as the 2-, and 5-yr events, Lake Hodges does not spill and therefore the watershed downstream of Lake Hodges supplies floodwater.

The roadway embankment of El Camino Real across the floodplain is like a small dam.

The proposed embankment would be higher and eliminate the small overtopping flow that now occurs in high flows. The proposed project would cause backwater and floodwater storage in the upstream floodplain during major events. However, the changes in floodwater storage due to changes in backwater are very small; they have insignificant effects on the floods discharges of the river channel. For small floods that are contained in the main channel, the roadway embankment has no backwater effects.

Impacts of Bridge Project – The channel bed area is considered to be a wetland area. Widening of the channel will increase the wetland area.

Hydrologic impacts from the bridge project may include floodwater surface, flow velocity, channel bed scour, sediment transport, etc. The bridge project may also impact the downstream JPA/Edison wetland restoration project. The impacts from the bridge project must be analyzed; adverse impacts also require mitigation. The 100-yr flood and some small floods may be used for impact analysis.

The basic difference among the four alternatives is in the channel width and bridge span. Channel width has the following basic effects on river hydraulics:

(1) The channel width at the bridge opening affects the flood level in the upstream channel but not in the downstream channel. A wider channel lowers the flood water-surface in the upstream channel. It also reduces the area of flooding in the upstream floodplain during major flood events.
(2) The channel width at the bridge opening affects the flow velocity through the bridge opening. A wider channel lowers the velocity through the bridge opening.
(3) Channel widening increases channel bed surface area for groundwater recharge in the main channel.
(4) Channel widening increases the wetland area.

These effects are analyzed and described below.

Impacts on Flood Level – The 100-yr flood is used as the criterion for flood level

evaluation. The proposed bridge has potential impacts on the flood level in different ways. As a basic principal, any proposed project may not raise the floodwater surface on its neighboring properties without the consent of the property owners. This project has no downstream impact on the flood level because the flood level is under downstream control. *Downstream control* is a terminology in hydraulic engineering. It means that the water-surface elevation at a river location is related to the physical conditions downstream from the location and it is independent of the conditions on the upstream side. The project may have flood level impacts on upstream properties. During the 100-yr flood, the area of inundation affects multiple properties; it is the best practice to avoid any flood level increase by the project. For this reason, it is necessary to design a bridge that will not raise the upstream flood level over the existing conditions.

Under existing conditions, the road embankment of El Camino Real is subject to overtopping. For the proposed bridge project, the roadway will be raised and overtopping flow will be eliminated and the entire 100-yr flood discharge will pass through the bridge opening. Such a change would raise the upstream flood level unless improvements are made to the existing bridge. The backwater effects are related to the bridge span. In general, a longer bridge span and thus a larger bridge opening will cause less backwater, and vice versa. Among the four alternatives for the new bridge, the first alternative (no change in bridge span) has the more backwater effect and the other alternatives (longer bridge span and channel widening) have less backwater effect.

Impacts on Channel Bed Scour - The river flow through a small bridge opening may cause channel bed scour. For the sake of scour protection, a stone blanket has been installed on the riverbed under the bridge. It is assumed that the stone blanket will be kept for all the alternatives under consideration. With stone blanket, channel bed scour at the bridge crossing is not affected by the bridge span and channel width. Geotechnical engineers will develop protective measures for potential liquefaction.

Groundwater – The lower San Dieguito River has an alluvium layer under the riverbed. Groundwater storage in the alluvium is used for irrigation, and it also prevents salt-water intrusion from the ocean. The river flow contributes to groundwater recharge that occurs when the ground surface is under water. During major floods, the floodwater spreads out to a broad

flood plain; groundwater recharge occurs over a large land area. During smaller events, the flow stays in the main channel and groundwater recharge occurs only in the main channel. Durations of major flood are much shorter than low flows.

The San Dieguito River is an ephemeral river; groundwater recharge occurs only when there is water in the river channel. The effects of the four alternatives for the bridge project on groundwater are analyzed as described below.

(1) Those alternatives with channel widening will increase the surface area for groundwater recharge during low flows in the widened channel reach. However, channel widening also reduces wetted surface area in the adjacent upstream channel bed.
(2) Channel widening lowers the flood level in the upstream channel and it also reduces the flooding area as well as duration of flooding in the floodplain during major floods. Such changes reduce ground water recharge during major events.
(3) The effects associated with channel width variation are small. The net effects on groundwater will not likely be significant.

Impacts on Sediment Transport – There is a sand flow in the river channel during floods. If the sand flow is affected by the proposed project, then the impacts also need to be studied. Any change to the existing pattern of sand flow may affect the river hydraulics, channel bed scour, and even beach sand supply in the long run.

The JPA/Edison wetland restoration project is located along the San Dieguito River to the west of this bridge. The upstream limit of the project is about 0.5 mile downstream of the bridge. The wetland project was studied extensively to insure that the project causes no impacts to the river with regard to the flood level, sediment transport, flow velocity and scour potential.

The bridge project has no hydraulic effects on the downstream channel since the river flow is under downstream control. However, the project may have sediment impacts on the downstream channel as the project may change the sediment supply toward downstream. First of all, major sediment source for the lower San Dieguito River has been cut off by Lake Hodges and by sand mining at Rancho Santa Fe. The source of sediment is now limited to the lower

river reach of about 4.5 miles.

During high flow, the floodwater spreads out of the main channel to a broad floodplain. The bridge crossing is a small opening in a broad floodplain; it constricts the flow to cause a high flow velocity through the bridge opening. The channel bed at the bridge opening is subject to scour during high flow. The scour development is limited to the layer of bed material above the stone blanket. Lower flows are contained in the main channel. The material removed by scour during high flow is usually refilled during low flow periods. Vegetation grows in the deposited sediment layer above the stone blanket.

The wetland restoration project was designed based on the existing conditions of the river channel. The El Camino Real Bridge project may affect the wetland restoration project, downstream infrastructure and even beach sand supply if the bridge design changes the existing pattern of sediment transport. The potential impacts associated with the four alternatives are described below:

If the existing channel width is maintained for the bridge project, then the project should have minimum downstream impacts. For the other alternatives, the channel width will be enlarged near the bridge crossing; the impacts of these alternatives are analyzed as described below.

With a wider channel, the backwater due to the small bridge opening is reduced to result in an increase of the approaching flow velocity that also brings in more sediment from upstream and to transport it toward downstream.

During low flow, the wider channel near the bridge crossing has a lower flow velocity and less sediment transport than its adjacent channel reaches; therefore, sediment deposition would occur along the wider channel reach. Such a development reduces sediment transport toward downstream.

The following points may be summarized:

(1) Channel widening would increase sediment inflow from upstream during high flow.

(2) Channel widening tends to decrease sediment transport toward downstream during low flow.

(3) Export of bed material from river channel due to channel widening represents a net loss of sediment storage in the system.

(4) In the short-term, beach sand supply is from sediment storage near the river mouth. Channel widening should have little or no effects on beach sand supply.

(5) There may be long-term effects of channel widening on beach sand supply and downstream infrastructure.

(6) The bridge project without substantial removal of the bed material should have no impacts on beach sand supply and downstream infrastructure.

Summary of Impacts – Potential effects of the bridge project on the JPA/Edison project are summarized below:

(1) The bridge project with four alternatives has insignificant effects on the downstream flood discharges.

(2) The bridge project will not raise the floodwater elevation at the JPA/Edison site because the flood level is under downstream control.

(3) The river widening would likely have an insignificant effect on groundwater recharge throughout the downstream river system, including the reach through the JPA/Edison project.

(4) Channel widening with substantial removal of channel bed material may have scour impacts on the downstream channel. River channel scour due to the bridge project should not endanger the tidal basins at the JPA/Edison site since the tidal basins are separated from the main channel by berms.

VI. SUPPLEMENTAL HYDRAULIC STUDY

The purpose of the supplemental study is to determine the hydraulic effects of the proposed bridge on the river channel if the existing El Camino Real Bridge is not removed but left in place. In order to accomplish this purpose, a new HEC-RAS data file for the river channel reach with the existing El Camino Real Bridge in place and with the proposed new bridge has been constructed. The results of HEC-RAS modeling are presented in this section. The HEC-RAS report for this case is included in Appendix E.

Results of the HEC-RAS computation for this case are described below. The HEC-RAS report containing the detailed input and output parameters for the case are given in Appendix E.

Water-Surface Profiles for Stream Channel - Water-surface profiles for the proposed bridge with the existing bridge not removed were computed based on the 10-yr, 50-yr, and 100-yr floods. Fig. 6 shows the water-surface and channel-bed profiles. Computed 100-yr water-surface elevations for the three conditions are also listed in Table 6 for comparison. It can be seen from the table that the water-surface elevations for this case are no higher than the corresponding water-surface elevations for the existing conditions. In conclusion, this case will result in no backwater effects in flood level.

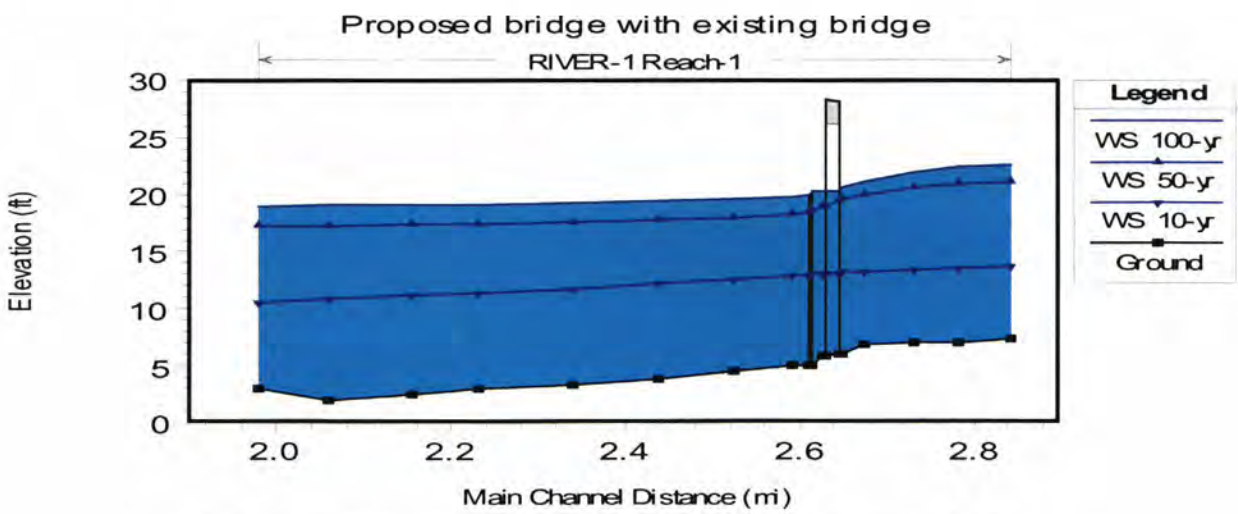


Fig. 6. Water-surface and channel-bed profiles for proposed bridge with existing bridge not removed

Table 6. Computed water-surface elevations for the 100-yr flood

SECTION NUMBER RIVER MILES	COMPUTED WATER-SURFACE ELEVATION, FEET		
	Existing conditions	Proposed conditions	Proposed bridge with existing bridge
1.979	19.0	19.0	19.0
2.060	19.1	19.1	19.1
2.155	19.1	19.1	19.1
2.231	19.2	19.2	19.2
2.341	19.3	19.3	19.3
2.439	19.5	19.5	19.5
2.524	19.6	19.6	19.6
2.590	19.8	19.7	19.8
2.609	19.9	19.8	19.9
2.614	20.2		20.2
2.623	20.6		
2.625		19.7	20.3
2.649		20.0	20.6
2.675	21.9	20.6	21.1
2.732	22.3	21.6	22.0
2.782	22.5	22.1	22.5
2.844	22.6	22.3	22.6

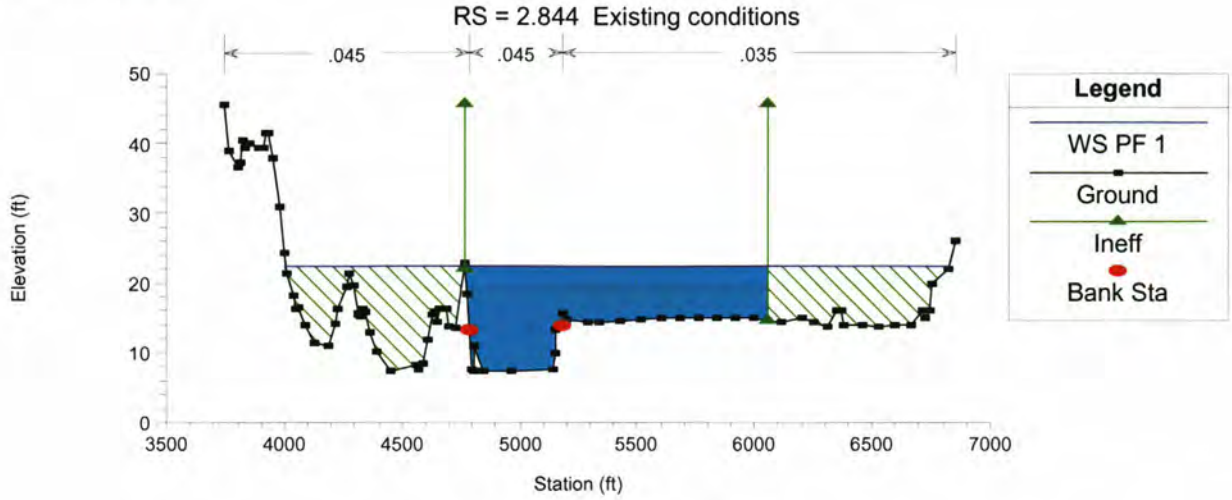
Flow Velocities at Bridge Crossing - Cross-sectionally averaged velocities at the proposed bridge opening were computed to be 8.2 feet per second for the 50-yr flood and 9.7 feet per second for the 100-yr flood.

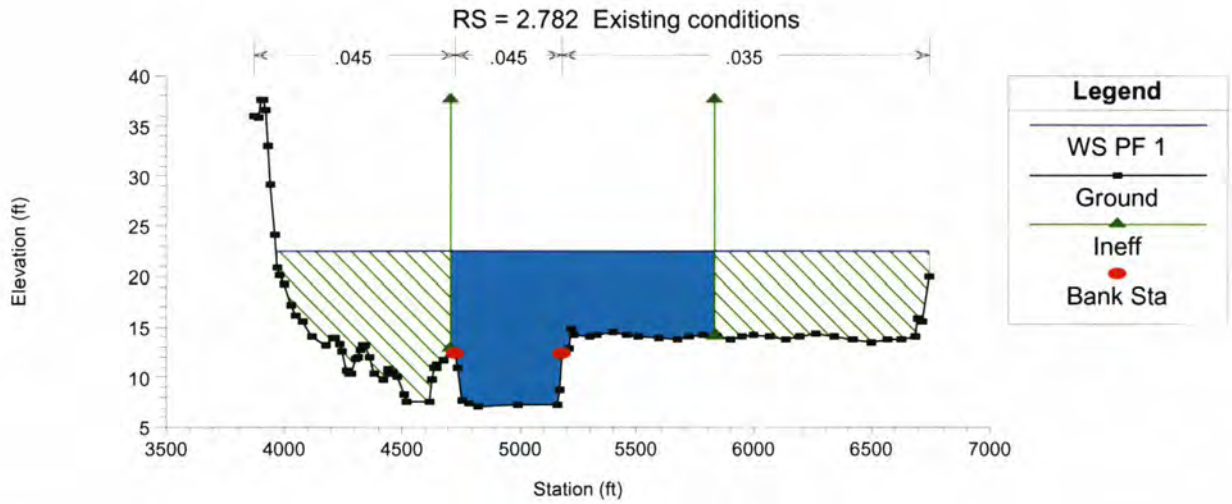
REFERENCES

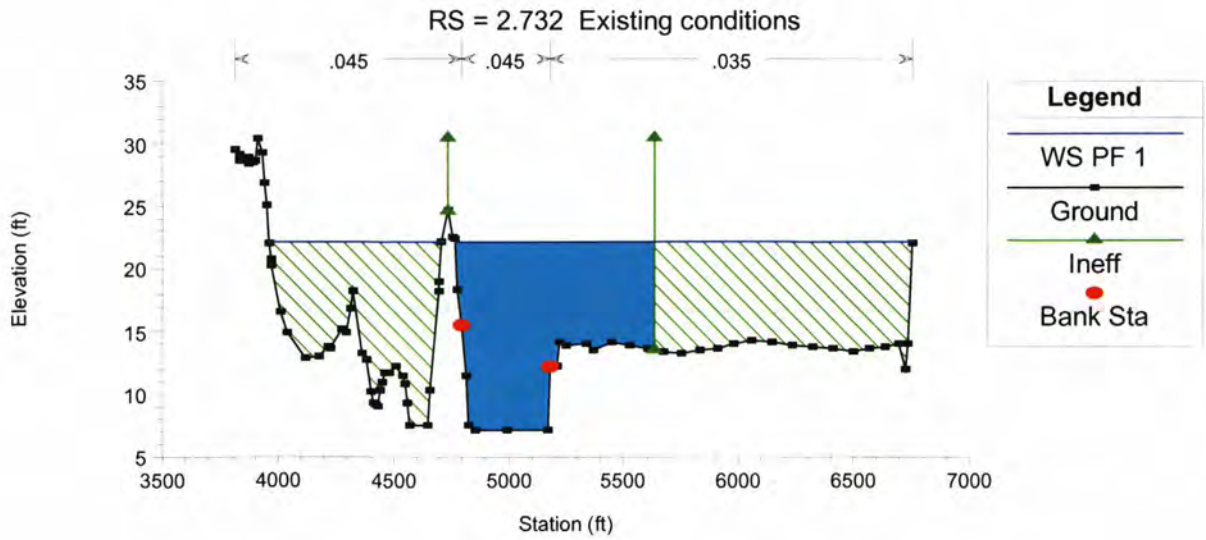
Federal Emergency Management Agency, 1997, AFlood Insurance Study, San Diego County, California@.

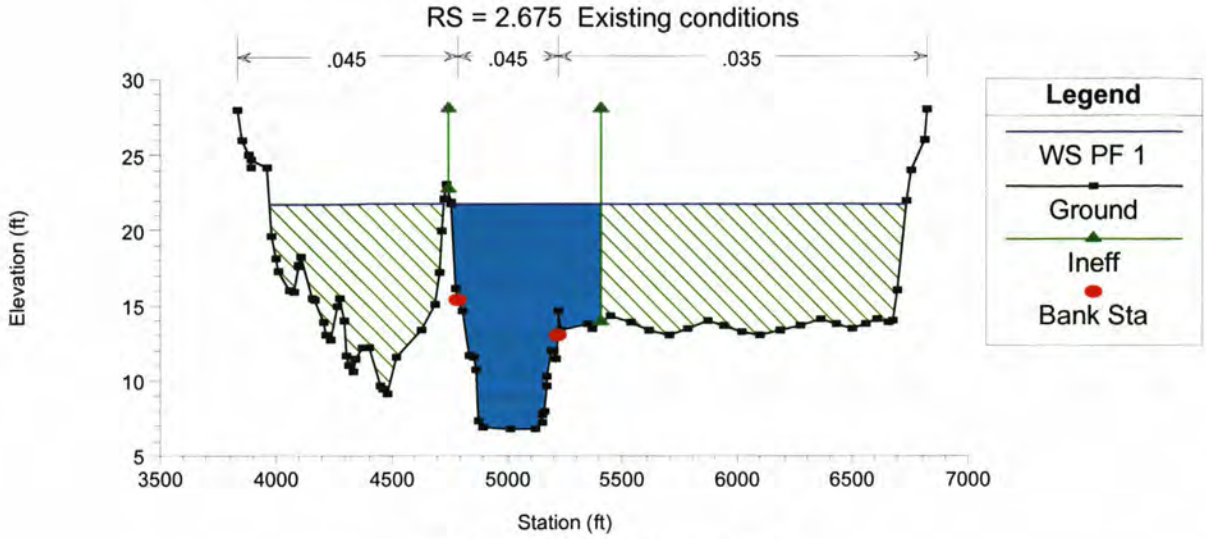
U. S. Army Corps of Engineers, 2001, AHEC-RAS, River Analysis System, Applications Guide@.

APPENDIX A – PLOTTED CROSS-SECTIONAL PROFILES FOR THE EXISTING CONDITIONS





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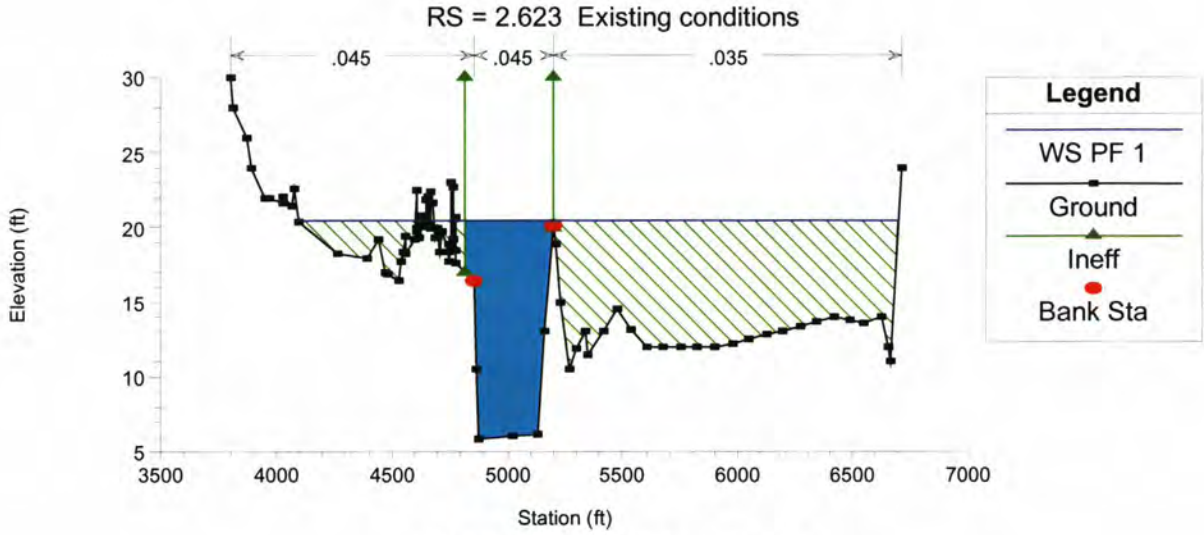
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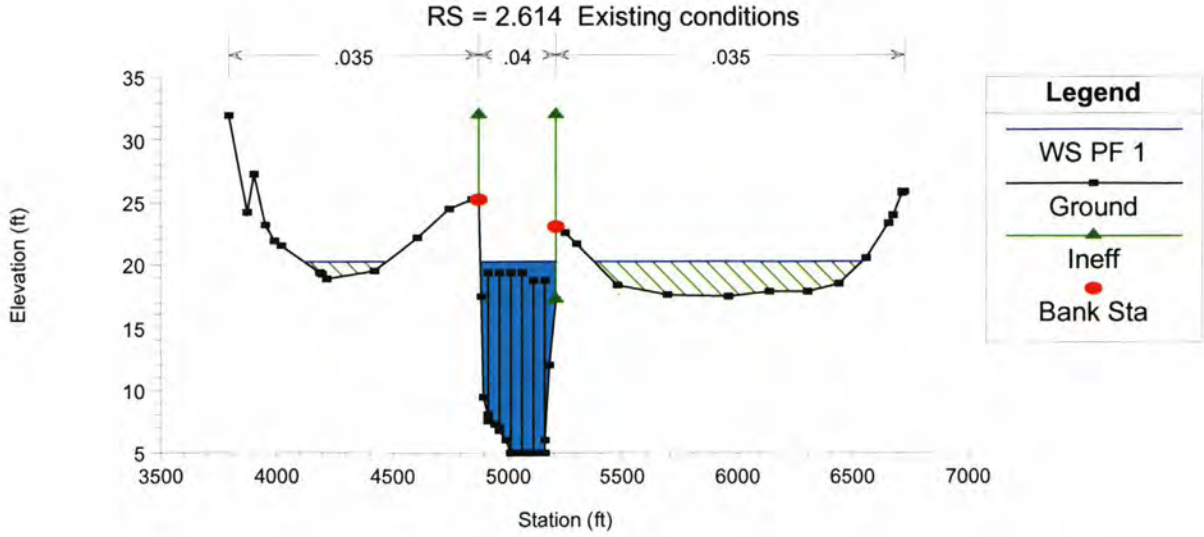
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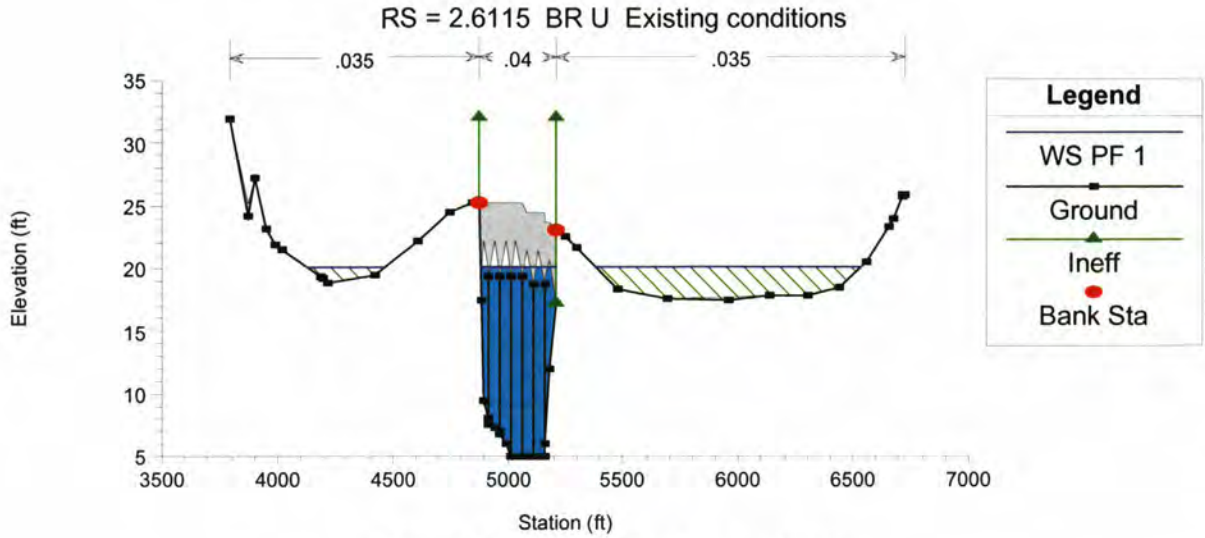
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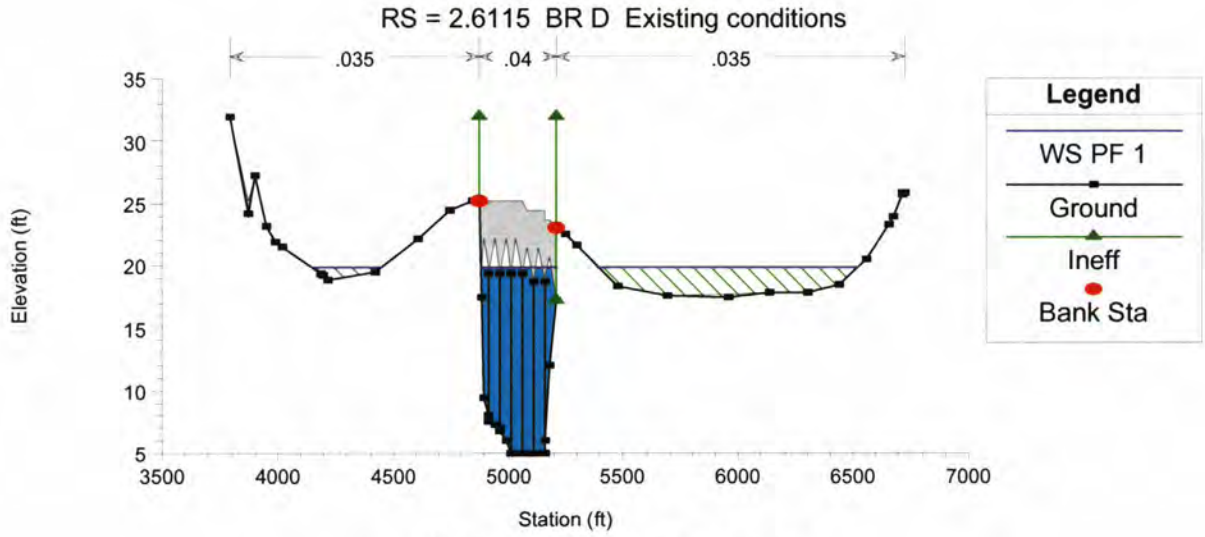
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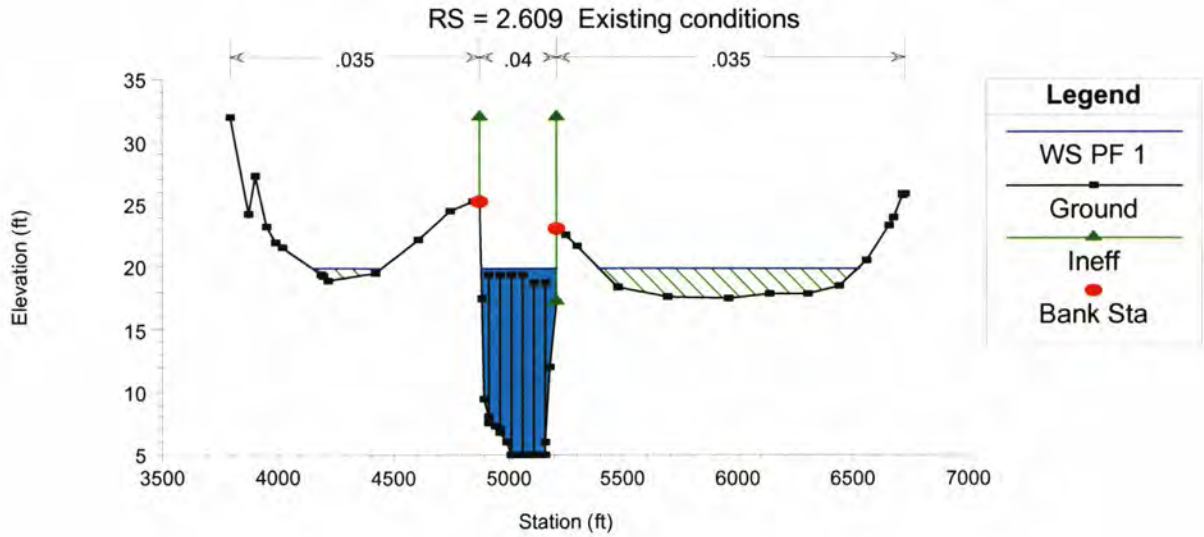
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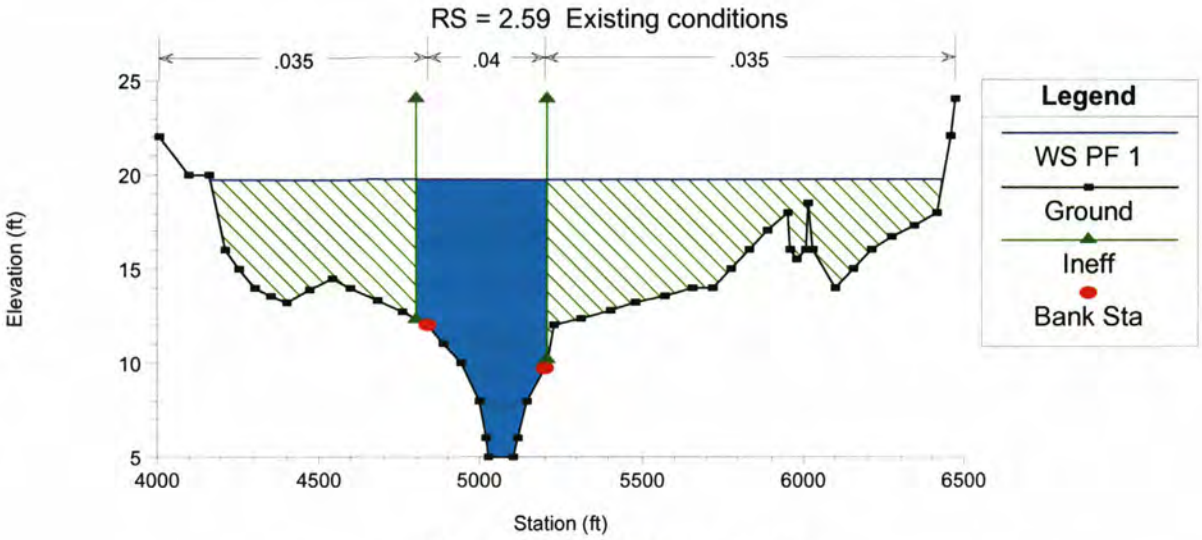
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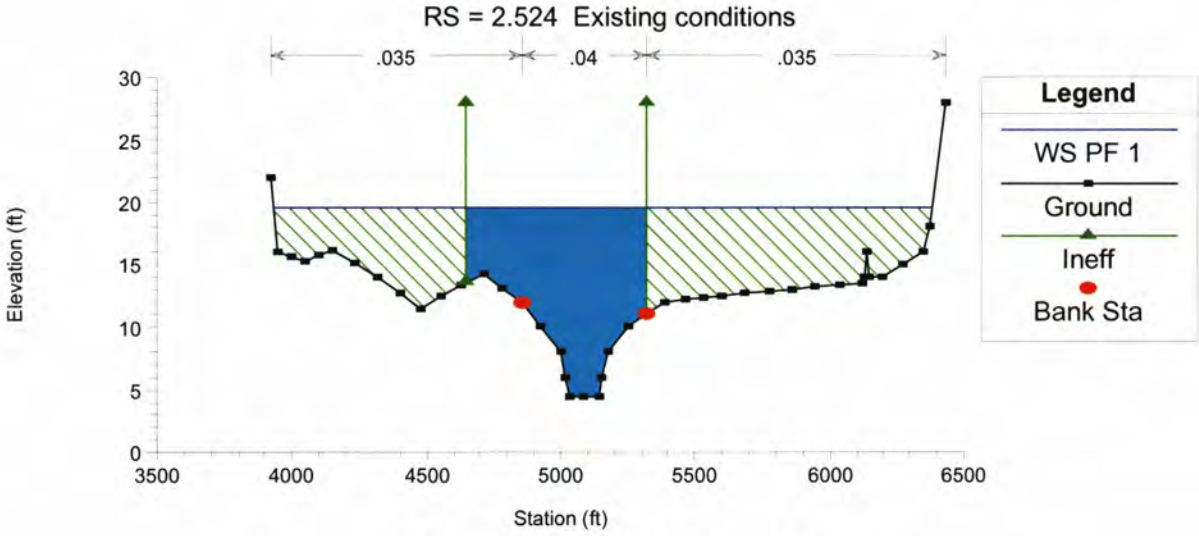
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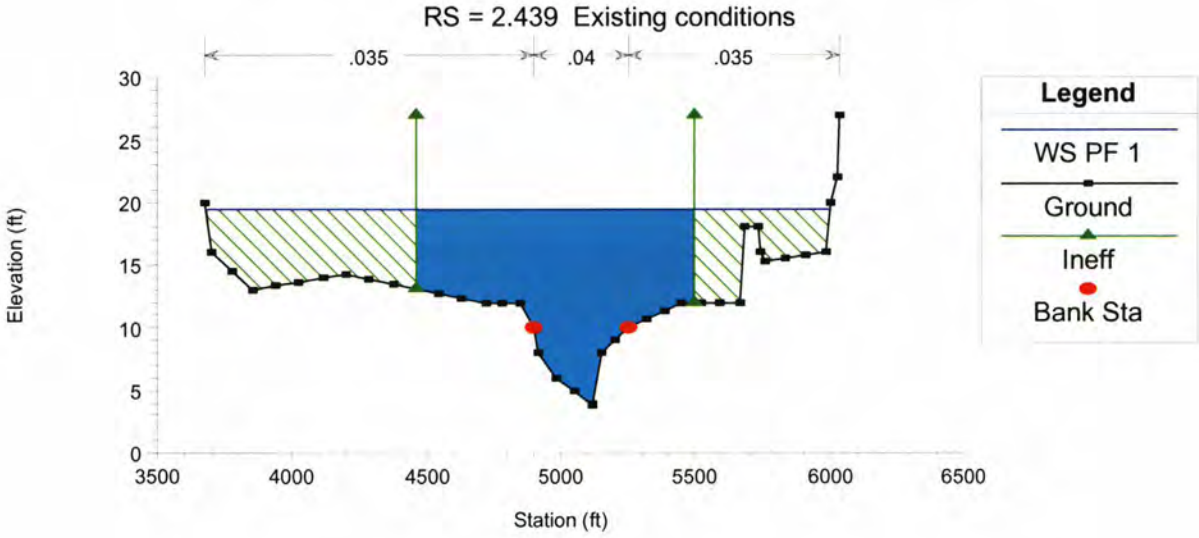
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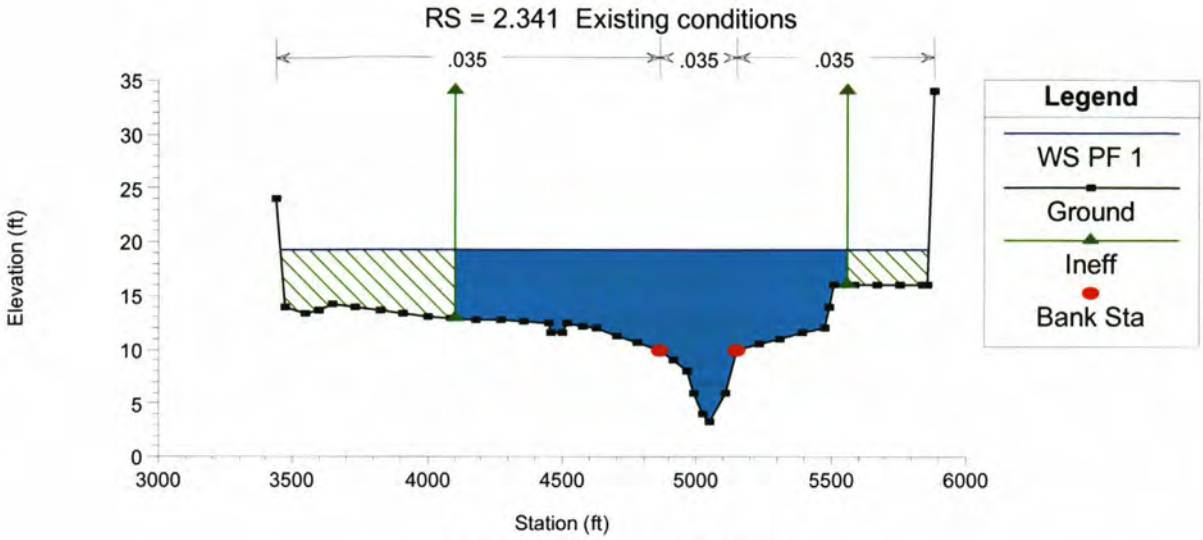
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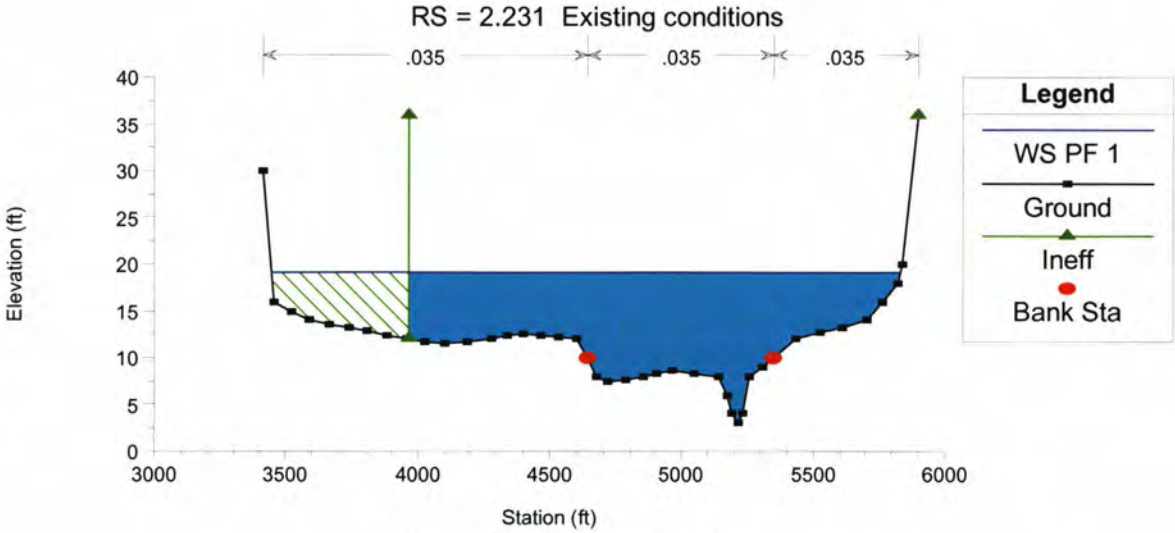
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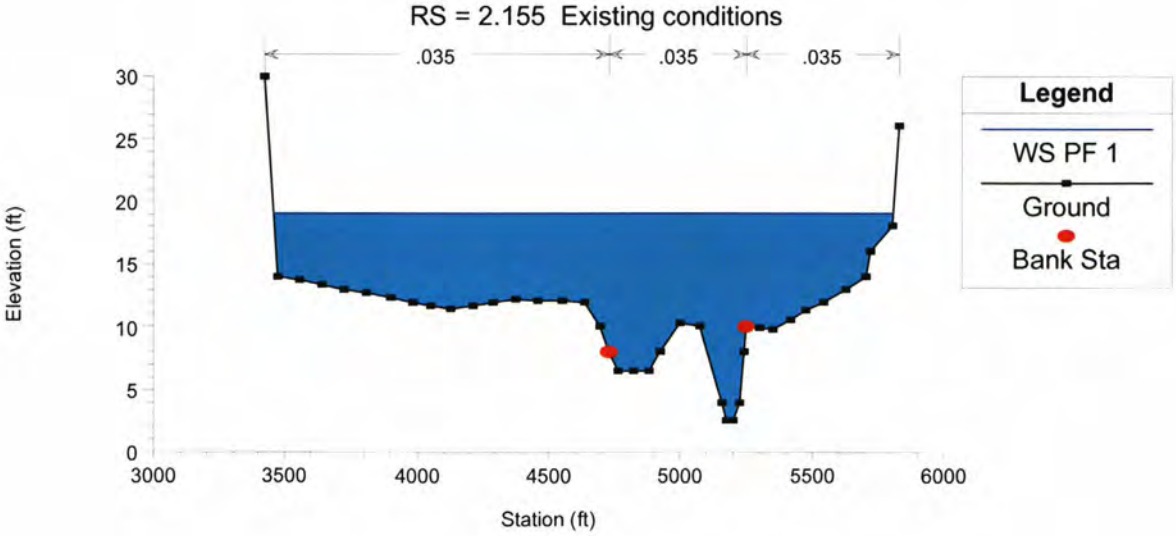
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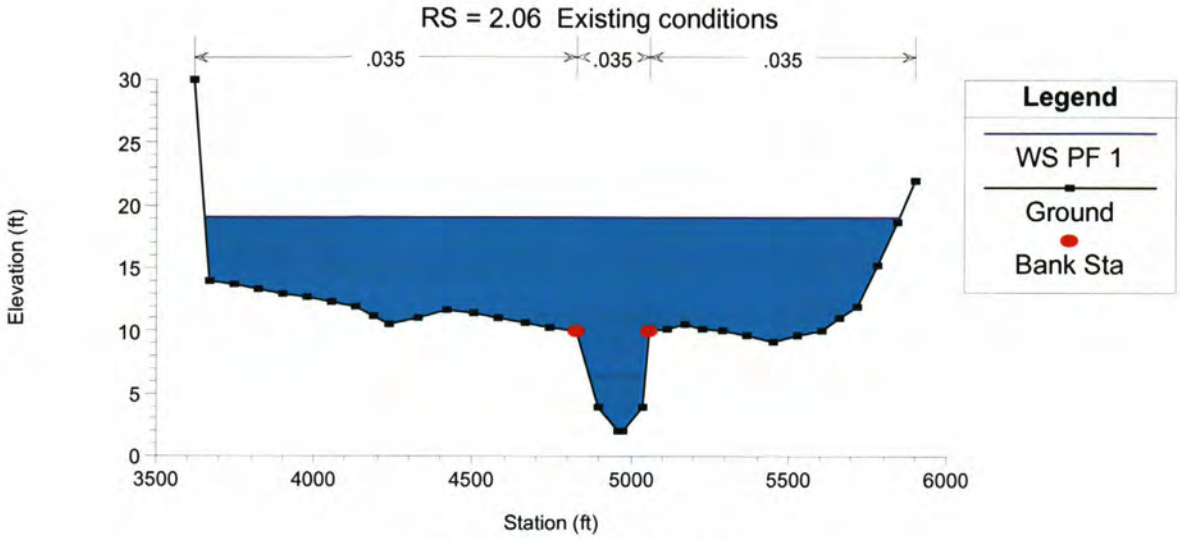
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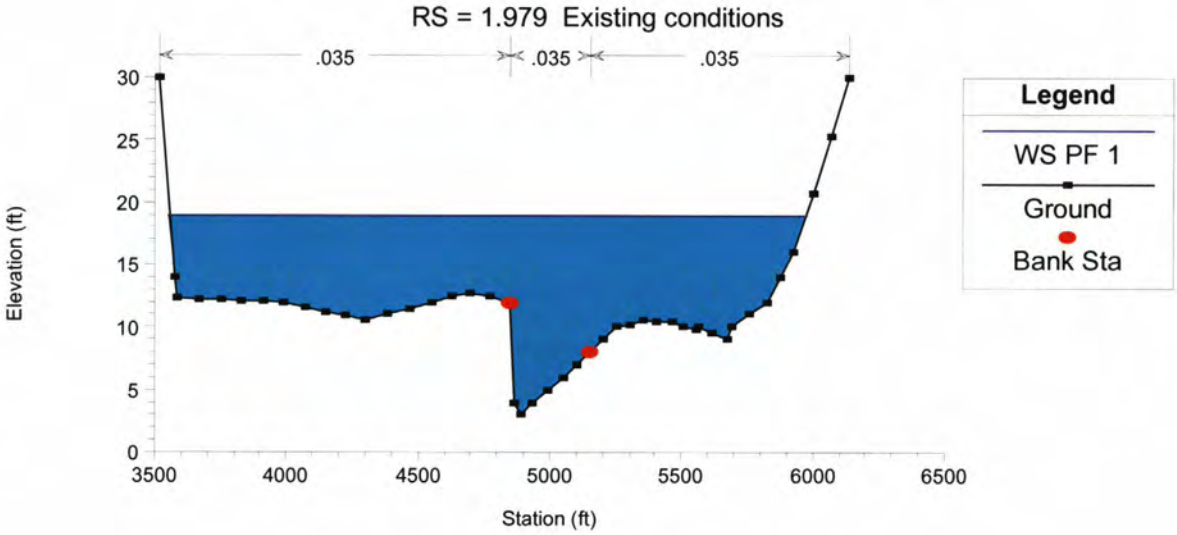
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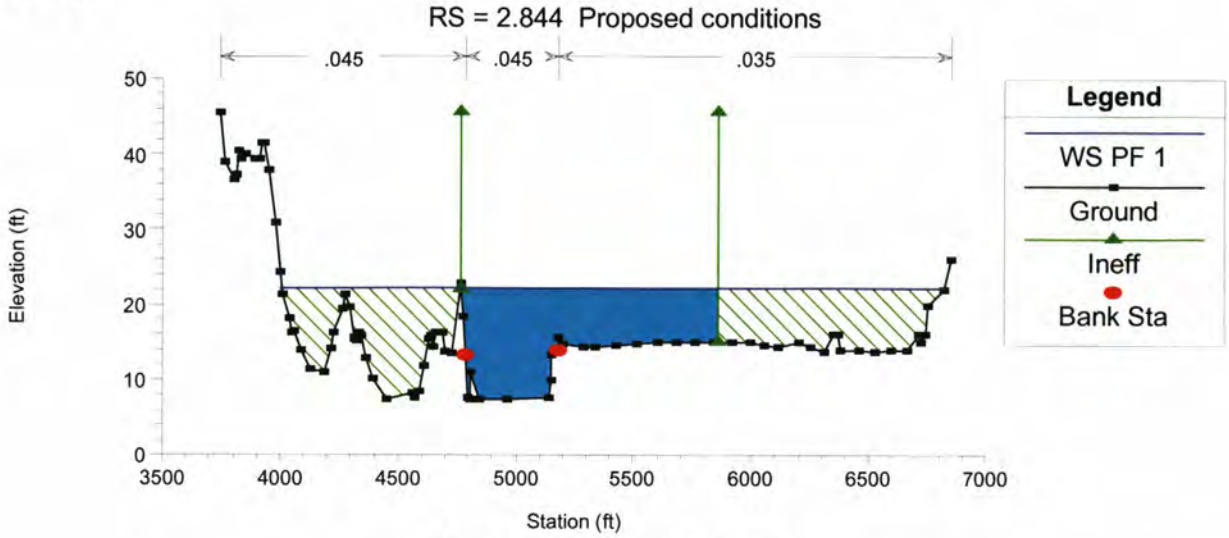
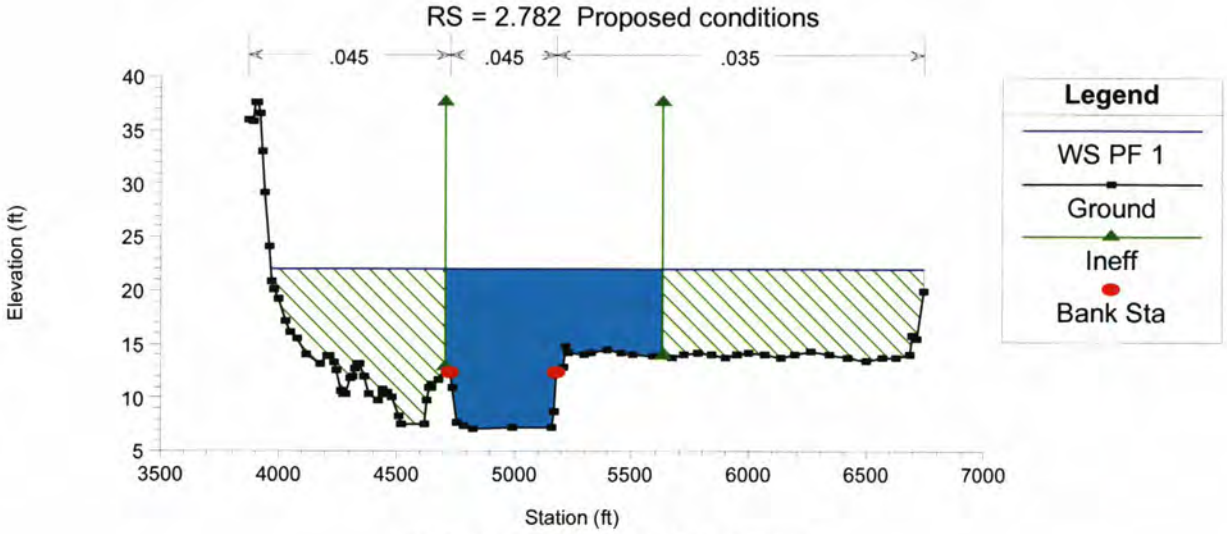
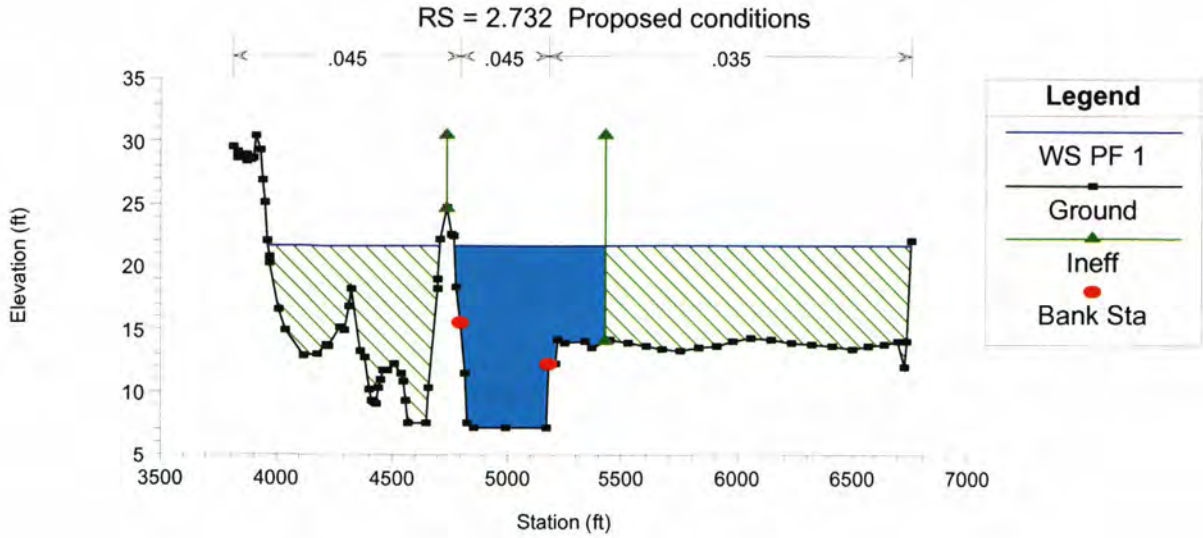
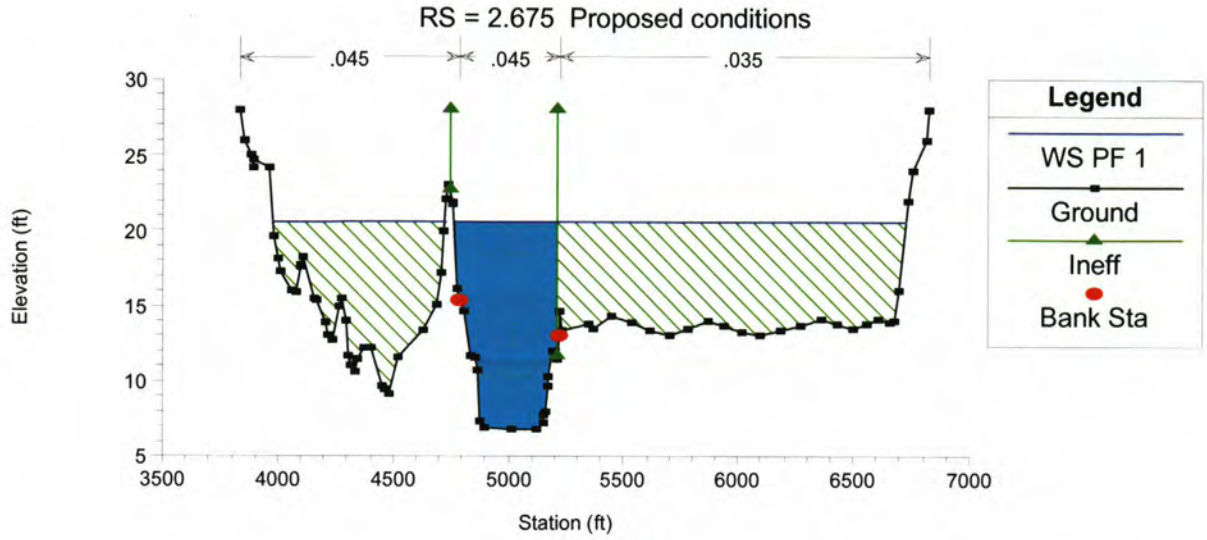
APPENDIX B – PLOTTED CROSS-SECTIONAL PROFILES FOR THE PROPOSED BRIDGE





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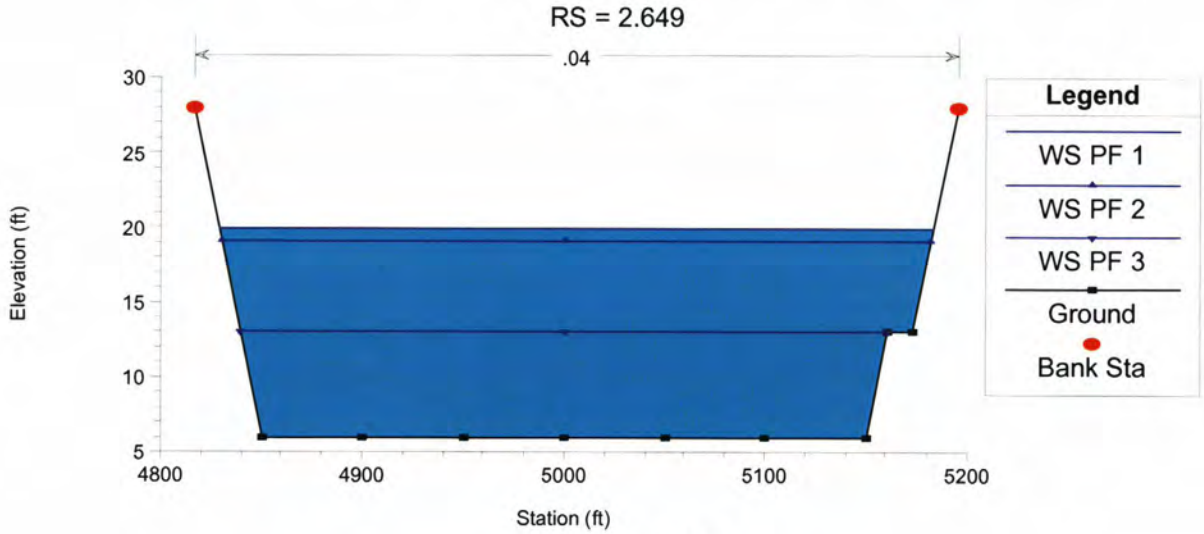
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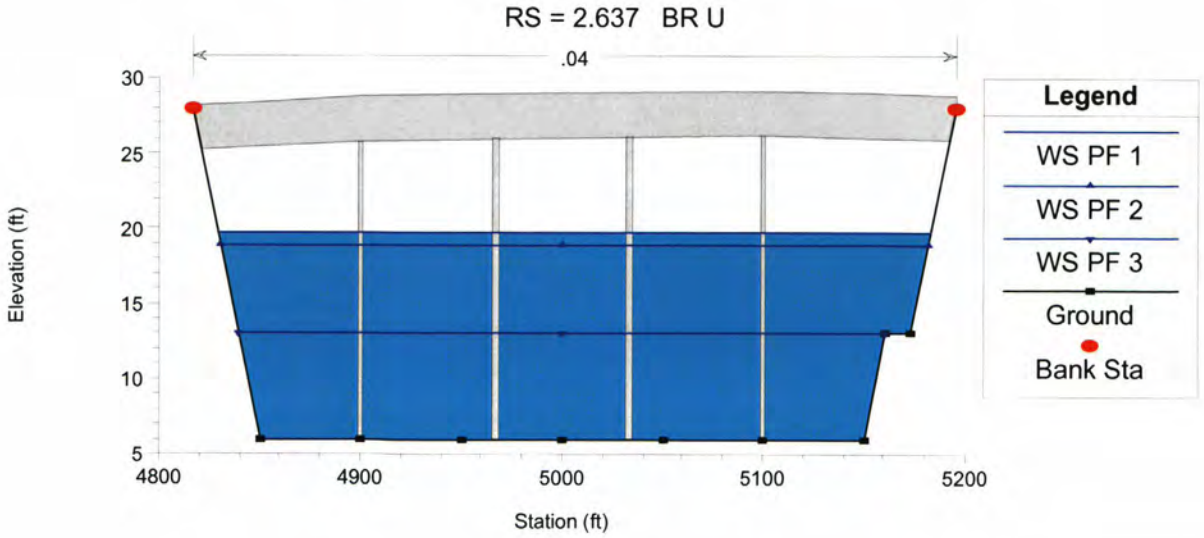
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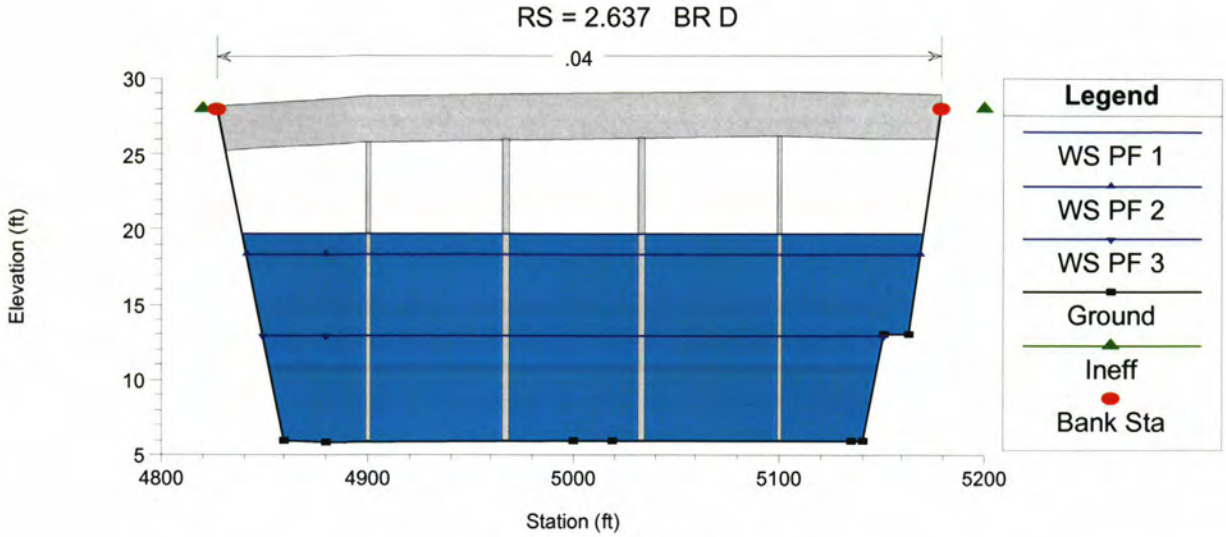
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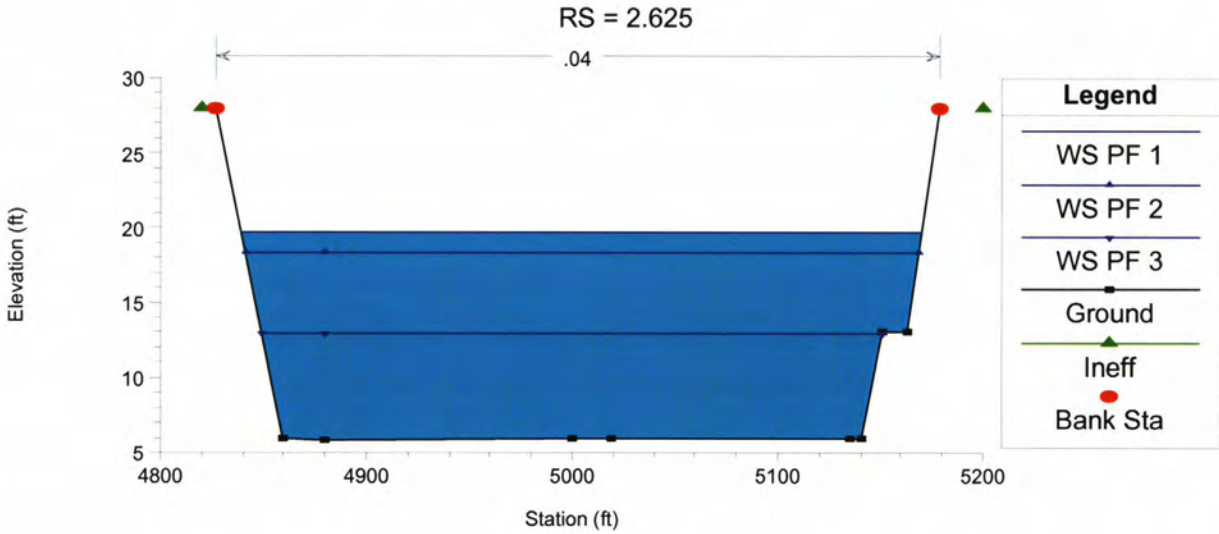
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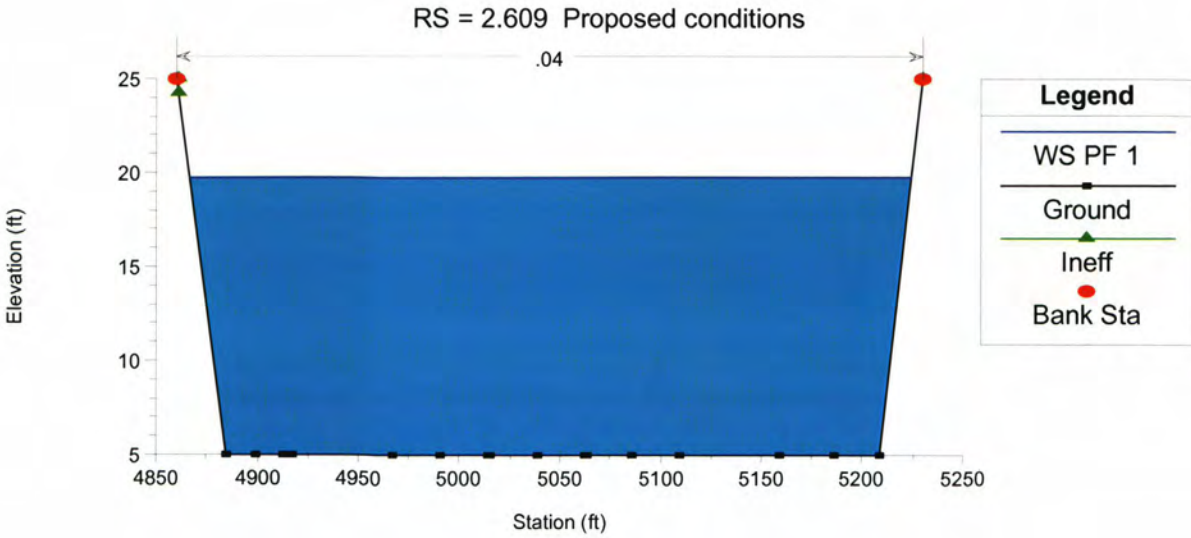
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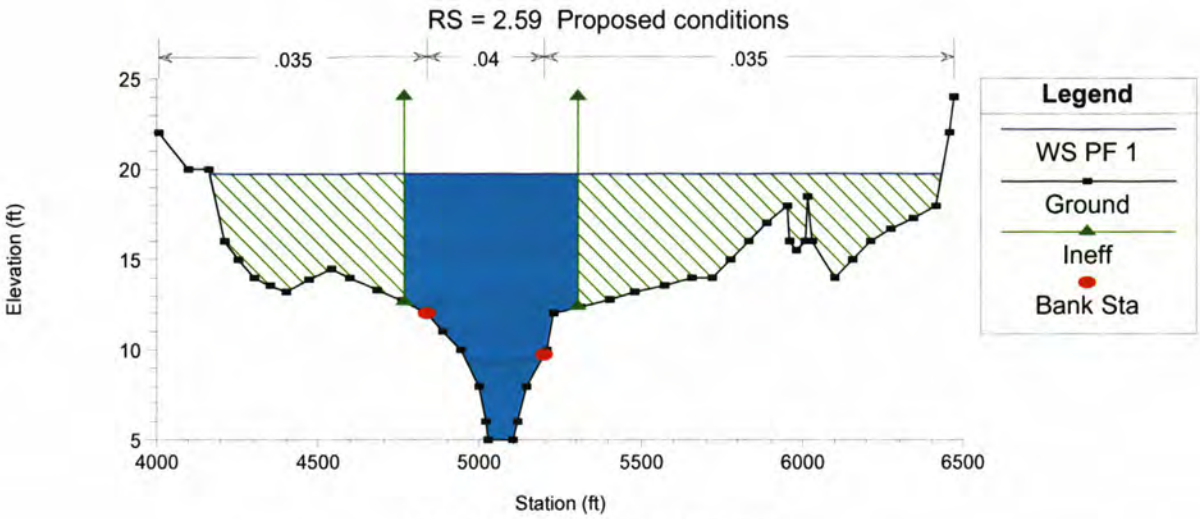
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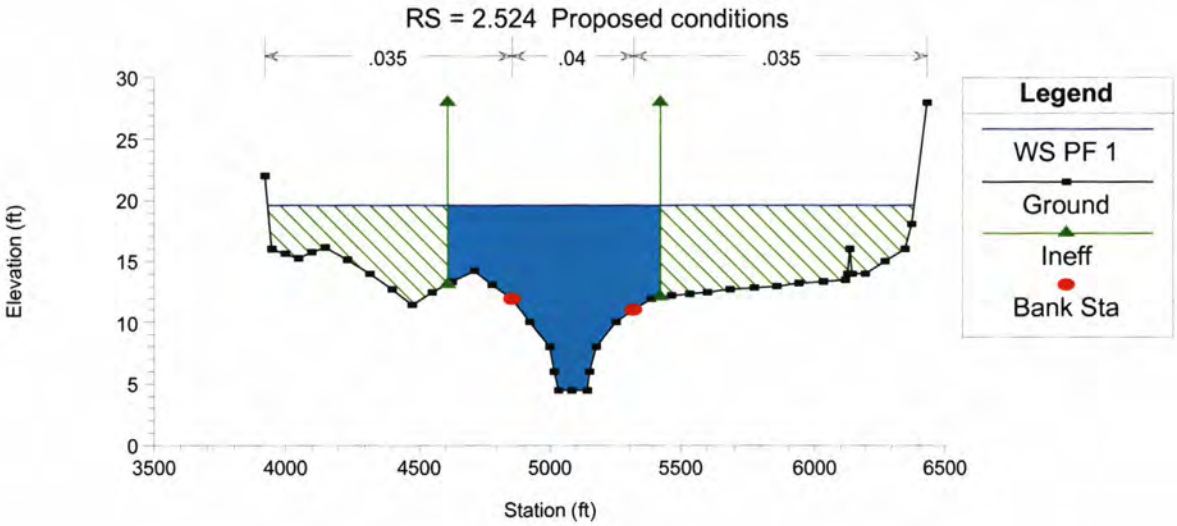
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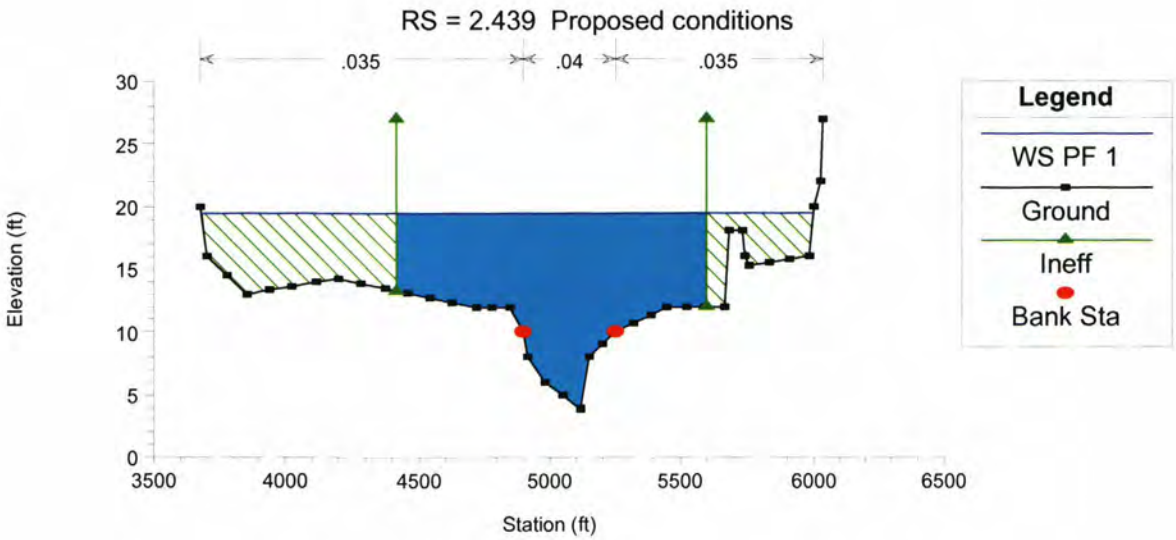
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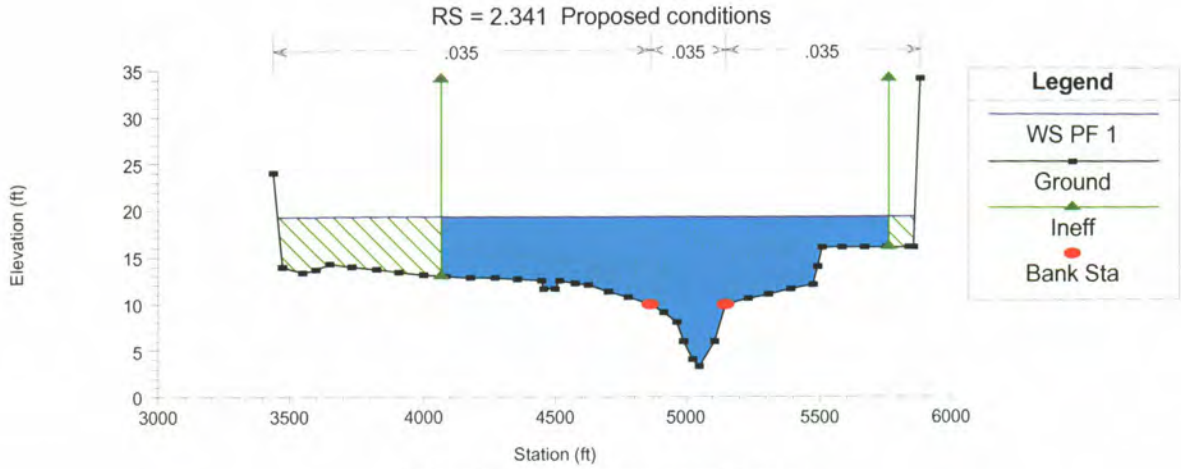
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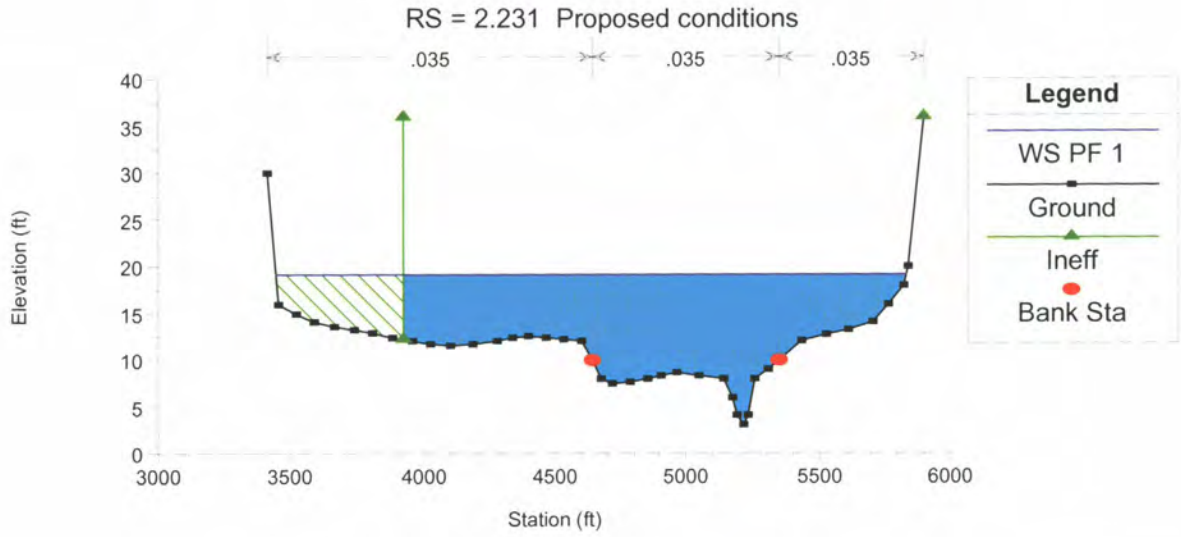
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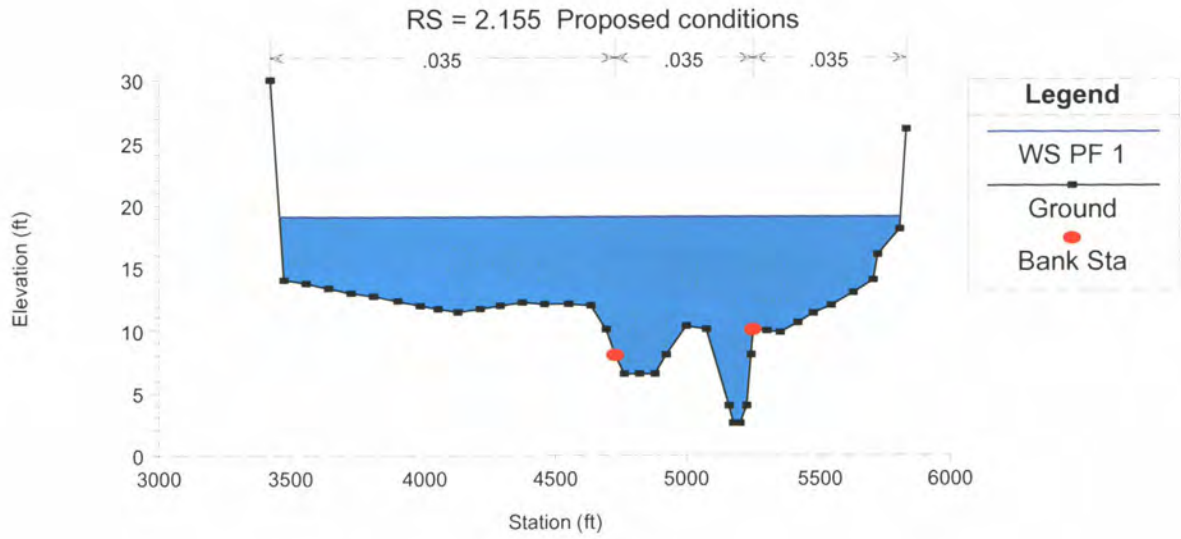
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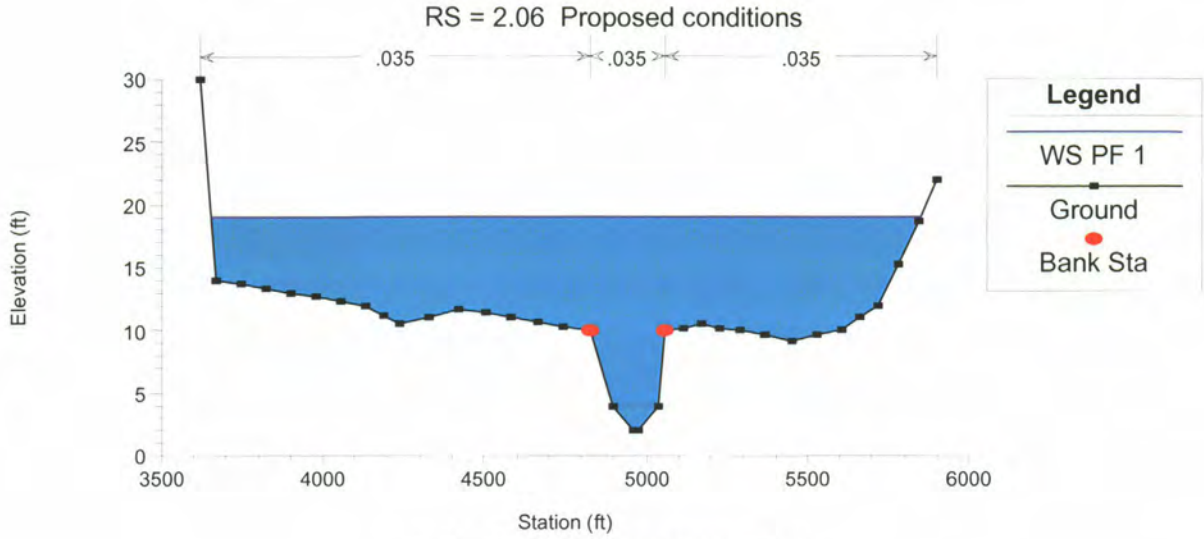
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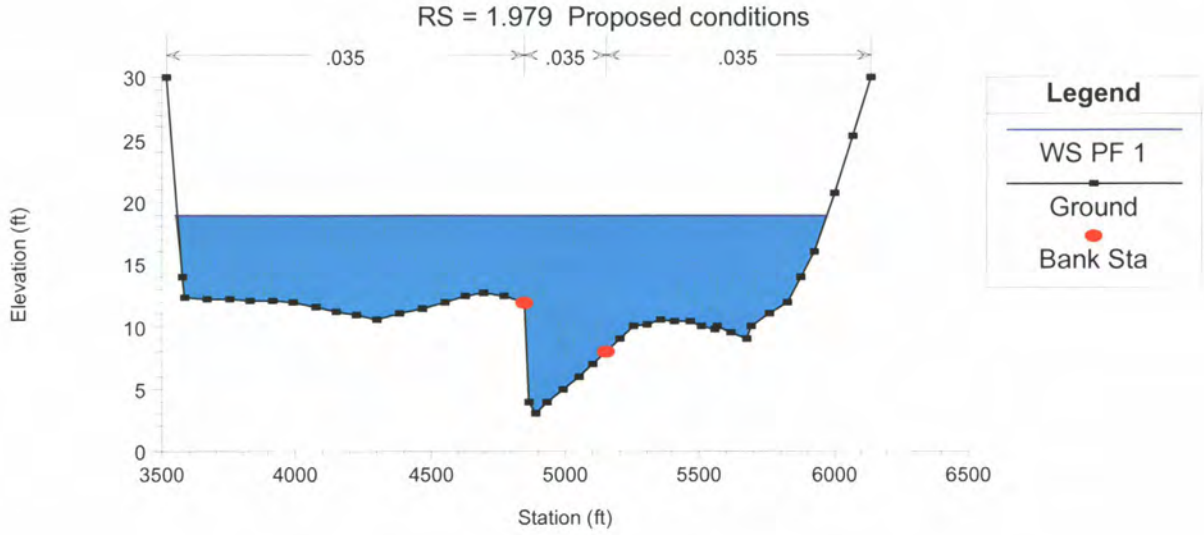
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6000
6500

APPENDIX C. HEC-RAS REPORT FOR THE EXISTING CONDITIONS

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                    HEC-RAS Version 3.1.2 April 2004
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California

          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX

*******************************************************************************

PROJECT DATA
Project Title: El Camino Real Br
Project File : Elcamino.prj
Run Date and Time: 6/6/2005 12:47:24 PM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
      EXISTING CONDITIONS

    100-YR FLOOD


*******************************************************************************

PLAN DATA

Plan Title: Existing
Plan File : C:\HEC Data\RAS\Elcamino.p08

           Geometry Title: Existing  Geom
           Geometry File : C:\HEC Data\RAS\Elcamino.g01

           Flow Title    : Existing Flow 01
           Flow File     : C:\HEC Data\RAS\Elcamino.f01

Plan Summary Information:
Number of:  Cross Sections =   15    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    1    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow


*******************************************************************************

FLOW DATA

Flow Title: Existing Flow 01
```

Flow File : C:\HEC Data\RAS\Elcamino.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2	PF 3
RIVER-1	Reach-1	2.844	42800	32500	5900
RIVER-1	Reach-1	2.732	42100	32500	5900
RIVER-1	Reach-1	2.675	41300	32500	5900
RIVER-1	Reach-1	2.623	40500	32500	5900
RIVER-1	Reach-1	2.614	40100	32500	5900
RIVER-1	Reach-1	2.524	40800	32500	5900
RIVER-1	Reach-1	2.439	41500	32500	5900
RIVER-1	Reach-1	2.341	42200	32500	5900
RIVER-1	Reach-1	2.231	42800	32500	5900
RIVER-1	Reach-1	2.155	42800	32500	5900

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	PF 1		Known WS = 19
RIVER-1	Reach-1	PF 2		Known WS = 17.24
RIVER-1	Reach-1	PF 3		Known WS = 10.5

****

GEOMETRY DATA

Geometry Title: Existing Geom
Geometry File : C:\HEC Data\RAS\Elcamino.g01

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.844

INPUT
Description: Revised
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3745	45.5	3767	39	3803	36.6	3810	37.2	3821	40.4
3837	39.4	3850	40	3892	39.4	3910	39.5	3924	41.5
3934	41.5	3952	37.9	3977	30.9	3998	24.3	4010	21.3
4038	18.3	4046	16.4	4056	16.6	4086	13.9	4130	11.5
4187	11	4220	14.2	4232	16.3	4268	19.5	4281	21.4
4298	19.6	4313	15.6	4316	15.5	4327	15.3	4334	16.3
4350	15.9	4365	13	4392	10.1	4456	7.5	4559	8.3
4569	7.7	4587	8.5	4613	11.9	4632	15.5	4641	15.8
4652	14.5	4663	16.4	4690	16.3	4704	13.7	4733	13.6
4764	22.8	4770	22.1	4780	18.5	4790	13.4	4798	7.6
4807	7.4	4810	11.1	4845	7.4	4964	7.5	5141	7.6
5147	9.9	5153	13.4	5180	14	5185	15.7	5196	14.8
5287	14.4	5340	14.4	5427	14.6	5513	14.8	5600	15
5680	15	5760	15	5840	15	5920	15	6000	15
6060	14.7	6120	14.5	6200	15	6256	14.4	6312	13.8
6350	16.2	6366	16	6380	14	6455	13.9	6530	13.7
6599	13.9	6668	14	6716	16	6725	15	6742	16
6758	20	6822	22	6848	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3745	.045	4790	.045	5180	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4790	5180	325	325	325	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3745	4770		T
6090	6848		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6
3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8
4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6
4708	12.9	4727	12.4	4740	11	4763	7.7	4784	7.3
4823	7.1	4994	7.2	5165	7.2	5176	8.7	5184	12.4
5187	12.6	5212	12.8	5218	14.8	5230	14.2	5296	14.1
5326	14.2	5327	14.2	5400	14.5	5455	14.2	5510	14
5590	13.9	5670	13.8	5725	14	5780	14.2	5840	14
5900	13.8	5950	14	6000	14.2	6065	14	6130	13.8
6195	14.1	6260	14.3	6340	14	6420	13.8	6500	13.5
6563	13.7	6626	13.8	6690	14	6700	15.8	6718	15.5
6743	20								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3877	.045	4727	.045	5184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4727	5184	265	265	265	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3877	4710		T
5870	6743		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.732

INPUT
Description: Revised
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3819	29.5	3837	29.1	3837	28.6	3856	28.8	3877	28.4
3877	28.9	3889	28.5	3904	28.6	3912	30.4	3929	29.3
3942	26.9	3949	25.1	3959	22	3967	20.7	3976	20.3
4012	16.6	4041	14.9	4118	12.9	4174	13	4214	13.8
4227	13.7	4277	15.2	4297	14.9	4320	16.8	4329	18.2
4368	13.3	4382	12.8	4405	10.2	4416	9.3	4425	9.2
4430	9.1	4445	10.3	4449	11	4454	11	4460	11.7
4488	11.7	4515	12.3	4541	11.5	4551	10.9	4560	9.3
4569	7.5	4649	7.5	4659	10.3	4695	18.2	4700	19
4714	22.1	4742	24.7	4758	22.5	4766	22.4	4780	18.3
4793	15.5	4818	11.5	4829	7.6	4854	7.2	4998	7.1
5171	7.1	5185	12.2	5211	12.3	5216	14.2	5250	13.9
5335	14	5365	13.5	5450	14.2	5525	13.9	5600	13.7
5675	13.4	5750	13.2	5827	13.5	5905	13.7	5982	14
6060	14.3	6148	14.1	6236	13.9	6324	13.8	6412	13.6
6500	13.4	6566	13.6	6633	13.8	6700	14	6720	12
6730	14	6758	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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*********************************************
    3819    .045    4793    .045    5185    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4793    5185              300     300     300             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3819    4740               T
    5650    6758               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.675

INPUT
Description: Revised
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    3836      28    3850      26    3887      25    3897    24.2    3898    24.7
    3958    24.2    3984    19.6    3997    18.1    4011    17.3    4063      16
    4077    15.9    4099    17.6    4104    17.7    4108    18.2    4160    15.5
    4170    15.4    4210    13.9    4222      13    4235    12.7    4268      15
    4279    15.5    4295      14    4310    11.7    4320      11    4334    10.6
    4350    11.5    4373    12.2    4407    12.2    4458     9.7    4462     9.5
    4482     9.1    4525    11.6    4633    13.4    4686    15.1    4707    17.2
    4724    19.9    4733    22.1    4742      23    4755    21.8    4763    21.7
    4782    16.1    4787    15.4    4806    14.6    4840    11.7    4852    11.6
    4862    10.7    4873     7.3    4893     6.9    5018     6.8    5119     6.8
    5149     7.2    5151     7.8    5157       8    5168     9.7    5171     9.7
    5174    10.3    5190      12    5204      12    5212    11.5    5219      13
    5224    14.6    5228    13.4    5346    13.8    5370    13.5    5450    14.3
    5533    13.9    5616    13.4    5700      13    5782    13.5    5865      14
    5943    13.7    6021    13.3    6100      13    6186    13.4    6273    13.7
    6360    14.1    6430    13.8    6500    13.5    6555    13.8    6610    14.1
    6660    13.9    6673      14    6700      16    6736      22    6758      24
    6818      26    6822      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3836    .045    4787    .045    5219    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4787    5219              285     273     250             .2       .4
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3836    4745               T
    5410    6822               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.623

INPUT
Description: Revised
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    3806      30    3813      28    3874      26    3894      24    3950      22
    3973      22    4027    21.6    4027    22.1    4075    21.4    4081    22.6
    4095    20.4    4264    18.2    4392    17.9    4446    19.2    4477      17
    4488    16.9    4532    16.4    4541    17.7    4555    18.3    4559    19.4
    4561    18.2    4601    19.2    4608    22.5    4610    19.9    4613    19.7
    4616    20.8    4622    19.3    4627    20.3    4632      20    4636    20.8
    4647    20.6    4650    21.8    4654    20.3    4659    20.3    4663    22.1
    4668    19.9    4674    22.4    4681    21.6    4686    19.3    4701    19.9
    4710    18.4    4719    19.7    4744    18.3    4745    18.9    4750    17.7
    4754    18.8    4759      23    4765    22.7    4769    19.2    4775    20.7
    4778    20.6    4783    18.5    4783    17.6    4854    16.4    4866    10.5
```

4880	5.9	5019	6.1	5135	6.2	5161	13.1	5198	20.1
5215	18.9	5229	15	5272	10.5	5296	11.9	5340	13
5350	11.5	5415	13	5480	14.5	5540	13.2	5600	12
5675	12	5750	12	5825	12	5900	12	5975	12.2
6050	12.5	6124	12.8	6198	13.1	6272	13.4	6346	13.7
6420	14	6485	13.8	6550	13.6	6625	14	6655	12
6670	11	6711	24						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3806	.045	4854	.045	5198	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4854	5198	90	51	35	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3806	4765		T
5229	6711		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.614

INPUT
Description: This is a REPEATED section.
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4917.9	19.4	4918.9	19.4
4919	7.6	4942.4	7.3	4965.8	7	4965.9	19.4	4966.9	19.4
4967	6.8	4990.4	6	5013.8	5	5013.9	19.4	5014.9	19.4
5015	5	5038.4	5	5061.8	5	5061.9	19.4	5062.9	19.4
5063	5	5086.4	5	5109.8	5	5109.9	18.7	5110.9	18.7
5111	5	5134.4	5	5157.8	5	5157.9	18.7	5158.9	18.7
5159	5	5163.4	6	5185.6	12	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5212.2	27	27	27	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

BRIDGE

RIVER: RIVER-1
REACH: Reach-1 RS: 2.6115

INPUT
Description: Bridge #1
Distance from Upstream XS = .1
Deck/Roadway Width = 26.8
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5

4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Upstream Bridge Cross Section Data
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4917.9	19.4	4918.9	19.4
4919	7.6	4942.4	7.3	4965.8	7	4965.9	19.4	4966.9	19.4
4967	6.8	4990.4	6	5013.8	5	5013.9	19.4	5014.9	19.4
5015	5	5038.4	5	5061.8	5	5061.9	19.4	5062.9	19.4
5063	5	5086.4	5	5109.8	5	5109.9	18.7	5110.9	18.7
5111	5	5134.4	5	5157.8	5	5157.9	18.7	5158.9	18.7
5159	5	5163.4	6	5185.6	12	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
4881.3	5212.2	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

Downstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8

6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Downstream Bridge Cross Section Data
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4917.9	19.4	4918.9	19.4
4919	7.6	4942.4	7.3	4965.8	7	4965.9	19.4	4966.9	19.4
4967	6.8	4990.4	6	5013.8	5	5013.9	19.4	5014.9	19.4
5015	5	5038.4	5	5061.8	5	5061.9	19.4	5062.9	19.4
5063	5	5086.4	5	5109.8	5	5109.9	18.7	5110.9	18.7
5111	5	5134.4	5	5157.8	5	5157.9	18.7	5158.9	18.7
5159	5	5163.4	6	5185.6	12	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left Right Coeff Contr. Expan.
4881.3 5212.2 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 17.6
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Energy

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	21.60	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	20.20	E.G. Elev (ft)	21.57	21.41
Q Total (cfs)	40100.00	W.S. Elev (ft)	20.08	19.89
Q Bridge (cfs)	40100.00	Crit W.S. (ft)	14.80	14.80
Q Weir (cfs)		Max Chl Dpth (ft)	15.08	14.89
Weir Sta Lft (ft)		Vel Total (ft/s)	9.82	9.91
Weir Sta Rgt (ft)		Flow Area (sq ft)	4084.03	4045.23
Weir Submerg		Froude # Chl	0.48	0.49
Weir Max Depth (ft)		Specif Force (cu ft)	40629.16	39981.90
Min El Weir Flow (ft)	23.01	Hydr Depth (ft)	21.01	18.54
Min El Prs (ft)	20.00	W.P. Total (ft)	621.68	597.32
Delta EG (ft)	0.22	Conv. Total (cfs)	532156.4	537903.7
Delta WS (ft)	0.28	Top Width (ft)	194.38	218.21
BR Open Area (sq ft)	4254.04	Frctn Loss (ft)	0.15	0.00

BR Open Vel (ft/s)	9.91	C & E Loss (ft)	0.01	0.03
Coef of Q		Shear Total (lb/sq ft)	2.33	2.35
Br Sel Method	Energy only	Power Total (lb/ft s)	22.87	23.29

BRIDGE OUTPUT Profile #PF 2

			Inside BR US	Inside BR DS
E.G. US. (ft)	19.84	Element		
W.S. US. (ft)	18.65	E.G. Elev (ft)	19.84	19.73
Q Total (cfs)	32500.00	W.S. Elev (ft)	18.64	18.50
Q Bridge (cfs)	32500.00	Crit W.S. (ft)	13.66	13.66
Q Weir (cfs)		Max Chl Dpth (ft)	13.64	13.50
Weir Sta Lft (ft)		Vel Total (ft/s)	8.79	8.90
Weir Sta Rgt (ft)		Flow Area (sq ft)	3696.21	3651.43
Weir Submerg		Froude # Chl	0.46	0.47
Weir Max Depth (ft)		Specif Force (cu ft)	31667.20	31251.99
Min El Weir Flow (ft)	23.01	Hydr Depth (ft)	11.79	11.61
Min El Prs (ft)	20.00	W.P. Total (ft)	493.45	490.49
Delta EG (ft)	0.12	Conv. Total (cfs)	525657.6	517157.5
Delta WS (ft)	0.15	Top Width (ft)	313.39	314.48
BR Open Area (sq ft)	4254.04	Frctn Loss (ft)	0.10	0.00
BR Open Vel (ft/s)	8.90	C & E Loss (ft)	0.01	0.00
Coef of Q		Shear Total (lb/sq ft)	1.79	1.84
Br Sel Method	Energy only	Power Total (lb/ft s)	15.72	16.34

BRIDGE OUTPUT Profile #PF 3

			Inside BR US	Inside BR DS
E.G. US. (ft)	13.14	Element		
W.S. US. (ft)	13.00	E.G. Elev (ft)	13.14	13.12
Q Total (cfs)	5900.00	W.S. Elev (ft)	13.00	12.98
Q Bridge (cfs)	5900.00	Crit W.S. (ft)	8.32	8.32
Q Weir (cfs)		Max Chl Dpth (ft)	8.00	7.98
Weir Sta Lft (ft)		Vel Total (ft/s)	3.04	3.05
Weir Sta Rgt (ft)		Flow Area (sq ft)	1943.01	1936.68
Weir Submerg		Froude # Chl	0.21	0.21
Weir Max Depth (ft)		Specif Force (cu ft)	7524.83	7484.69
Min El Weir Flow (ft)	23.01	Hydr Depth (ft)	6.64	6.62
Min El Prs (ft)	20.00	W.P. Total (ft)	380.70	380.20
Delta EG (ft)	0.02	Conv. Total (cfs)	213962.7	212991.0
Delta WS (ft)	0.02	Top Width (ft)	292.61	292.45
BR Open Area (sq ft)	4254.04	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	3.05	C & E Loss (ft)	0.00	0.00
Coef of Q		Shear Total (lb/sq ft)	0.24	0.24
Br Sel Method	Energy only	Power Total (lb/ft s)	0.74	0.74

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.609

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4917.9	19.4	4918.9	19.4
4919	7.6	4942.4	7.3	4965.8	7	4965.9	19.4	4966.9	19.4
4967	6.8	4990.4	6	5013.8	5	5013.9	19.4	5014.9	19.4
5015	5	5038.4	5	5061.8	5	5061.9	19.4	5062.9	19.4
5063	5	5086.4	5	5109.8	5	5109.9	18.7	5110.9	18.7
5111	5	5134.4	5	5157.8	5	5157.9	18.7	5158.9	18.7
5159	5	5163.4	6	5185.6	12	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
**********************************************
  3793.5     .03  4881.3     .04  5212.2     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4881.3  5212.2              100     100      90             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  3793.5    4881               T
    5212  6721.8               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.59

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    4010      22    4100      20    4160      20    4210      16    4256      15
    4303      14    4351    13.6    4400    13.2    4470    13.9    4540    14.5
    4600      14    4678    13.3    4756    12.7    4835      12    4887      11
    4940      10    5000       8    5016       6    5025       5    5100       5
    5120       6    5142       8    5200    9.76    5208      10    5232      12
    5316    12.4    5401    12.8    5485    13.2    5570    13.6    5655      14
    5720      14    5775      15    5830      16    5891      17    5953      18
    5960      16    5980    15.5    6010      16    6017    18.5    6027      16
    6100      14    6155      15    6210      16    6278    16.7    6346    17.3
    6415      18    6455      22    6475      24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    4010    .035    4835     .04    5200    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4835    5200              345     345     340             .2       .4
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4010    4800               T
    5210    6475               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.524

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    3920      22    3945      16    3997    15.6    4050    15.2    4098    15.7
    4147    16.2    4233    15.1    4320      14    4400    12.7    4480    11.5
    4556    12.4    4633    13.4    4710    14.3    4783    13.1    4856      12
    4926      10    4997       8    5013       6    5030     4.5    5085     4.5
    5140     4.5    5150       6    5175       8    5250      10    5320      11
    5390      12    5460    12.2    5530    12.3    5600    12.5    5686    12.7
    5773    12.8    5859      13    5946    13.2    6033    13.3    6120    13.5
    6130      14    6140      16    6146      14    6200      14    6275      15
    6350      16    6373      18    6430      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    3920    .035    4856     .04    5320    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4856    5320              450     450     450             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
```

```
    3920    4650                T
    5320    6430                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.439

INPUT
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    3680      20    3700      16    3775    14.5    3850      13    3937    13.3
    4025    13.6    4112      14    4200    14.3    4286    13.9    4373    13.5
    4459    13.1    4546    12.7    4633    12.3    4720    11.9    4785    11.9
    4850      12    4895      10    4917       8    4985       6    5050     4.9
    5115     3.8    5120       4    5152       8    5204       9    5256      10
    5320    10.7    5384    11.3    5448      12    5519      12    5590      12
    5662      12    5685      18    5730      18    5740      16    5760    15.3
    5834    15.5    5908    15.8    5982      16    6003      20    6027      22
    6037      27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3680    .035    4895     .04    5256    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4895    5256              520     520     520             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3680    4460                T
    5500    6037                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.341

INPUT
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    3440      24    3473      14    3550    13.3    3600    13.7    3650    14.2
    3737    13.9    3825    13.6    3912    13.3    4000      13    4090    12.9
    4180    12.8    4270    12.7    4360    12.6    4450    12.5    4460    11.5
    4500    11.5    4520    12.5    4573    12.2    4626      12    4704    11.3
    4782    10.7    4860      10    4910       9    4960       8    4990       6
    5025       4    5050     3.3    5110       6    5147      10    5229    10.5
    5312      11    5394    11.5    5477      12    5496      14    5508      16
    5591      16    5674      16    5757      16    5840      16    5855      16
    5885      34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3440    .035    4860    .035    5147    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4860    5147              550     580     600             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3440    4100                T
    5560    5885                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.231
```

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3413	.035	4644	.035	5355	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4644	5355	300	400	430	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3413	3970		T
5900	5900		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.155

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5
4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4
5175	2.5	5200	2.5	5222	4	5238	8	5250	10
5300	9.9	5350	9.8	5415	10.5	5480	11.3	5545	12
5626	13	5708	14	5722	16	5803	18	5834	26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3422	.035	4728	.035	5250	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4728	5250	330	500	450	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.06

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3622	30	3666	14	3743	13.7	3821	13.3	3899	13
3976	12.7	4054	12.3	4132	12	4186	11.2	4240	10.5
4330	11.1	4420	11.7	4501	11.4	4582	11	4663	10.7
4744	10.3	4825	10	4897	4	4958	2	4974	2
5035	4	5058	10	5114	10.2	5170	10.5	5230	10.2
5290	10	5370	9.6	5450	9.2	5530	9.6	5610	10
5665	11	5720	12	5781	15.3	5843	18.7	5905	22

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3622    .035    4825    .035    5058    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4825    5058              480     430     330              .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 1.979

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    3516      30    3572      14    3588    12.3    3668    12.2    3749    12.2
    3830    12.1    3911    12.1    3992      12    4069    11.6    4146    11.2
    4223    10.9    4300    10.5    4384      11    4468    11.5    4553      12
    4626    12.4    4700    12.7    4776    12.4    4852      12    4863       4
    4890       3    4933       4    4993       5    5053       6    5101       7
    5150       8    5202       9    5254      10    5302    10.2    5350    10.5
    5405    10.4    5460    10.4    5507    10.1    5555     9.8    5568      10
    5619     9.5    5670       9    5693      10    5759      11    5826      12
    5878      14    5930      16    6000    20.7    6070    25.3    6140      30

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3516    .035    4852    .035    5150    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4852    5150              400     400     400              .1       .3

*******************************************************************************

SUMMARY OF MANNING'S N VALUES

River:RIVER-1
*****************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*Reach-1          *    2.844       *     .045*     .045*     .035*
*Reach-1          *    2.782       *     .045*     .045*     .035*
*Reach-1          *    2.732       *     .045*     .045*     .035*
*Reach-1          *    2.675       *     .045*     .045*     .035*
*Reach-1          *    2.623       *     .045*     .045*     .035*
*Reach-1          *    2.614       *      .03*      .04*      .03*
*Reach-1          *    2.6115      *Bridge   *        *        *
*Reach-1          *    2.609       *      .03*      .04*      .03*
*Reach-1          *    2.59        *     .035*      .04*     .035*
*Reach-1          *    2.524       *     .035*      .04*     .035*
*Reach-1          *    2.439       *     .035*      .04*     .035*
*Reach-1          *    2.341       *     .035*     .035*     .035*
*Reach-1          *    2.231       *     .035*     .035*     .035*
*Reach-1          *    2.155       *     .035*     .035*     .035*
*Reach-1          *    2.06        *     .035*     .035*     .035*
*Reach-1          *    1.979       *     .035*     .035*     .035*
*****************************************************************

*******************************************************************************

SUMMARY OF REACH LENGTHS

River: RIVER-1
*****************************************************************
*     Reach       *   River Sta.   *  Left   * Channel *  Right  *
*****************************************************************
*Reach-1          *    2.844       *      325*      325*      325*
*Reach-1          *    2.782       *      265*      265*      265*
```

*Reach-1	* 2.732	* 300*	300*	300*
*Reach-1	* 2.675	* 285*	273*	250*
*Reach-1	* 2.623	* 90*	51*	35*
*Reach-1	* 2.614	* 27*	27*	27*
*Reach-1	* 2.6115	*Bridge *	*	*
*Reach-1	* 2.609	* 100*	100*	90*
*Reach-1	* 2.59	* 345*	345*	340*
*Reach-1	* 2.524	* 450*	450*	450*
*Reach-1	* 2.439	* 520*	520*	520*
*Reach-1	* 2.341	* 550*	580*	600*
*Reach-1	* 2.231	* 300*	400*	430*
*Reach-1	* 2.155	* 330*	500*	450*
*Reach-1	* 2.06	* 480*	430*	330*
*Reach-1	* 1.979	* 400*	400*	400*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
*Reach-1	* 2.844	* .1*	.3*
*Reach-1	* 2.782	* .1*	.3*
*Reach-1	* 2.732	* .1*	.3*
*Reach-1	* 2.675	* .2*	.4*
*Reach-1	* 2.623	* .3*	.5*
*Reach-1	* 2.614	* .3*	.5*
*Reach-1	* 2.6115	*Bridge *	*
*Reach-1	* 2.609	* .3*	.5*
*Reach-1	* 2.59	* .2*	.4*
*Reach-1	* 2.524	* .1*	.3*
*Reach-1	* 2.439	* .1*	.3*
*Reach-1	* 2.341	* .1*	.3*
*Reach-1	* 2.231	* .1*	.3*
*Reach-1	* 2.155	* .1*	.3*
*Reach-1	* 2.06	* .1*	.3*
*Reach-1	* 1.979	* .1*	.3*

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.844	PF 1	42800.00	7.40	22.63		22.81	0.000352	3.63	12802.57	2819.35	0.17
Reach-1	2.844	PF 2	32500.00	7.40	20.89		21.04	0.000384	3.48	10505.14	2748.32	0.17
Reach-1	2.844	PF 3	5900.00	7.40	13.78		13.89	0.000691	2.74	2156.45	856.25	0.20
Reach-1	2.782	PF 1	42800.00	7.10	22.52		22.70	0.000310	3.53	12855.91	2776.27	0.16
Reach-1	2.782	PF 2	32500.00	7.10	20.78		20.93	0.000311	3.26	10836.54	2769.82	0.16
Reach-1	2.782	PF 3	5900.00	7.10	13.66		13.72	0.000357	2.09	2855.25	1131.48	0.15
Reach-1	2.732	PF 1	42100.00	7.10	22.29		22.58	0.000529	4.52	9770.31	2749.56	0.21
Reach-1	2.732	PF 2	32500.00	7.10	20.56		20.81	0.000544	4.21	8250.33	2717.63	0.21
Reach-1	2.732	PF 3	5900.00	7.10	13.50		13.60	0.000555	2.57	2318.79	1098.31	0.18
Reach-1	2.675	PF 1	41300.00	6.80	21.86		22.35	0.000962	5.72	7377.31	2741.55	0.28
Reach-1	2.675	PF 2	32500.00	6.80	20.15		20.57	0.001005	5.33	6276.95	2700.82	0.28
Reach-1	2.675	PF 3	5900.00	6.80	13.27		13.40	0.000852	2.87	2052.72	976.61	0.22
Reach-1	2.623	PF 1	40500.00	5.90	20.61		21.82	0.002475	8.92	4738.12	2547.96	0.44
Reach-1	2.623	PF 2	32500.00	5.90	18.97		20.04	0.002539	8.35	4007.18	2291.78	0.44
Reach-1	2.623	PF 3	5900.00	5.90	13.04		13.18	0.000711	3.04	1939.47	1140.18	0.21
Reach-1	2.614	PF 1	40100.00	5.00	20.20	14.79	21.60	0.003781	9.51	4215.80	1846.38	0.47
Reach-1	2.614	PF 2	32500.00	5.00	18.65	13.65	19.84	0.003671	8.77	3707.24	1313.37	0.46

```
* Reach-1     * 2.614       * PF 3        *     5900.00 *     5.00 *    13.00 *     8.32 *    13.14 *  0.000760 *     3.04 *  1943.04
*   292.61 *        0.21 *
*            *             *             *             *          *          *          *          *          *          *
*          *             *
* Reach-1     * 2.6115      *             *      Bridge *          *          *          *          *          *          *
*          *             *
*            *             *             *             *          *          *          *          *          *          *
*          *             *
* Reach-1     * 2.609       * PF 1        *    40100.00 *     5.00 *    19.91 *          *    21.38 *  0.004070 *     9.73 *  4122.85
*  1772.07 *        0.49 *
* Reach-1     * 2.609       * PF 2        *    32500.00 *     5.00 *    18.50 *          *    19.72 *  0.003816 *     8.88 *  3658.53
*  1296.06 *        0.47 *
* Reach-1     * 2.609       * PF 3        *     5900.00 *     5.00 *    12.98 *          *    13.12 *  0.000767 *     3.05 *  1936.66
*   292.45 *        0.21 *
*            *             *             *             *          *          *          *          *          *          *
*          *             *
* Reach-1     * 2.59        * PF 1        *    40100.00 *     5.00 *    19.76 *          *    20.96 *  0.002184 *     8.84 *  4566.19
*  2269.56 *        0.46 *
* Reach-1     * 2.59        * PF 2        *    32500.00 *     5.00 *    18.30 *          *    19.34 *  0.002288 *     8.27 *  3967.13
*  2235.30 *        0.46 *
* Reach-1     * 2.59        * PF 3        *     5900.00 *     5.00 *    12.83 *          *    13.02 *  0.001138 *     3.46 *  1727.19
*   669.49 *        0.28 *
*            *             *             *             *          *          *          *          *          *          *
*          *             *
* Reach-1     * 2.524       * PF 1        *    40800.00 *     4.50 *    19.58 *          *    20.19 *  0.001166 *     6.46 *  6622.20
*  2451.92 *        0.34 *
* Reach-1     * 2.524       * PF 2        *    32500.00 *     4.50 *    18.02 *          *    18.57 *  0.001287 *     6.16 *  5574.24
*  2436.48 *        0.34 *
* Reach-1     * 2.524       * PF 3        *     5900.00 *     4.50 *    12.54 *          *    12.67 *  0.000791 *     2.84 *  2087.85
*   956.17 *        0.24 *
*            *             *             *             *          *          *          *          *          *          *
*          *             *
* Reach-1     * 2.439       * PF 1        *    41500.00 *     3.80 *    19.45 *          *    19.74 *  0.000548 *     4.72 *  9743.08
*  2317.40 *        0.23 *
* Reach-1     * 2.439       * PF 2        *    32500.00 *     3.80 *    17.82 *          *    18.09 *  0.000622 *     4.58 *  8047.44
*  2254.14 *        0.24 *
* Reach-1     * 2.439       * PF 3        *     5900.00 *     3.80 *    12.24 *          *    12.36 *  0.000615 *     2.84 *  2316.42
*  1015.94 *        0.22 *
*            *             *             *             *          *          *          *          *          *          *
*          *             *
* Reach-1     * 2.341       * PF 1        *    42200.00 *     3.30 *    19.28 *          *    19.49 *  0.000370 *     4.39 * 12180.39
*  2404.91 *        0.22 *
* Reach-1     * 2.341       * PF 2        *    32500.00 *     3.30 *    17.60 *          *    17.80 *  0.000449 *     4.39 *  9720.12
*  2396.54 *        0.24 *
* Reach-1     * 2.341       * PF 3        *     5900.00 *     3.30 *    11.75 *          *    11.95 *  0.000945 *     3.79 *  1863.03
*   829.12 *        0.30 *
*            *             *             *             *          *          *          *          *          *          *
*          *             *
* Reach-1     * 2.231       * PF 1        *    42800.00 *     3.00 *    19.18 *          *    19.30 *  0.000220 *     3.19 * 15687.33
*  2385.53 *        0.17 *
* Reach-1     * 2.231       * PF 2        *    32500.00 *     3.00 *    17.46 *          *    17.58 *  0.000255 *     3.08 * 12516.73
*  2352.97 *        0.17 *
```

```
* Reach-1     * 2.231       * PF 3        *     5900.00 *     3.00 *    11.46 *          *    11.54 *  0.000477 *     2.22 *  2703.16
*   803.13 *        0.20 *
*            *             *             *             *          *          *          *          *          *          *
*          *            *
* Reach-1     * 2.155       * PF 1        *    42800.00 *     2.50 *    19.13 *          *    19.22 *  0.000170 *     2.89 * 18701.16
*  2354.14 *        0.15 *
* Reach-1     * 2.155       * PF 2        *    32500.00 *     2.50 *    17.40 *          *    17.49 *  0.000209 *     2.89 * 14640.56
*  2320.43 *        0.16 *
* Reach-1     * 2.155       * PF 3        *     5900.00 *     2.50 *    11.22 *          *    11.32 *  0.000609 *     2.64 *  2413.63
*   813.86 *        0.23 *
*            *             *             *             *          *          *          *          *          *          *
*          *            *
* Reach-1     * 2.06        * PF 1        *    42800.00 *     2.00 *    19.05 *          *    19.15 *  0.000169 *     3.27 * 18250.76
*  2197.55 *        0.15 *
* Reach-1     * 2.06        * PF 2        *    32500.00 *     2.00 *    17.31 *          *    17.40 *  0.000201 *     3.27 * 14444.65
*  2160.70 *        0.16 *
* Reach-1     * 2.06        * PF 3        *     5900.00 *     2.00 *    10.82 *          *    11.01 *  0.000638 *     3.63 *  2098.55
*  1097.08 *        0.26 *
*            *             *             *             *          *          *          *          *          *          *
*          *            *
* Reach-1     * 1.979       * PF 1        *    42800.00 *     3.00 *    19.00 *    13.18 *    19.08 *  0.000145 *     2.90 * 19913.77
*  2420.18 *        0.14 *
* Reach-1     * 1.979       * PF 2        *    32500.00 *     3.00 *    17.24 *    12.57 *    17.32 *  0.000176 *     2.91 * 15682.74
*  2387.81 *        0.15 *
* Reach-1     * 1.979       * PF 3        *     5900.00 *     3.00 *    10.50 *     7.56 *    10.70 *  0.000844 *     3.65 *  1887.90
*   871.94 *        0.28 *
*****************************************************************************************************************************************
*************************

Profile Output Table - Standard Table 2
*****************************************************************************************************************************************
*************
* Reach       * River Sta   * Profile     *   E.G. Elev *W.S. Elev * Vel Head *Frctn Loss *C & E Loss *   Q Left *Q Channel *  Q Right
*Top Width *
*            *             *             *        (ft) *     (ft) *     (ft) *      (ft) *      (ft) *    (cfs) *    (cfs) *    (cfs)
*     (ft) *
*****************************************************************************************************************************************
*************
* Reach-1     * 2.844       * PF 1        *       22.81 *    22.63 *     0.18 *      0.11 *      0.00 *   143.54 * 20370.29 * 22286.17
*  2819.35 *
* Reach-1     * 2.844       * PF 2        *       21.04 *    20.89 *     0.16 *      0.11 *      0.00 *    79.39 * 17145.99 * 15274.61
*  2748.32 *
* Reach-1     * 2.844       * PF 3        *       13.89 *    13.78 *     0.12 *      0.16 *      0.01 *     0.04 *  5899.96 *
*   856.25 *
*            *             *             *             *          *          *          *          *          *          *
*          *
* Reach-1     * 2.782       * PF 1        *       22.70 *    22.52 *     0.17 *      0.11 *      0.01 *   450.90 * 24232.67 * 18116.43
*  2776.27 *
* Reach-1     * 2.782       * PF 2        *       20.93 *    20.78 *     0.14 *      0.11 *      0.01 *   327.46 * 19781.99 * 12390.55
*  2769.82 *
* Reach-1     * 2.782       * PF 3        *       13.72 *    13.66 *     0.07 *      0.12 *      0.00 *    11.16 *  5867.18 *    21.66
*  1131.48 *
```

Reach-1	2.732	PF 1	22.58	22.29	0.29	0.21	0.02	171.32	25830.63	16098.06	2749.56
Reach-1	2.732	PF 2	20.81	20.56	0.25	0.22	0.02	82.85	21230.39	11186.76	2717.63
Reach-1	2.732	PF 3	13.60	13.50	0.10	0.20	0.00		5861.74	38.27	1098.31
Reach-1	2.675	PF 1	22.35	21.86	0.49	0.39	0.14	170.40	32726.59	8403.00	2741.55
Reach-1	2.675	PF 2	20.57	20.15	0.42	0.41	0.13	98.00	26575.24	5826.76	2700.82
Reach-1	2.675	PF 3	13.40	13.27	0.13	0.21	0.00		5899.97	0.04	976.61
Reach-1	2.623	PF 1	21.82	20.61	1.21	0.16	0.06	972.38	39275.52	252.11	2547.96
Reach-1	2.623	PF 2	20.04	18.97	1.07	0.15	0.04	358.59	32051.10	90.32	2291.78
Reach-1	2.623	PF 3	13.18	13.04	0.14	0.04	0.00		5900.00		1140.18
Reach-1	2.614	PF 1	21.60	20.20	1.40	0.00	0.03		40100.00		1846.38
Reach-1	2.614	PF 2	19.84	18.65	1.19	0.00	0.00		32500.00		1313.37
Reach-1	2.614	PF 3	13.14	13.00	0.14	0.00	0.00		5900.00		292.61
Reach-1	2.6115		Bridge								
Reach-1	2.609	PF 1	21.38	19.91	1.47	0.29	0.13		40100.00		1772.07
Reach-1	2.609	PF 2	19.72	18.50	1.23	0.29	0.09		32500.00		1296.06
Reach-1	2.609	PF 3	13.12	12.98	0.14	0.09	0.01		5900.00		292.45
Reach-1	2.59	PF 1	20.96	19.76	1.20	0.54	0.24	2041.42	37163.09	895.49	2269.56
Reach-1	2.59	PF 2	19.34	18.30	1.05	0.58	0.20	1464.01	30334.93	701.07	2235.30
Reach-1	2.59	PF 3	13.02	12.83	0.18	0.32	0.02	26.28	5788.68	85.04	669.49

Reach-1	2.524	PF 1	20.19	19.58	0.61	0.35	0.09	6272.39	34527.62	2451.92
Reach-1	2.524	PF 2	18.57	18.02	0.55	0.39	0.08	4063.98	28436.02	2436.48
Reach-1	2.524	PF 3	12.67	12.54	0.12	0.31	0.00	4.94	5895.06	956.17
Reach-1	2.439	PF 1	19.74	19.45	0.29	0.23	0.03	11825.79	21522.49	8151.72	2317.40
Reach-1	2.439	PF 2	18.09	17.82	0.27	0.27	0.02	8260.88	18222.79	6016.33	2254.14
Reach-1	2.439	PF 3	12.36	12.24	0.12	0.39	0.01	65.60	5567.70	266.70	1015.94
Reach-1	2.341	PF 1	19.49	19.28	0.20	0.16	0.02	16910.87	15724.74	9564.39	2404.91
Reach-1	2.341	PF 2	17.80	17.60	0.20	0.19	0.02	12010.64	13614.50	6874.86	2396.54
Reach-1	2.341	PF 3	11.95	11.75	0.20	0.38	0.04	217.89	5381.29	300.82	829.12
Reach-1	2.231	PF 1	19.30	19.18	0.13	0.07	0.01	11475.01	25936.85	5388.14	2385.53
Reach-1	2.231	PF 2	17.58	17.46	0.12	0.09	0.01	7864.66	21280.58	3354.77	2352.97
Reach-1	2.231	PF 3	11.54	11.46	0.08	0.21	0.00	17.69	5849.33	32.98	803.13
Reach-1	2.155	PF 1	19.22	19.13	0.09	0.07	0.00	17372.63	17994.14	7433.23	2354.14
Reach-1	2.155	PF 2	17.49	17.40	0.09	0.09	0.00	11884.70	15367.44	5247.86	2320.43
Reach-1	2.155	PF 3	11.32	11.22	0.10	0.31	0.01	119.76	5548.41	231.82	813.86
Reach-1	2.06	PF 1	19.15	19.05	0.10	0.07	0.00	17433.12	11057.27	14309.62	2197.55
Reach-1	2.06	PF 2	17.40	17.31	0.09	0.08	0.00	11998.77	9716.36	10784.87	2160.70
Reach-1	2.06	PF 3	11.01	10.82	0.19	0.31	0.00	53.24	5293.69	553.07	1097.08
Reach-1	1.979	PF 1	19.08	19.00	0.08			17476.25	11725.14	13598.62	2420.18

```
* Reach-1     * 1.979       * PF 2        *       17.32 *    17.24 *     0.08 *           *           * 12043.20 * 10246.63 * 10210.17
*  2387.81 *
* Reach-1     * 1.979       * PF 3        *       10.70 *    10.50 *     0.20 *           *           *          *  5543.01 *   356.99
*   871.94 *
*****************************************************************************************************************************************
*************
```

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Existing

River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.782 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
River: RIVER-1 Reach: Reach-1 RS: 2.782 Profile: PF 2
Warning:The cross-section end points had to be extended vertically for the computed water surface.
River: RIVER-1 Reach: Reach-1 RS: 2.782 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.732 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
River: RIVER-1 Reach: Reach-1 RS: 2.732 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.732 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.675 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.675 Profile: PF 2
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.675 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.623 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.623 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.623 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.614 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.614 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.614 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.609 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.609 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.609 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.59 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.59 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.524 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.524 Profile: PF 2
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.524 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.439 Profile: PF 2
Warning:Divided flow computed for this cross-section.

```
River: RIVER-1  Reach: Reach-1     RS: 2.341     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.06     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 1.979     Profile: PF 1
     Warning:The parabolic search method failed to converge on critical depth.  The program will try the
cross section
             slice/secant method to find critical depth.
River: RIVER-1  Reach: Reach-1     RS: 1.979     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
```

APPENDIX D. HEC-RAS REPORT FOR THE PROPOSED CONDITIONS

```
                    HEC-RAS Version 3.0.1  Mar 2001
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                       609 Second Street, Suite D
                      Davis, California 95616-4687
                             (916) 756-1104


           X     X  XXXXXX    XXXX        XXXX       XX      XXXX
           X     X  X        X    X       X   X     X  X    X
           X     X  X        X            X   X    X    X   X
           XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
           X     X  X        X            X  X     X    X        X
           X     X  X        X    X       X   X    X    X        X
           X     X  XXXXXX    XXXX        X    X   X    X   XXXXX


*******************************************************************************

PROJECT DATA
Project Title: El Camino Real Br
Project File : Elcamino.prj
Run Date and Time: 11/23/04 5:31:52 AM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
      PROPOSED CONDITIONS

    100-YR FLOOD


*******************************************************************************

PLAN DATA

Plan Title: Proposed
Plan File : C:\HEC\RAS\Elcamino.p03

           Geometry Title: Proposed
           Geometry File : C:\HEC\RAS\Elcamino.g02

           Flow Title    : Proposed Flow
           Flow File     : C:\HEC\RAS\Elcamino.f02

Plan Summary Information:
Number of:  Cross Sections =   15    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    1

Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  20
    Maximum difference tolerance        =  0.3
    Flow tolerance factor               =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Supercritical Flow


*******************************************************************************

FLOW DATA

Flow Title: Proposed Flow
```

Flow File : C:\HEC\RAS\Elcamino.f02

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2	PF 3
RIVER-1	Reach-1	2.844	42800	32500	5900
RIVER-1	Reach-1	2.439	42800	32500	5900
RIVER-1	Reach-1	2.341	42800	32500	5900
RIVER-1	Reach-1	2.231	42800	32500	5900
RIVER-1	Reach-1	2.155	42800	32500	5900

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	PF 1		Known WS = 19
	Reach-1	PF 2		Known WS = 17.24
	Reach-1	PF 3		Known WS = 9.8

GEOMETRY DATA

Geometry Title: Proposed
Geometry File : C:\HEC\RAS\Elcamino.g02

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 2.844

INPUT
Description: Revised
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3745	45.5	3767	39	3803	36.6	3810	37.2	3821	40.4
3837	39.4	3850	40	3892	39.4	3910	39.5	3924	41.5
3934	41.5	3952	37.9	3977	30.9	3998	24.3	4010	21.3
4038	18.3	4046	16.4	4056	16.6	4086	13.9	4130	11.5
4187	11	4220	14.2	4232	16.3	4268	19.5	4281	21.4
4298	19.6	4313	15.6	4316	15.5	4327	15.3	4334	16.3
4350	15.9	4365	13	4392	10.1	4456	7.5	4559	8.3
4569	7.7	4587	8.5	4613	11.9	4632	15.5	4641	15.8
4652	14.5	4663	16.4	4690	16.3	4704	13.7	4733	13.6
4764	22.8	4770	22.1	4780	18.5	4790	13.4	4798	7.6
4807	7.4	4810	11.1	4845	7.4	4964	7.5	5141	7.6
5147	9.9	5153	13.4	5180	14	5185	15.7	5196	14.8
5287	14.4	5340	14.4	5427	14.6	5513	14.8	5600	15
5680	15	5760	15	5840	15	5920	15	6000	15
6060	14.7	6120	14.5	6200	15	6256	14.4	6312	13.8
6350	16.2	6366	16	6380	14	6455	13.9	6530	13.7
6599	13.9	6668	14	6716	16	6725	15	6742	16
6758	20	6822	22	6848	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3745	.045	4790	.045	5180	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4790	5180	325	325	325	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888		T	
888		T	

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6

3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8
4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6
4708	12.9	4727	12.4	4740	11	4763	7.7	4784	7.3
4823	7.1	4994	7.2	5165	7.2	5176	8.7	5184	12.4
5187	12.6	5212	12.8	5218	14.8	5230	14.2	5296	14.1
5326	14.2	5327	14.2	5400	14.5	5455	14.2	5510	14
5590	13.9	5670	13.8	5725	14	5780	14.2	5840	14
5900	13.8	5950	14	6000	14.2	6065	14	6130	13.8
6195	14.1	6260	14.3	6340	14	6420	13.8	6500	13.5
6563	13.7	6626	13.8	6690	14	6700	15.8	6718	15.5
6743	20								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3877	.045	4727	.045	5184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4727	5184	265	265	265	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888	T		
888	T		

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 2.732

INPUT
Description: Revised
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3819	29.5	3837	29.1	3837	28.6	3856	28.8	3877	28.4
3877	28.9	3889	28.5	3904	28.6	3912	30.4	3929	29.3
3942	26.9	3949	25.1	3959	22	3967	20.7	3976	20.3
4012	16.6	4041	14.9	4118	12.9	4174	13	4214	13.8
4227	13.7	4277	15.2	4297	14.9	4320	16.8	4329	18.2
4368	13.3	4382	12.8	4405	10.2	4416	9.3	4425	9.2
4430	9.1	4445	10.3	4449	11	4454	11	4460	11.7
4488	11.7	4515	12.3	4541	11.5	4551	10.9	4560	9.3
4569	7.5	4649	7.5	4659	10.3	4695	18.2	4700	19
4714	22.1	4742	24.7	4758	22.5	4766	22.4	4780	18.3
4793	15.5	4818	11.5	4829	7.6	4854	7.2	4998	7.1
5171	7.1	5185	12.2	5211	12.3	5216	14.2	5250	13.9
5335	14	5365	13.5	5450	14.2	5525	13.9	5600	13.7
5675	13.4	5750	13.2	5827	13.5	5905	13.7	5982	14
6060	14.3	6148	14.1	6236	13.9	6324	13.8	6412	13.6
6500	13.4	6566	13.6	6633	13.8	6700	14	6720	12
6730	14	6758	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3819	.045	4793	.045	5185	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4793	5185	300	300	300	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888	T		
888	T		

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 2.675

INPUT
Description: Revised
Station Elevation Data num= 87

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    3836      28    3850      26    3887      25    3897    24.2    3898    24.7
    3958    24.2    3984    19.6    3997    18.1    4011    17.3    4063      16
    4077    15.9    4099    17.6    4104    17.7    4108    18.2    4160    15.5
    4170    15.4    4210    13.9    4222      13    4235    12.7    4268      15
    4279    15.5    4295      14    4310    11.7    4320      11    4334    10.6
    4350    11.5    4373    12.2    4407    12.2    4458     9.7    4462     9.5
    4482     9.1    4525    11.6    4633    13.4    4686    15.1    4707    17.2
    4724    19.9    4733    22.1    4742      23    4755    21.8    4763    21.7
    4782    16.1    4787    15.4    4806    14.6    4840    11.7    4852    11.6
    4862    10.7    4873     7.3    4893     6.9    5018     6.8    5119     6.8
    5149     7.2    5151     7.8    5157       8    5168     9.7    5171     9.7
    5174    10.3    5190      12    5204      12    5212    11.5    5219      13
    5224    14.6    5228    13.4    5346    13.8    5370    13.5    5450    14.3
    5533    13.9    5616    13.4    5700      13    5782    13.5    5865      14
    5943    13.7    6021    13.3    6100      13    6186    13.4    6273    13.7
    6360    14.1    6430    13.8    6500    13.5    6555    13.8    6610    14.1
    6660    13.9    6673      14    6700      16    6736      22    6758      24
    6818      26    6822      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3836    .045    4787    .045    5219    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4787    5219              160     133     105             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888       T
888       T

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 2.649

INPUT
Description:
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    4817      28    4850       6    4900       6    4950       6    5000       6
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65    13.1
  5195.3      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4817    .045    4817     .04  5195.3    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4817  5195.3              128     128     128             .3       .5

BRIDGE                 RIVER: RIVER-1
REACH: Reach-1            RS: 2.637

INPUT
Description:
Distance from Upstream XS =      20
Deck/Roadway Width        =      80
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************
    4814   28.16   25.16    4850    28.4    25.4    4900    28.8    25.8
    5000      29      26    5100    29.2    26.2    5150      29      26
    5200    28.8    25.8

Upstream Bridge Cross Section Data
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    4817      28    4850       6    4900       6    4950       6    5000       6
```

```
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65    13.1
  5195.3      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4817    .045    4817     .04  5195.3    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4817  5195.3             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    4814   28.16   25.16    4850    28.4    25.4    4900    28.8    25.8
    5000      29      26    5100    29.2    26.2    5150      29      26
    5250    28.8    25.8

Downstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    4827      28    4860       6    4880     5.9    5000       6    5019       6
    5135       6    5140       6  5150.5      13  5162.5      13    5179      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4827    .045    4827     .04    5179    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888       T
888       T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=    4900    Downstream=    4900
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
       3       5       3      28
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       3       5       3      28

Pier Data
Pier Station     Upstream=    4967    Downstream=    4967
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
       3       5       3      28
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       3       5       3      28

Pier Data
Pier Station     Upstream=    5033    Downstream=    5033
Upstream     num=       2
    Width   Elev    Width   Elev
```

```
*******************************
       3       5       3      28
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       3       5       3      28

Pier Data
Pier Station     Upstream=    5100    Downstream=    5100
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
       3       5       3      28
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       3       5       3      28

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Yarnell                KVal =     1.2
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 2.625

INPUT
Description: Revised
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    4827      28    4860       6    4880     5.9    5000       6    5019       6
    5135       6    5140       6  5150.5      13  5162.5      13    5179      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4827    .045    4827     .04    5179    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4827    5179               60      85     110             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888       T
888       T

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 2.609

INPUT
Description:
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    4860      25    4885       5  4899.6       5  4913.3       5  4917.8       5
  4966.9       5  4990.4       5  5013.8       5    5015       5  5038.4       5
  5061.8       5    5063       5  5086.4       5  5109.8       5    5159       5
  5185.6       5    5208       5    5230      25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
```

```
    4860    .035    4860     .04    5230    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4860    5230              100     100      90             .2       .4
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888       T
888       T

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 2.59

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    4010      22    4100      20    4160      20    4210      16    4256      15
    4303      14    4351    13.6    4400    13.2    4470    13.9    4540    14.5
    4600      14    4678    13.3    4756    12.7    4835      12    4887      11
    4940      10    5000       8    5016       6    5025       5    5100       5
    5120       6    5142       8    5200    9.76    5208      10    5232      12
    5316    12.4    5401    12.8    5485    13.2    5570    13.6    5655      14
    5720      14    5775      15    5830      16    5891      17    5953      18
    5960      16    5980    15.5    6010      16    6017    18.5    6027      16
    6100      14    6155      15    6210      16    6278    16.7    6346    17.3
    6415      18    6455      22    6475      24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4010    .035    4835     .04    5200    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4835    5200              345     345     340             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888       T
888       T

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 2.524

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    3920      22    3945      16    3997    15.6    4050    15.2    4098    15.7
    4147    16.2    4233    15.1    4320      14    4400    12.7    4480    11.5
    4556    12.4    4633    13.4    4710    14.3    4783    13.1    4856      12
    4926      10    4997       8    5013       6    5030     4.5    5085     4.5
    5140     4.5    5150       6    5175       8    5250      10    5320      11
    5390      12    5460    12.2    5530    12.3    5600    12.5    5686    12.7
    5773    12.8    5859      13    5946    13.2    6033    13.3    6120    13.5
    6130      14    6140      16    6146      14    6200      14    6275      15
    6350      16    6373      18    6430      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3920    .035    4856     .04    5320    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4856    5320              450     450     450             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888       T
888       T

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 2.439

INPUT
```

Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3680	20	3700	16	3775	14.5	3850	13	3937	13.3
4025	13.6	4112	14	4200	14.3	4286	13.9	4373	13.5
4459	13.1	4546	12.7	4633	12.3	4720	11.9	4785	11.9
4850	12	4895	10	4917	8	4985	6	5050	4.9
5115	3.8	5120	4	5152	8	5204	9	5256	10
5320	10.7	5384	11.3	5448	12	5519	12	5590	12
5662	12	5685	18	5730	18	5740	16	5760	15.3
5834	15.5	5908	15.8	5982	16	6003	20	6027	22
6037	27								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3680	.035	4895	.04	5256	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4895 5256 520 520 520 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888	T		
888	T		

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 2.341

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3440	24	3473	14	3550	13.3	3600	13.7	3650	14.2
3737	13.9	3825	13.6	3912	13.3	4000	13	4090	12.9
4180	12.8	4270	12.7	4360	12.6	4450	12.5	4460	11.5
4500	11.5	4520	12.5	4573	12.2	4626	12	4704	11.3
4782	10.7	4860	10	4910	9	4960	8	4990	6
5025	4	5050	3.3	5110	6	5147	10	5229	10.5
5312	11	5394	11.5	5477	12	5496	14	5508	16
5591	16	5674	16	5757	16	5840	16	5855	16
5885	34								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3440	.035	4860	.035	5147	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4860 5147 550 580 600 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888	T		
888	T		

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 2.231

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    3413    .035    4644    .035    5355    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4644    5355              300     400     430             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        T
888        T

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 2.155

INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    3422      30    3468      14    3554    13.7    3640    13.3    3726      13
    3812    12.7    3898    12.3    3985      12    4057    11.7    4130    11.5
    4210    11.7    4290      12    4370    12.2    4458    12.1    4547    12.1
    4636      12    4696      10    4728       8    4760     6.5    4820     6.5
    4880     6.5    4922       8    5000    10.3    5070      10    5160       4
    5175     2.5    5200     2.5    5222       4    5238       8    5250      10
    5300     9.9    5350     9.8    5415    10.5    5480    11.3    5545      12
    5626      13    5708      14    5722      16    5803      18    5834      26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    3422    .035    4728    .035    5250    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4728    5250              330     500     450             .1       .3

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 2.06

INPUT
Description:
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    3622      30    3666      14    3743    13.7    3821    13.3    3899      13
    3976    12.7    4054    12.3    4132      12    4186    11.2    4240    10.5
    4330    11.1    4420    11.7    4501    11.4    4582      11    4663    10.7
    4744    10.3    4825      10    4897       4    4958       2    4974       2
    5035       4    5058      10    5114    10.2    5170    10.5    5230    10.2
    5290      10    5370     9.6    5450     9.2    5530     9.6    5610      10
    5665      11    5720      12    5781    15.3    5843    18.7    5905      22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    3622    .035    4825    .035    5058    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4825    5058              480     430     330             .1       .3

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 1.979

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    3516      30    3572      14    3588    12.3    3668    12.2    3749    12.2
    3830    12.1    3911    12.1    3992      12    4069    11.6    4146    11.2
    4223    10.9    4300    10.5    4384      11    4468    11.5    4553      12
    4626    12.4    4700    12.7    4776    12.4    4852      12    4863       4
    4890       3    4933       4    4993       5    5053       6    5101       7
```

5150	8	5202	9	5254	10	5302	10.2	5350	10.5
5405	10.4	5460	10.4	5507	10.1	5555	9.8	5568	10
5619	9.5	5670	9	5693	10	5759	11	5826	12
5878	14	5930	16	6000	20.7	6070	25.3	6140	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3516	.035	4852	.035	5150	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4852	5150	400	400	400	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3
Reach-1	2.844	.045	.045	.035
Reach-1	2.782	.045	.045	.035
Reach-1	2.732	.045	.045	.035
Reach-1	2.675	.045	.045	.035
Reach-1	2.649	.045	.04	.035
Reach-1	2.637	Bridge		
Reach-1	2.625	.045	.04	.035
Reach-1	2.609	.035	.04	.035
Reach-1	2.59	.035	.04	.035
Reach-1	2.524	.035	.04	.035
Reach-1	2.439	.035	.04	.035
Reach-1	2.341	.035	.035	.035
Reach-1	2.231	.035	.035	.035
Reach-1	2.155	.035	.035	.035
Reach-1	2.06	.035	.035	.035
Reach-1	1.979	.035	.035	.035

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	2.844	325	325	325
Reach-1	2.782	265	265	265
Reach-1	2.732	300	300	300
Reach-1	2.675	160	133	105
Reach-1	2.649	128	128	128
Reach-1	2.637	Bridge		
Reach-1	2.625	60	85	110
Reach-1	2.609	100	100	90
Reach-1	2.59	345	345	340
Reach-1	2.524	450	450	450
Reach-1	2.439	520	520	520
Reach-1	2.341	550	580	600
Reach-1	2.231	300	400	430
Reach-1	2.155	330	500	450
Reach-1	2.06	480	430	330
Reach-1	1.979	400	400	400

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	2.844	.1	.3

```
*Reach-1          *    2.782   *        .1*        .3*
*Reach-1          *    2.732   *        .1*        .3*
*Reach-1          *    2.675   *        .1*        .3*
*Reach-1          *    2.649   *        .3*        .5*
*Reach-1          *    2.637   *Bridge   *          *
*Reach-1          *    2.625   *        .3*        .5*
*Reach-1          *    2.609   *        .2*        .4*
*Reach-1          *    2.59    *        .1*        .3*
*Reach-1          *    2.524   *        .1*        .3*
*Reach-1          *    2.439   *        .1*        .3*
*Reach-1          *    2.341   *        .1*        .3*
*Reach-1          *    2.231   *        .1*        .3*
*Reach-1          *    2.155   *        .1*        .3*
*Reach-1          *    2.06    *        .1*        .3*
*Reach-1          *    1.979   *        .1*        .3*
*****************************************************
```

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	2.844	42800.00	7.40	22.26		22.52	0.000524	4.35	10627.13	2811.09	0.20
Reach-1	2.844	32500.00	7.40	20.38		20.61	0.000599	4.23	8579.58	2715.90	0.21
Reach-1	2.844	5900.00	7.40	13.65		13.78	0.000729	2.80	2109.75	775.40	0.21
Reach-1	2.782	42800.00	7.10	22.09		22.35	0.000485	4.33	10406.44	2774.68	0.20
Reach-1	2.782	32500.00	7.10	20.21		20.43	0.000503	4.02	8677.12	2764.07	0.20
Reach-1	2.782	5900.00	7.10	13.52		13.59	0.000384	2.14	2788.21	1035.18	0.15
Reach-1	2.732	42800.00	7.10	21.64		22.15	0.000969	5.93	7486.14	2738.77	0.28
Reach-1	2.732	32500.00	7.10	19.80		20.23	0.000982	5.44	6280.44	2698.25	0.28
Reach-1	2.732	5900.00	7.10	13.36		13.46	0.000601	2.63	2259.76	923.30	0.19
Reach-1	2.675	42800.00	6.80	20.58		21.66	0.002336	8.37	5150.32	2709.02	0.43
Reach-1	2.675	32500.00	6.80	18.92		19.76	0.002222	7.39	4417.36	2672.94	0.40
Reach-1	2.675	5900.00	6.80	13.10		13.24	0.000929	2.98	1977.22	815.67	0.23
Reach-1	2.649	42800.00	6.00	19.97	14.51	21.34	0.002170	9.37	4567.31	354.05	0.46
Reach-1	2.649	32500.00	6.00	18.47	13.08	19.48	0.001846	8.04	4039.82	349.52	0.42
Reach-1	2.649	5900.00	6.00	13.04	8.27	13.15	0.000416	2.70	2185.90	321.12	0.18
Reach-1	2.637	Bridge									

```
* Reach-1* 2.625       *    42800.00 *     5.90 *    19.71 *          *    21.32 *  0.002633 *    10.20 *  4197.66 *   330.43 *
0.50 *
* Reach-1* 2.625       *    32500.00 *     5.90 *    18.30 *          *    19.48 *  0.002197 *     8.70 *  3736.61 *   326.79 *
0.45 *
* Reach-1* 2.625       *     5900.00 *     5.90 *    12.94 *          *    13.07 *  0.000496 *     2.92 *  2021.92 *   300.81 *
0.20 *
*             *             *             *          *          *          *          *          *          *          *          *
*
* Reach-1* 2.609       *    42800.00 *     5.00 *    19.78 *          *    20.90 *  0.001609 *     8.51 *  5029.80 *   357.73 *
0.40 *
* Reach-1* 2.609       *    32500.00 *     5.00 *    18.35 *          *    19.15 *  0.001304 *     7.19 *  4520.25 *   354.36 *
0.35 *
* Reach-1* 2.609       *     5900.00 *     5.00 *    12.94 *          *    13.01 *  0.000243 *     2.24 *  2637.74 *   341.65 *
0.14 *
*             *             *             *          *          *          *          *          *          *          *          *
*
* Reach-1* 2.59        *    42800.00 *     5.00 *    19.73 *          *    20.66 *  0.001769 *     7.94 *  5548.48 *  2268.83 *
0.41 *
* Reach-1* 2.59        *    32500.00 *     5.00 *    18.24 *          *    18.98 *  0.001707 *     7.11 *  4744.50 *  2233.54 *
0.40 *
* Reach-1* 2.59        *     5900.00 *     5.00 *    12.77 *          *    12.95 *  0.001163 *     3.46 *  1790.93 *   646.84 *
0.29 *
*             *             *             *          *          *          *          *          *          *          *          *
*
* Reach-1* 2.524       *    42800.00 *     4.50 *    19.59 *          *    20.09 *  0.000980 *     5.93 *  7673.56 *  2452.05 *
0.31 *
* Reach-1* 2.524       *    32500.00 *     4.50 *    18.01 *          *    18.43 *  0.001014 *     5.47 *  6395.47 *  2436.48 *
0.31 *
* Reach-1* 2.524       *     5900.00 *     4.50 *    12.48 *          *    12.60 *  0.000810 *     2.84 *  2134.77 *   913.94 *
0.24 *
*             *             *             *          *          *          *          *          *          *          *          *
*
* Reach-1* 2.439       *    42800.00 *     3.80 *    19.46 *          *    19.71 *  0.000491 *     4.47 * 10745.51 *  2317.46 *
0.22 *
* Reach-1* 2.439       *    32500.00 *     3.80 *    17.83 *          *    18.05 *  0.000535 *     4.25 *  8821.92 *  2254.24 *
0.23 *
* Reach-1* 2.439       *     5900.00 *     3.80 *    12.14 *          *    12.27 *  0.000671 *     2.93 *  2249.50 *   994.68 *
0.22 *
*             *             *             *          *          *          *          *          *          *          *          *
*
* Reach-1* 2.341       *    42800.00 *     3.30 *    19.29 *          *    19.48 *  0.000360 *     4.33 * 13036.32 *  2404.93 *
0.22 *
* Reach-1* 2.341       *    32500.00 *     3.30 *    17.60 *          *    17.79 *  0.000450 *     4.39 * 10179.42 *  2396.54 *
0.24 *
* Reach-1* 2.341       *     5900.00 *     3.30 *    11.59 *          *    11.82 *  0.001091 *     3.98 *  1733.66 *   779.67 *
0.32 *
*             *             *             *          *          *          *          *          *          *          *          *
*
* Reach-1* 2.231       *    42800.00 *     3.00 *    19.18 *          *    19.30 *  0.000214 *     3.14 * 15975.07 *  2385.55 *
0.16 *
```

```
* Reach-1* 2.231       *    32500.00 *     3.00 *    17.46 *          *    17.58 *  0.000248 *     3.04 * 12731.46 *  2352.95 *
0.17 *
* Reach-1* 2.231       *     5900.00 *     3.00 *    11.23 *          *    11.32 *  0.000593 *     2.37 *  2520.95 *   788.71 *
0.22 *
*             *             *             *          *          *          *          *          *          *          *
*
* Reach-1* 2.155       *    42800.00 *     2.50 *    19.12 *          *    19.21 *  0.000171 *     2.89 * 18684.13 *  2354.09 *
0.15 *
* Reach-1* 2.155       *    32500.00 *     2.50 *    17.39 *          *    17.48 *  0.000210 *     2.89 * 14622.82 *  2320.10 *
0.16 *
* Reach-1* 2.155       *     5900.00 *     2.50 *    10.92 *          *    11.04 *  0.000814 *     2.90 *  2172.29 *   780.18 *
0.27 *
*             *             *             *          *          *          *          *          *          *          *
*
* Reach-1* 2.06        *    42800.00 *     2.00 *    19.05 *          *    19.15 *  0.000169 *     3.27 * 18250.76 *  2197.55 *
0.15 *
* Reach-1* 2.06        *    32500.00 *     2.00 *    17.31 *          *    17.40 *  0.000201 *     3.27 * 14444.68 *  2160.70 *
0.16 *
* Reach-1* 2.06        *     5900.00 *     2.00 *    10.32 *          *    10.59 *  0.000960 *     4.21 *  1619.84 *   820.37 *
0.31 *
*             *             *             *          *          *          *          *          *          *          *
*
* Reach-1* 1.979       *    42800.00 *     3.00 *    19.00 *    13.18 *    19.08 *  0.000145 *     2.90 * 19913.77 *  2420.18 *
0.14 *
* Reach-1* 1.979       *    32500.00 *     3.00 *    17.24 *    12.57 *    17.32 *  0.000176 *     2.91 * 15682.74 *  2387.81 *
0.15 *
* Reach-1* 1.979       *     5900.00 *     3.00 *     9.80 *     7.56 *    10.09 *  0.001466 *     4.38 *  1435.47 *   488.58 *
0.37 *
*****************************************************************************************************************************
************
```

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Proposed

River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.782 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.782 Profile: PF 2
Warning:The cross-section end points had to be extended vertically for the computed water surface.
River: RIVER-1 Reach: Reach-1 RS: 2.782 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.732 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.732 Profile: PF 2
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.732 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.675 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.675 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.675 Profile: PF 3
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.637 Profile: PF 3
Warning:The Yarnell method gave an invalid answer. The upstream energy was less than the downstream energy. The program defaulted to the next valid (user selected) method. If the Yarnell method was the only one selected, the program will default to an energy based solution.
River: RIVER-1 Reach: Reach-1 RS: 2.609 Profile: PF 3
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RIVER-1 Reach: Reach-1 RS: 2.59 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.524 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.439 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.341 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.06 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 1.979 Profile: PF 1
Warning:The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
River: RIVER-1 Reach: Reach-1 RS: 1.979 Profile: PF 3
Warning:Divided flow computed for this cross-section.

APPENDIX E – HEC-RAS REPORT FOR THE PROPOSED CONDITIONS WITH EXISTING BRIDGE NOT REMOVED

HEC-RAS Version 3.1.2 April 2004
U.S. Army Corp of Engineers
Hydrologic Engineering Center

```
                              609 Second Street
                              Davis, California

           X     X  XXXXXX    XXXX        XXXX       XX      XXXX
           X     X  X        X    X       X   X     X  X    X
           X     X  X        X            X   X    X    X   X
           XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
           X     X  X        X            X  X     X    X        X
           X     X  X        X    X       X   X    X    X        X
           X     X  XXXXXX    XXXX        X    X   X    X   XXXXX

*******************************************************************************

PROJECT DATA
Project Title: El Camino Real Br
Project File : Elcamino.prj
Run Date and Time: 6/6/2005 1:03:59 PM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
      PROPOSED CONDITIONS WITH EXISTING BRIDGE NOT REMOVED

    100-YR FLOOD

*******************************************************************************

PLAN DATA

Plan Title: Prop+Exist
Plan File : C:\HEC Data\RAS\Elcamino.p02

           Geometry Title: Prop+Exit
           Geometry File : C:\HEC Data\RAS\Elcamino.g03

           Flow Title    : Prop+Exis
           Flow File     : C:\HEC Data\RAS\Elcamino.f03

Plan Summary Information:
Number of:  Cross Sections =   16    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    2    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow


*******************************************************************************

FLOW DATA

Flow Title: Prop+Exis
Flow File : C:\HEC Data\RAS\Elcamino.f03

Flow Data (cfs)
*******************************************************************************************
* River           Reach           RS      *            PF 1            PF 2            PF 3 *
* RIVER-1         Reach-1         2.844   *           42800           32500            5900 *
```

```
* RIVER-1          Reach-1          2.732   *          42800          32500          5900 *
* RIVER-1          Reach-1          2.675   *          42800          32500          5900 *
* RIVER-1          Reach-1          2.625   *          42800          32500          5900 *
* RIVER-1          Reach-1          2.614   *          40100          32500          5900 *
* RIVER-1          Reach-1          2.524   *          40800          32500          5900 *
* RIVER-1          Reach-1          2.439   *          41500          32500          5900 *
* RIVER-1          Reach-1          2.341   *          42200          32500          5900 *
* RIVER-1          Reach-1          2.231   *          42800          32500          5900 *
* RIVER-1          Reach-1          2.155   *          42800          32500          5900 *
*****************************************************************************************

Boundary Conditions
*****************************************************************************************
*******
*  River                  Reach                  Profile                *                  Upstream
Downstream    *
*****************************************************************************************
*******
* RIVER-1          Reach-1          PF 1             *                                    Known WS
= 19 *
* RIVER-1          Reach-1          PF 2             *                                   Known WS =
17.24 *
* RIVER-1          Reach-1          PF 3             *                                   Known WS =
10.5 *
*****************************************************************************************
*******

*************************************************************************

GEOMETRY DATA

Geometry Title: Prop+Exit
Geometry File : C:\HEC Data\RAS\Elcamino.g03

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.844

INPUT
Description: Revised
Station Elevation Data    num=      88
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************
    3745    45.5    3767      39    3803    36.6    3810    37.2    3821    40.4
    3837    39.4    3850      40    3892    39.4    3910    39.5    3924    41.5
    3934    41.5    3952    37.9    3977    30.9    3998    24.3    4010    21.3
    4038    18.3    4046    16.4    4056    16.6    4086    13.9    4130    11.5
    4187      11    4220    14.2    4232    16.3    4268    19.5    4281    21.4
    4298    19.6    4313    15.6    4316    15.5    4327    15.3    4334    16.3
    4350    15.9    4365      13    4392    10.1    4456     7.5    4559     8.3
    4569     7.7    4587     8.5    4613    11.9    4632    15.5    4641    15.8
    4652    14.5    4663    16.4    4690    16.3    4704    13.7    4733    13.6
    4764    22.8    4770    22.1    4780    18.5    4790    13.4    4798     7.6
    4807     7.4    4810    11.1    4845     7.4    4964     7.5    5141     7.6
    5147     9.9    5153    13.4    5180      14    5185    15.7    5196    14.8
    5287    14.4    5340    14.4    5427    14.6    5513    14.8    5600      15
    5680      15    5760      15    5840      15    5920      15    6000      15
    6060    14.7    6120    14.5    6200      15    6256    14.4    6312    13.8
    6350    16.2    6366      16    6380      14    6455    13.9    6530    13.7
    6599    13.9    6668      14    6716      16    6725      15    6742      16
    6758      20    6822      22    6848      26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3745    .045    4790    .045    5180    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4790    5180              325     325     325              .1       .3
```

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3745	4770		T
6060	6848		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6
3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8
4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6
4708	12.9	4727	12.4	4740	11	4763	7.7	4784	7.3
4823	7.1	4994	7.2	5165	7.2	5176	8.7	5184	12.4
5187	12.6	5212	12.8	5218	14.8	5230	14.2	5296	14.1
5326	14.2	5327	14.2	5400	14.5	5455	14.2	5510	14
5590	13.9	5670	13.8	5725	14	5780	14.2	5840	14
5900	13.8	5950	14	6000	14.2	6065	14	6130	13.8
6195	14.1	6260	14.3	6340	14	6420	13.8	6500	13.5
6563	13.7	6626	13.8	6690	14	6700	15.8	6718	15.5
6743	20								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3877	.045	4727	.045	5184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4727	5184	265	265	265	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3877	4710		T
5830	6743		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.732

INPUT
Description: Revised
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3819	29.5	3837	29.1	3837	28.6	3856	28.8	3877	28.4
3877	28.9	3889	28.5	3904	28.6	3912	30.4	3929	29.3
3942	26.9	3949	25.1	3959	22	3967	20.7	3976	20.3
4012	16.6	4041	14.9	4118	12.9	4174	13	4214	13.8
4227	13.7	4277	15.2	4297	14.9	4320	16.8	4329	18.2
4368	13.3	4382	12.8	4405	10.2	4416	9.3	4425	9.2
4430	9.1	4445	10.3	4449	11	4454	11	4460	11.7
4488	11.7	4515	12.3	4541	11.5	4551	10.9	4560	9.3
4569	7.5	4649	7.5	4659	10.3	4695	18.2	4700	19
4714	22.1	4742	24.7	4758	22.5	4766	22.4	4780	18.3
4793	15.5	4818	11.5	4829	7.6	4854	7.2	4998	7.1
5171	7.1	5185	12.2	5211	12.3	5216	14.2	5250	13.9
5335	14	5365	13.5	5450	14.2	5525	13.9	5600	13.7

5675	13.4	5750	13.2	5827	13.5	5905	13.7	5982	14
6060	14.3	6148	14.1	6236	13.9	6324	13.8	6412	13.6
6500	13.4	6566	13.6	6633	13.8	6700	14	6720	12
6730	14	6758	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3819	.045	4793	.045	5185	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4793	5185	300	300	300	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3819	4740		T
5430	6758		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.675

INPUT
Description: Revised
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3836	28	3850	26	3887	25	3897	24.2	3898	24.7
3958	24.2	3984	19.6	3997	18.1	4011	17.3	4063	16
4077	15.9	4099	17.6	4104	17.7	4108	18.2	4160	15.5
4170	15.4	4210	13.9	4222	13	4235	12.7	4268	15
4279	15.5	4295	14	4310	11.7	4320	11	4334	10.6
4350	11.5	4373	12.2	4407	12.2	4458	9.7	4462	9.5
4482	9.1	4525	11.6	4633	13.4	4686	15.1	4707	17.2
4724	19.9	4733	22.1	4742	23	4755	21.8	4763	21.7
4782	16.1	4787	15.4	4806	14.6	4840	11.7	4852	11.6
4862	10.7	4873	7.3	4893	6.9	5018	6.8	5119	6.8
5149	7.2	5151	7.8	5157	8	5168	9.7	5171	9.7
5174	10.3	5190	12	5204	12	5212	11.5	5219	13
5224	14.6	5228	13.4	5346	13.8	5370	13.5	5450	14.3
5533	13.9	5616	13.4	5700	13	5782	13.5	5865	14
5943	13.7	6021	13.3	6100	13	6186	13.4	6273	13.7
6360	14.1	6430	13.8	6500	13.5	6555	13.8	6610	14.1
6660	13.9	6673	14	6700	16	6736	22	6758	24
6818	26	6822	28						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3836	.045	4787	.045	5219	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4787	5219	160	133	105	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3836	4745		T
5210	6822		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.649

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4817	28	4850	6	4900	6	4950	6	5000	6

```
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65    13.1
  5195.3      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4817    .045    4817     .04  5195.3    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4817  5195.3              128     128     128             .3       .5

BRIDGE


RIVER: RIVER-1
REACH: Reach-1            RS: 2.637

INPUT
Description:
Distance from Upstream XS =      20
Deck/Roadway Width        =      80
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    4814   28.16   25.16    4850    28.4    25.4    4900    28.8    25.8
    5000      29      26    5100    29.2    26.2    5150      29      26
    5200    28.8    25.8

Upstream Bridge Cross Section Data
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    4817      28    4850       6    4900       6    4950       6    5000       6
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65    13.1
  5195.3      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4817    .045    4817     .04  5195.3    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4817  5195.3             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    4814   28.16   25.16    4850    28.4    25.4    4900    28.8    25.8
    5000      29      26    5100    29.2    26.2    5150      29      26
    5250    28.8    25.8

Downstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    4827      28    4860       6    4880     5.9    5000       6    5019       6
    5135       6    5140       6  5150.5      13  5162.5      13    5179      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4827    .045    4827     .04    5179    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820                T
```

```
    5200    5179                T

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins           =
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=    4900    Downstream=    4900
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3       5       3      28
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3       5       3      28

Pier Data
Pier Station     Upstream=    4967    Downstream=    4967
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3       5       3      28
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3       5       3      28

Pier Data
Pier Station     Upstream=    5033    Downstream=    5033
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3       5       3      28
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3       5       3      28

Pier Data
Pier Station     Upstream=    5100    Downstream=    5100
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3       5       3      28
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       3       5       3      28

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Yarnell                KVal =     1.2
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
```

Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	21.80	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	20.55	E.G. Elev (ft)	21.72	21.92
Q Total (cfs)	42800.00	W.S. Elev (ft)	20.33	20.33
Q Bridge (cfs)	42800.00	Crit W.S. (ft)	14.72	15.10
Q Weir (cfs)		Max Chl Dpth (ft)	14.33	14.43
Weir Sta Lft (ft)		Vel Total (ft/s)	9.46	10.11
Weir Sta Rgt (ft)		Flow Area (sq ft)	4522.67	4232.64
Weir Submerg		Froude # Chl	0.46	0.49
Weir Max Depth (ft)		Specif Force (cu ft)	43939.37	42824.51
Min El Weir Flow (ft)	28.26	Hydr Depth (ft)	13.18	13.22
Min El Prs (ft)	26.20	W.P. Total (ft)	466.44	444.22
Delta EG (ft)	0.00	Conv. Total (cfs)	763945.6	706676.3
Delta WS (ft)	0.22	Top Width (ft)	343.14	320.06
BR Open Area (sq ft)	6060.23	Frctn Loss (ft)		
BR Open Vel (ft/s)	10.11	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	1.90	2.18
Br Sel Method	Yarnell	Power Total (lb/ft s)	17.98	22.06

BRIDGE OUTPUT Profile #PF 2

E.G. US. (ft)	20.46	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	19.63	E.G. Elev (ft)	20.40	20.14
Q Total (cfs)	32500.00	W.S. Elev (ft)	19.49	19.01
Q Bridge (cfs)	32500.00	Crit W.S. (ft)	13.32	13.64
Q Weir (cfs)		Max Chl Dpth (ft)	13.49	13.11
Weir Sta Lft (ft)		Vel Total (ft/s)	7.68	8.53
Weir Sta Rgt (ft)		Flow Area (sq ft)	4233.94	3811.65
Weir Submerg		Froude # Chl	0.38	0.43
Weir Max Depth (ft)		Specif Force (cu ft)	35410.59	32671.23
Min El Weir Flow (ft)	28.26	Hydr Depth (ft)	12.43	12.04
Min El Prs (ft)	26.20	W.P. Total (ft)	456.62	429.29
Delta EG (ft)	0.43	Conv. Total (cfs)	694177.3	607139.2
Delta WS (ft)	0.64	Top Width (ft)	340.59	316.62
BR Open Area (sq ft)	6060.23	Frctn Loss (ft)	0.20	0.06
BR Open Vel (ft/s)	8.53	C & E Loss (ft)	0.06	0.04
Coef of Q		Shear Total (lb/sq ft)	1.27	1.59
Br Sel Method	Energy only	Power Total (lb/ft s)	9.74	13.54

Warning: The Yarnell method gave an invalid answer. The upstream energy was less than the downstream energy. The program defaulted to the next valid (user selected) method. If the Yarnell method was the only one selected, the program will default to an energy based solution.

BRIDGE OUTPUT Profile #PF 3

E.G. US. (ft)	13.27	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	13.16	E.G. Elev (ft)	13.26	13.20
Q Total (cfs)	5900.00	W.S. Elev (ft)	13.14	13.07
Q Bridge (cfs)	5900.00	Crit W.S. (ft)	8.34	8.44
Q Weir (cfs)		Max Chl Dpth (ft)	7.14	7.17
Weir Sta Lft (ft)		Vel Total (ft/s)	2.77	2.99
Weir Sta Rgt (ft)		Flow Area (sq ft)	2133.61	1976.09
Weir Submerg		Froude # Chl	0.19	0.21
Weir Max Depth (ft)		Specif Force (cu ft)	8032.01	7461.54
Min El Weir Flow (ft)	28.26	Hydr Depth (ft)	6.64	6.56
Min El Prs (ft)	26.20	W.P. Total (ft)	382.88	362.21
Delta EG (ft)	0.09	Conv. Total (cfs)	249127.2	227496.1
Delta WS (ft)	0.11	Top Width (ft)	321.42	301.17
BR Open Area (sq ft)	6060.23	Frctn Loss (ft)	0.05	0.02
BR Open Vel (ft/s)	2.99	C & E Loss (ft)	0.01	0.01
Coef of Q		Shear Total (lb/sq ft)	0.20	0.23
Br Sel Method	Energy only	Power Total (lb/ft s)	0.54	0.68

Warning: The Yarnell method gave an invalid answer. The upstream energy was less than the downstream
energy. The program defaulted to the next valid (user selected) method. If the Yarnell method
was the only one selected, the program will default to an energy based solution.

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.625

INPUT
Description: Revised
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4827	28	4860	6	4880	5.9	5000	6	5019	6
5135	6	5140	6	5150.5	13	5162.5	13	5179	28

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4827	.045	4827	.04	5179	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4827	5179	40	58	80	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4827	4820		T
5200	5179		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.614

INPUT
Description: This is a REPEATED section.
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4917.9	19.4	4918.9	19.4
4919	7.6	4942.4	7.3	4965.8	7	4965.9	19.4	4966.9	19.4
4967	6.8	4990.4	6	5013.8	5	5013.9	19.4	5014.9	19.4
5015	5	5038.4	5	5061.8	5	5061.9	19.4	5062.9	19.4
5063	5	5086.4	5	5109.8	5	5109.9	18.7	5110.9	18.7
5111	5	5134.4	5	5157.8	5	5157.9	18.7	5158.9	18.7
5159	5	5163.4	6	5185.6	12	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5212.2	27	27	27	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

BRIDGE

RIVER: RIVER-1
REACH: Reach-1 RS: 2.6115

INPUT
Description: Bridge #1
Distance from Upstream XS = .1
Deck/Roadway Width = 26.8
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Upstream Bridge Cross Section Data
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4917.9	19.4	4918.9	19.4
4919	7.6	4942.4	7.3	4965.8	7	4965.9	19.4	4966.9	19.4
4967	6.8	4990.4	6	5013.8	5	5013.9	19.4	5014.9	19.4
5015	5	5038.4	5	5061.8	5	5061.9	19.4	5062.9	19.4
5063	5	5086.4	5	5109.8	5	5109.9	18.7	5110.9	18.7
5111	5	5134.4	5	5157.8	5	5157.9	18.7	5158.9	18.7
5159	5	5163.4	6	5185.6	12	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left Right Coeff Contr. Expan.
4881.3 5212.2 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

Downstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2

3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Downstream Bridge Cross Section Data
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4917.9	19.4	4918.9	19.4
4919	7.6	4942.4	7.3	4965.8	7	4965.9	19.4	4966.9	19.4
4967	6.8	4990.4	6	5013.8	5	5013.9	19.4	5014.9	19.4
5015	5	5038.4	5	5061.8	5	5061.9	19.4	5062.9	19.4
5063	5	5086.4	5	5109.8	5	5109.9	18.7	5110.9	18.7
5111	5	5134.4	5	5157.8	5	5157.9	18.7	5158.9	18.7
5159	5	5163.4	6	5185.6	12	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left Right Coeff Contr. Expan.
4881.3 5212.2 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 17.6
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Energy

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum

Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	21.60	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	20.20	E.G. Elev (ft)	21.57	21.41
Q Total (cfs)	40100.00	W.S. Elev (ft)	20.08	19.89
Q Bridge (cfs)	40100.00	Crit W.S. (ft)	14.80	14.80
Q Weir (cfs)		Max Chl Dpth (ft)	15.08	14.89
Weir Sta Lft (ft)		Vel Total (ft/s)	9.82	9.91
Weir Sta Rgt (ft)		Flow Area (sq ft)	4084.03	4045.23
Weir Submerg		Froude # Chl	0.48	0.49
Weir Max Depth (ft)		Specif Force (cu ft)	40629.16	39981.90
Min El Weir Flow (ft)	23.01	Hydr Depth (ft)	21.01	18.54
Min El Prs (ft)	20.00	W.P. Total (ft)	621.68	597.32
Delta EG (ft)	0.22	Conv. Total (cfs)	532156.4	537903.7
Delta WS (ft)	0.28	Top Width (ft)	194.38	218.21
BR Open Area (sq ft)	4254.04	Frctn Loss (ft)	0.15	0.00
BR Open Vel (ft/s)	9.91	C & E Loss (ft)	0.01	0.03
Coef of Q		Shear Total (lb/sq ft)	2.33	2.35
Br Sel Method	Energy only	Power Total (lb/ft s)	22.87	23.29

BRIDGE OUTPUT Profile #PF 2

E.G. US. (ft)	19.84	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	18.65	E.G. Elev (ft)	19.84	19.73
Q Total (cfs)	32500.00	W.S. Elev (ft)	18.64	18.50
Q Bridge (cfs)	32500.00	Crit W.S. (ft)	13.66	13.66
Q Weir (cfs)		Max Chl Dpth (ft)	13.64	13.50
Weir Sta Lft (ft)		Vel Total (ft/s)	8.79	8.90
Weir Sta Rgt (ft)		Flow Area (sq ft)	3696.21	3651.43
Weir Submerg		Froude # Chl	0.46	0.47
Weir Max Depth (ft)		Specif Force (cu ft)	31667.20	31251.99
Min El Weir Flow (ft)	23.01	Hydr Depth (ft)	11.79	11.61
Min El Prs (ft)	20.00	W.P. Total (ft)	493.45	490.49
Delta EG (ft)	0.12	Conv. Total (cfs)	525657.6	517157.5
Delta WS (ft)	0.15	Top Width (ft)	313.39	314.48
BR Open Area (sq ft)	4254.04	Frctn Loss (ft)	0.10	0.00
BR Open Vel (ft/s)	8.90	C & E Loss (ft)	0.01	0.00
Coef of Q		Shear Total (lb/sq ft)	1.79	1.84
Br Sel Method	Energy only	Power Total (lb/ft s)	15.72	16.34

BRIDGE OUTPUT Profile #PF 3

E.G. US. (ft)	13.14	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	13.00	E.G. Elev (ft)	13.14	13.12
Q Total (cfs)	5900.00	W.S. Elev (ft)	13.00	12.98
Q Bridge (cfs)	5900.00	Crit W.S. (ft)	8.32	8.32
Q Weir (cfs)		Max Chl Dpth (ft)	8.00	7.98
Weir Sta Lft (ft)		Vel Total (ft/s)	3.04	3.05
Weir Sta Rgt (ft)		Flow Area (sq ft)	1943.01	1936.68
Weir Submerg		Froude # Chl	0.21	0.21
Weir Max Depth (ft)		Specif Force (cu ft)	7524.83	7484.69
Min El Weir Flow (ft)	23.01	Hydr Depth (ft)	6.64	6.62
Min El Prs (ft)	20.00	W.P. Total (ft)	380.70	380.20
Delta EG (ft)	0.02	Conv. Total (cfs)	213962.7	212991.0
Delta WS (ft)	0.02	Top Width (ft)	292.61	292.45
BR Open Area (sq ft)	4254.04	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	3.05	C & E Loss (ft)	0.00	0.00
Coef of Q		Shear Total (lb/sq ft)	0.24	0.24
Br Sel Method	Energy only	Power Total (lb/ft s)	0.74	0.74

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.609

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4424.6	19.5
4613.1	22.1	4752.2	24.4	4842.8	25.2	4881.3	25.2	4881.4	17.5
4899.6	9.4	4913.3	8	4917.8	7.8	4917.9	19.4	4918.9	19.4
4919	7.6	4942.4	7.3	4965.8	7	4965.9	19.4	4966.9	19.4
4967	6.8	4990.4	6	5013.8	5	5013.9	19.4	5014.9	19.4
5015	5	5038.4	5	5061.8	5	5061.9	19.4	5062.9	19.4
5063	5	5086.4	5	5109.8	5	5109.9	18.7	5110.9	18.7
5111	5	5134.4	5	5157.8	5	5157.9	18.7	5158.9	18.7
5159	5	5163.4	6	5185.6	12	5212	17.2	5212.1	17.2
5212.2	23	5247.2	22.5	5295.1	21.7	5472.7	18.4	5687.5	17.6
5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5	6558	20.5
6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8	6721.8	25.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5212.2	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5212.2	100	100	90	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5212	6721.8		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.59

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4010	22	4100	20	4160	20	4210	16	4256	15
4303	14	4351	13.6	4400	13.2	4470	13.9	4540	14.5
4600	14	4678	13.3	4756	12.7	4835	12	4887	11
4940	10	5000	8	5016	6	5025	5	5100	5
5120	6	5142	8	5200	9.76	5208	10	5232	12
5316	12.4	5401	12.8	5485	13.2	5570	13.6	5655	14
5720	14	5775	15	5830	16	5891	17	5953	18
5960	16	5980	15.5	6010	16	6017	18.5	6027	16
6100	14	6155	15	6210	16	6278	16.7	6346	17.3
6415	18	6455	22	6475	24				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4010	.035	4835	.04	5200	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4835	5200	345	345	340	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4010	4800		T
5210	6475		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.524

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3920	22	3945	16	3997	15.6	4050	15.2	4098	15.7
4147	16.2	4233	15.1	4320	14	4400	12.7	4480	11.5
4556	12.4	4633	13.4	4710	14.3	4783	13.1	4856	12
4926	10	4997	8	5013	6	5030	4.5	5085	4.5
5140	4.5	5150	6	5175	8	5250	10	5320	11
5390	12	5460	12.2	5530	12.3	5600	12.5	5686	12.7
5773	12.8	5859	13	5946	13.2	6033	13.3	6120	13.5
6130	14	6140	16	6146	14	6200	14	6275	15
6350	16	6373	18	6430	28				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3920	.035	4856	.04	5320	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4856	5320	450	450	450	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3920	4650		T
5320	6430		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.439

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3680	20	3700	16	3775	14.5	3850	13	3937	13.3
4025	13.6	4112	14	4200	14.3	4286	13.9	4373	13.5
4459	13.1	4546	12.7	4633	12.3	4720	11.9	4785	11.9
4850	12	4895	10	4917	8	4985	6	5050	4.9
5115	3.8	5120	4	5152	8	5204	9	5256	10
5320	10.7	5384	11.3	5448	12	5519	12	5590	12
5662	12	5685	18	5730	18	5740	16	5760	15.3
5834	15.5	5908	15.8	5982	16	6003	20	6027	22
6037	27								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3680	.035	4895	.04	5256	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4895	5256	520	520	520	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3680	4460		T
5500	6037		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.341

INPUT
Description:

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3440	24	3473	14	3550	13.3	3600	13.7	3650	14.2
3737	13.9	3825	13.6	3912	13.3	4000	13	4090	12.9
4180	12.8	4270	12.7	4360	12.6	4450	12.5	4460	11.5
4500	11.5	4520	12.5	4573	12.2	4626	12	4704	11.3
4782	10.7	4860	10	4910	9	4960	8	4990	6
5025	4	5050	3.3	5110	6	5147	10	5229	10.5
5312	11	5394	11.5	5477	12	5496	14	5508	16
5591	16	5674	16	5757	16	5840	16	5855	16
5885	34								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3440	.035	4860	.035	5147	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4860	5147	550	580	600	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3440	4100		T
5560	5885		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.231

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3413	.035	4644	.035	5355	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4644	5355	300	400	430	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3413	3970		T
5900	5900		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.155

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5

4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4
5175	2.5	5200	2.5	5222	4	5238	8	5250	10
5300	9.9	5350	9.8	5415	10.5	5480	11.3	5545	12
5626	13	5708	14	5722	16	5803	18	5834	26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3422	.035	4728	.035	5250	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4728	5250	330	500	450	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.06

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3622	30	3666	14	3743	13.7	3821	13.3	3899	13
3976	12.7	4054	12.3	4132	12	4186	11.2	4240	10.5
4330	11.1	4420	11.7	4501	11.4	4582	11	4663	10.7
4744	10.3	4825	10	4897	4	4958	2	4974	2
5035	4	5058	10	5114	10.2	5170	10.5	5230	10.2
5290	10	5370	9.6	5450	9.2	5530	9.6	5610	10
5665	11	5720	12	5781	15.3	5843	18.7	5905	22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3622	.035	4825	.035	5058	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4825	5058	480	430	330	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 1.979

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3516	30	3572	14	3588	12.3	3668	12.2	3749	12.2
3830	12.1	3911	12.1	3992	12	4069	11.6	4146	11.2
4223	10.9	4300	10.5	4384	11	4468	11.5	4553	12
4626	12.4	4700	12.7	4776	12.4	4852	12	4863	4
4890	3	4933	4	4993	5	5053	6	5101	7
5150	8	5202	9	5254	10	5302	10.2	5350	10.5
5405	10.4	5460	10.4	5507	10.1	5555	9.8	5568	10
5619	9.5	5670	9	5693	10	5759	11	5826	12
5878	14	5930	16	6000	20.7	6070	25.3	6140	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3516	.035	4852	.035	5150	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4852	5150	400	400	400	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3
Reach-1	2.844	.045	.045	.035
Reach-1	2.782	.045	.045	.035
Reach-1	2.732	.045	.045	.035
Reach-1	2.675	.045	.045	.035
Reach-1	2.649	.045	.04	.035
Reach-1	2.637	Bridge		
Reach-1	2.625	.045	.04	.035
Reach-1	2.614	.03	.04	.03
Reach-1	2.6115	Bridge		
Reach-1	2.609	.03	.04	.03
Reach-1	2.59	.035	.04	.035
Reach-1	2.524	.035	.04	.035
Reach-1	2.439	.035	.04	.035
Reach-1	2.341	.035	.035	.035
Reach-1	2.231	.035	.035	.035
Reach-1	2.155	.035	.035	.035
Reach-1	2.06	.035	.035	.035
Reach-1	1.979	.035	.035	.035

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	2.844	325	325	325
Reach-1	2.782	265	265	265
Reach-1	2.732	300	300	300
Reach-1	2.675	160	133	105
Reach-1	2.649	128	128	128
Reach-1	2.637	Bridge		
Reach-1	2.625	40	58	80
Reach-1	2.614	27	27	27
Reach-1	2.6115	Bridge		
Reach-1	2.609	100	100	90
Reach-1	2.59	345	345	340
Reach-1	2.524	450	450	450
Reach-1	2.439	520	520	520
Reach-1	2.341	550	580	600
Reach-1	2.231	300	400	430
Reach-1	2.155	330	500	450
Reach-1	2.06	480	430	330
Reach-1	1.979	400	400	400

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	2.844	.1	.3
Reach-1	2.782	.1	.3
Reach-1	2.732	.1	.3
Reach-1	2.675	.1	.3
Reach-1	2.649	.3	.5
Reach-1	2.637	Bridge	
Reach-1	2.625	.3	.5

```
*Reach-1          *    2.614   *        .3*        .5*
*Reach-1          *    2.6115  *Bridge   *          *
*Reach-1          *    2.609   *        .3*        .5*
*Reach-1          *    2.59    *        .2*        .4*
*Reach-1          *    2.524   *        .1*        .3*
*Reach-1          *    2.439   *        .1*        .3*
*Reach-1          *    2.341   *        .1*        .3*
*Reach-1          *    2.231   *        .1*        .3*
*Reach-1          *    2.155   *        .1*        .3*
*Reach-1          *    2.06    *        .1*        .3*
*Reach-1          *    1.979   *        .1*        .3*
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Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.844	PF 1	42800.00	7.40	22.61		22.79	0.000368	3.71	12537.51	2818.90	0.17
Reach-1	2.844	PF 2	32500.00	7.40	21.12		21.27	0.000362	3.42	10618.07	2763.19	0.17
Reach-1	2.844	PF 3	5900.00	7.40	13.74		13.86	0.000701	2.75	2143.88	829.28	0.20
Reach-1	2.782	PF 1	42800.00	7.10	22.50		22.68	0.000329	3.63	12482.66	2776.17	0.17
Reach-1	2.782	PF 2	32500.00	7.10	21.02		21.16	0.000301	3.24	10827.75	2770.79	0.16
Reach-1	2.782	PF 3	5900.00	7.10	13.62		13.69	0.000364	2.10	2837.34	1105.76	0.15
Reach-1	2.732	PF 1	42800.00	7.10	22.04		22.52	0.000866	5.72	7751.47	2745.59	0.27
Reach-1	2.732	PF 2	32500.00	7.10	20.66		21.02	0.000746	4.96	6844.77	2721.07	0.24
Reach-1	2.732	PF 3	5900.00	7.10	13.46		13.57	0.000567	2.58	2303.07	1044.01	0.19
Reach-1	2.675	PF 1	42800.00	6.80	21.09		22.09	0.002032	8.02	5376.51	2718.76	0.40
Reach-1	2.675	PF 2	32500.00	6.80	19.98		20.67	0.001602	6.70	4883.20	2697.46	0.35
Reach-1	2.675	PF 3	5900.00	6.80	13.22		13.36	0.000863	2.91	2024.83	933.90	0.22
Reach-1	2.649	PF 1	42800.00	6.00	20.55	14.48	21.80	0.001889	8.97	4772.81	355.80	0.43
Reach-1	2.649	PF 2	32500.00	6.00	19.63	13.12	20.46	0.001362	7.31	4447.06	353.03	0.36
Reach-1	2.649	PF 3	5900.00	6.00	13.16	8.27	13.27	0.000412	2.65	2226.57	333.49	0.18
Reach-1	2.637		Bridge									

Reach-1	2.625	PF 1	42800.00	5.90	20.33		21.80	0.002260	9.72	4404.94	332.06
	0.47										
Reach-1	2.625	PF 2	32500.00	5.90	18.99		20.03	0.001825	8.20	3961.04	328.57
	0.42										
Reach-1	2.625	PF 3	5900.00	5.90	13.06		13.18	0.000493	2.87	2057.85	313.14
	0.20										
Reach-1	2.614	PF 1	40100.00	5.00	20.20	14.79	21.60	0.003781	9.51	4215.80	1846.38
	0.47										
Reach-1	2.614	PF 2	32500.00	5.00	18.65	13.65	19.84	0.003671	8.77	3707.24	1313.37
	0.46										
Reach-1	2.614	PF 3	5900.00	5.00	13.00	8.32	13.14	0.000760	3.04	1943.04	292.61
	0.21										
Reach-1	2.6115		Bridge								
Reach-1	2.609	PF 1	40100.00	5.00	19.91		21.38	0.004070	9.73	4122.85	1772.07
	0.49										
Reach-1	2.609	PF 2	32500.00	5.00	18.50		19.72	0.003816	8.88	3658.53	1296.06
	0.47										
Reach-1	2.609	PF 3	5900.00	5.00	12.98		13.12	0.000767	3.05	1936.66	292.45
	0.21										
Reach-1	2.59	PF 1	40100.00	5.00	19.76		20.96	0.002184	8.84	4566.19	2269.56
	0.46										
Reach-1	2.59	PF 2	32500.00	5.00	18.30		19.34	0.002288	8.27	3967.13	2235.30
	0.46										
Reach-1	2.59	PF 3	5900.00	5.00	12.83		13.02	0.001138	3.46	1727.19	669.49
	0.28										
Reach-1	2.524	PF 1	40800.00	4.50	19.58		20.19	0.001166	6.46	6622.20	2451.92
	0.34										
Reach-1	2.524	PF 2	32500.00	4.50	18.02		18.57	0.001287	6.16	5574.24	2436.48
	0.34										
Reach-1	2.524	PF 3	5900.00	4.50	12.54		12.67	0.000791	2.84	2087.85	956.17
	0.24										
Reach-1	2.439	PF 1	41500.00	3.80	19.45		19.74	0.000548	4.72	9743.08	2317.40
	0.23										
Reach-1	2.439	PF 2	32500.00	3.80	17.82		18.09	0.000622	4.58	8047.44	2254.14
	0.24										

```
* Reach-1      * 2.439       * PF 3        *     5900.00 *     3.80 *    12.24 *          *    12.36 *  0.000615 *     2.84 *  2316.42 *
1015.94 *        0.22 *
*             *             *             *             *         *         *          *          *           *           *          *
*             *
* Reach-1      * 2.341       * PF 1        *    42200.00 *     3.30 *    19.28 *          *    19.49 *  0.000370 *     4.39 * 12180.39 *
2404.91 *        0.22 *
* Reach-1      * 2.341       * PF 2        *    32500.00 *     3.30 *    17.60 *          *    17.80 *  0.000449 *     4.39 *  9720.12 *
2396.54 *        0.24 *
* Reach-1      * 2.341       * PF 3        *     5900.00 *     3.30 *    11.75 *          *    11.95 *  0.000945 *     3.79 *  1863.03 *
829.12 *        0.30 *
*             *             *             *             *         *         *          *          *           *           *          *
*             *
* Reach-1      * 2.231       * PF 1        *    42800.00 *     3.00 *    19.18 *          *    19.30 *  0.000220 *     3.19 * 15687.33 *
2385.53 *        0.17 *
* Reach-1      * 2.231       * PF 2        *    32500.00 *     3.00 *    17.46 *          *    17.58 *  0.000255 *     3.08 * 12516.73 *
2352.97 *        0.17 *
* Reach-1      * 2.231       * PF 3        *     5900.00 *     3.00 *    11.46 *          *    11.54 *  0.000477 *     2.22 *  2703.16 *
803.13 *        0.20 *
*             *             *             *             *         *         *          *          *           *           *          *
*             *
* Reach-1      * 2.155       * PF 1        *    42800.00 *     2.50 *    19.13 *          *    19.22 *  0.000170 *     2.89 * 18701.16 *
2354.14 *        0.15 *
* Reach-1      * 2.155       * PF 2        *    32500.00 *     2.50 *    17.40 *          *    17.49 *  0.000209 *     2.89 * 14640.56 *
2320.43 *        0.16 *
* Reach-1      * 2.155       * PF 3        *     5900.00 *     2.50 *    11.22 *          *    11.32 *  0.000609 *     2.64 *  2413.63 *
813.86 *        0.23 *
*             *             *             *             *         *         *          *          *           *           *          *
*             *
* Reach-1      * 2.06        * PF 1        *    42800.00 *     2.00 *    19.05 *          *    19.15 *  0.000169 *     3.27 * 18250.76 *
2197.55 *        0.15 *
* Reach-1      * 2.06        * PF 2        *    32500.00 *     2.00 *    17.31 *          *    17.40 *  0.000201 *     3.27 * 14444.65 *
2160.70 *        0.16 *
* Reach-1      * 2.06        * PF 3        *     5900.00 *     2.00 *    10.82 *          *    11.01 *  0.000638 *     3.63 *  2098.55 *
1097.08 *        0.26 *
*             *             *             *             *         *         *          *          *           *           *          *
*             *
* Reach-1      * 1.979       * PF 1        *    42800.00 *     3.00 *    19.00 *    13.18 *    19.08 *  0.000145 *     2.90 * 19913.77 *
2420.18 *        0.14 *
* Reach-1      * 1.979       * PF 2        *    32500.00 *     3.00 *    17.24 *    12.57 *    17.32 *  0.000176 *     2.91 * 15682.74 *
2387.81 *        0.15 *
* Reach-1      * 1.979       * PF 3        *     5900.00 *     3.00 *    10.50 *     7.56 *    10.70 *  0.000844 *     3.65 *  1887.90 *
871.94 *        0.28 *
*************************************************************************************************************************************
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Profile Output Table - Standard Table 2
*************************************************************************************************************************************
**********
* Reach        * River Sta    * Profile      *   E.G. Elev *W.S. Elev * Vel Head *Frctn Loss *C & E Loss *    Q Left *Q Channel *   Q Right
*Top Width *
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			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Reach-1	2.844	PF 1	22.79	22.61	0.18	0.11	0.00	145.54	20760.39	21894.07	2818.90
Reach-1	2.844	PF 2	21.27	21.12	0.15	0.11	0.00	84.07	17165.24	15250.70	2763.19
Reach-1	2.844	PF 3	13.86	13.74	0.12	0.16	0.01	0.03	5899.97		829.28
Reach-1	2.782	PF 1	22.68	22.50	0.18	0.13	0.03	462.18	24878.50	17459.32	2776.17
Reach-1	2.782	PF 2	21.16	21.02	0.14	0.12	0.02	337.59	20027.67	12134.74	2770.79
Reach-1	2.782	PF 3	13.69	13.62	0.07	0.12	0.00	10.63	5868.81	20.56	1105.76
Reach-1	2.732	PF 1	22.52	22.04	0.48	0.38	0.05	199.39	32110.21	10490.39	2745.59
Reach-1	2.732	PF 2	21.02	20.66	0.36	0.32	0.03	102.03	25186.61	7211.36	2721.07
Reach-1	2.732	PF 3	13.57	13.46	0.10	0.21	0.00		5863.32	36.69	1044.01
Reach-1	2.675	PF 1	22.09	21.09	1.00	0.26	0.03	215.22	42584.77		2718.76
Reach-1	2.675	PF 2	20.67	19.98	0.69	0.20	0.01	113.07	32386.93		2697.46
Reach-1	2.675	PF 3	13.36	13.22	0.13	0.08	0.01		5900.00		933.90
Reach-1	2.649	PF 1	21.80	20.55	1.25				42800.00		355.80
Reach-1	2.649	PF 2	20.46	19.63	0.83	0.03	0.03		32500.00		353.03
Reach-1	2.649	PF 3	13.27	13.16	0.11	0.01	0.00		5900.00		333.49
Reach-1	2.637		Bridge								
Reach-1	2.625	PF 1	21.80	20.33	1.47	0.17	0.03		42800.00		332.06

Reach-1	2.625	PF 2		20.03	18.99	1.05	0.15	0.04		32500.00		328.57
Reach-1	2.625	PF 3		13.18	13.06	0.13	0.04	0.00		5900.00		313.14
Reach-1	2.614	PF 1		21.60	20.20	1.40	0.00	0.03		40100.00		1846.38
Reach-1	2.614	PF 2		19.84	18.65	1.19	0.00	0.00		32500.00		1313.37
Reach-1	2.614	PF 3		13.14	13.00	0.14	0.00	0.00		5900.00		292.61
Reach-1	2.6115			Bridge								
Reach-1	2.609	PF 1		21.38	19.91	1.47	0.29	0.13		40100.00		1772.07
Reach-1	2.609	PF 2		19.72	18.50	1.23	0.29	0.09		32500.00		1296.06
Reach-1	2.609	PF 3		13.12	12.98	0.14	0.09	0.01		5900.00		292.45
Reach-1	2.59	PF 1		20.96	19.76	1.20	0.54	0.24	2041.42	37163.09	895.49	2269.56
Reach-1	2.59	PF 2		19.34	18.30	1.05	0.58	0.20	1464.01	30334.93	701.07	2235.30
Reach-1	2.59	PF 3		13.02	12.83	0.18	0.32	0.02	26.28	5788.68	85.04	669.49
Reach-1	2.524	PF 1		20.19	19.58	0.61	0.35	0.09	6272.39	34527.62		2451.92
Reach-1	2.524	PF 2		18.57	18.02	0.55	0.39	0.08	4063.98	28436.02		2436.48
Reach-1	2.524	PF 3		12.67	12.54	0.12	0.31	0.00	4.94	5895.06		956.17
Reach-1	2.439	PF 1		19.74	19.45	0.29	0.23	0.03	11825.79	21522.49	8151.72	2317.40
Reach-1	2.439	PF 2		18.09	17.82	0.27	0.27	0.02	8260.88	18222.79	6016.33	2254.14
Reach-1	2.439	PF 3		12.36	12.24	0.12	0.39	0.01	65.60	5567.70	266.70	1015.94

Reach-1	2.341	PF 1		19.49	19.28	0.20	0.16	0.02	16910.87	15724.74	9564.39	2404.91
Reach-1	2.341	PF 2		17.80	17.60	0.20	0.19	0.02	12010.64	13614.50	6874.86	2396.54
Reach-1	2.341	PF 3		11.95	11.75	0.20	0.38	0.04	217.89	5381.29	300.82	829.12
Reach-1	2.231	PF 1		19.30	19.18	0.13	0.07	0.01	11475.01	25936.85	5388.14	2385.53
Reach-1	2.231	PF 2		17.58	17.46	0.12	0.09	0.01	7864.66	21280.58	3354.77	2352.97
Reach-1	2.231	PF 3		11.54	11.46	0.08	0.21	0.00	17.69	5849.33	32.98	803.13
Reach-1	2.155	PF 1		19.22	19.13	0.09	0.07	0.00	17372.63	17994.14	7433.23	2354.14
Reach-1	2.155	PF 2		17.49	17.40	0.09	0.09	0.00	11884.70	15367.44	5247.86	2320.43
Reach-1	2.155	PF 3		11.32	11.22	0.10	0.31	0.01	119.76	5548.41	231.82	813.86
Reach-1	2.06	PF 1		19.15	19.05	0.10	0.07	0.00	17433.12	11057.27	14309.62	2197.55
Reach-1	2.06	PF 2		17.40	17.31	0.09	0.08	0.00	11998.77	9716.36	10784.87	2160.70
Reach-1	2.06	PF 3		11.01	10.82	0.19	0.31	0.00	53.24	5293.69	553.06	1097.08
Reach-1	1.979	PF 1		19.08	19.00	0.08			17476.25	11725.14	13598.62	2420.18
Reach-1	1.979	PF 2		17.32	17.24	0.08			12043.20	10246.63	10210.17	2387.81
Reach-1	1.979	PF 3		10.70	10.50	0.20				5543.01	356.99	871.94

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Prop+Exist

River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 2
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.844 Profile: PF 3
Warning:Divided flow computed for this cross-section.
River: RIVER-1 Reach: Reach-1 RS: 2.782 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.

```
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.782     Profile: PF 2
     Warning:The cross-section end points had to be extended vertically for the computed water surface.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.782     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.732     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The cross-section end points had to be extended vertically for the computed water surface.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.732     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.732     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.675     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.675     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.675     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.637     Profile: PF 2
     Warning:The Yarnell method gave an invalid answer.  The upstream energy was less than the downstream energy.  The program
             defaulted to the next valid (user selected) method.  If the Yarnell method was the only one selected, the program
             will default to an energy based solution.
River: RIVER-1  Reach: Reach-1     RS: 2.637     Profile: PF 3
     Warning:The Yarnell method gave an invalid answer.  The upstream energy was less than the downstream energy.  The program
             defaulted to the next valid (user selected) method.  If the Yarnell method was the only one selected, the program
             will default to an energy based solution.
River: RIVER-1  Reach: Reach-1     RS: 2.625     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.614     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.614     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.614     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.609     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.609     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.609     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
```

```
River: RIVER-1  Reach: Reach-1     RS: 2.59     Profile: PF 1
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.59     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.524     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.524     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.524     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.439     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.341     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.06     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 1.979     Profile: PF 1
     Warning:The parabolic search method failed to converge on critical depth.  The program will try the cross section
             slice/secant method to find critical depth.
River: RIVER-1  Reach: Reach-1     RS: 1.979     Profile: PF 3
     Warning:Divided flow computed for this cross-section.
```

APPENDIX F – HYDRAULIC STUDY FOR THE CENTRAL ALIGNMENT

The Central Alignment is an alternative along the existing El Camino Real alignment. The hydraulic study for this alignment was made in a previous study. It is repeated and included here as an addendum. Under this alternative, the existing bridge will be removed and a new bridge will be constructed. Geometric features of the proposed new bridge as illustrated in Fig. F-1 are as follow:

Bridge low chord (soffit) elevation:	22 feet
Bridge span:	340 feet
Bridge total width:	94 feet
Piers/bents:	Columns with 5-foot diameter
Channel bed elevation at bridge crossing:	5 feet same as existing
Channel bed width at bridge crossing:	280 feet
Abutment slope:	Sloping lower abutments from channel bed to the elevation of 20 feet with 2 horizontal units to1vertical unit; vertical upper abutments from elevation 20 feet to bridge low chord.
Top of roadway of El Camino Real:	To be raised to the elevation of 21 feet.

Since the roadway of El Camino Real will be raised above the 100-yr flood level, the entire 100-yr discharge will flow through the bridge opening. The computed water-surface profile for this alignment is shown in Fig. F-2. A comparison of computed water-surface elevations is listed in Table F-1. The small rise in water surface elevation at Section 2.609 is within the bridge alignment. The comparison shows that the proposed bridge alignment will not impact the flood level for adjacent properties. The detailed HEC-RAS report is also attached.

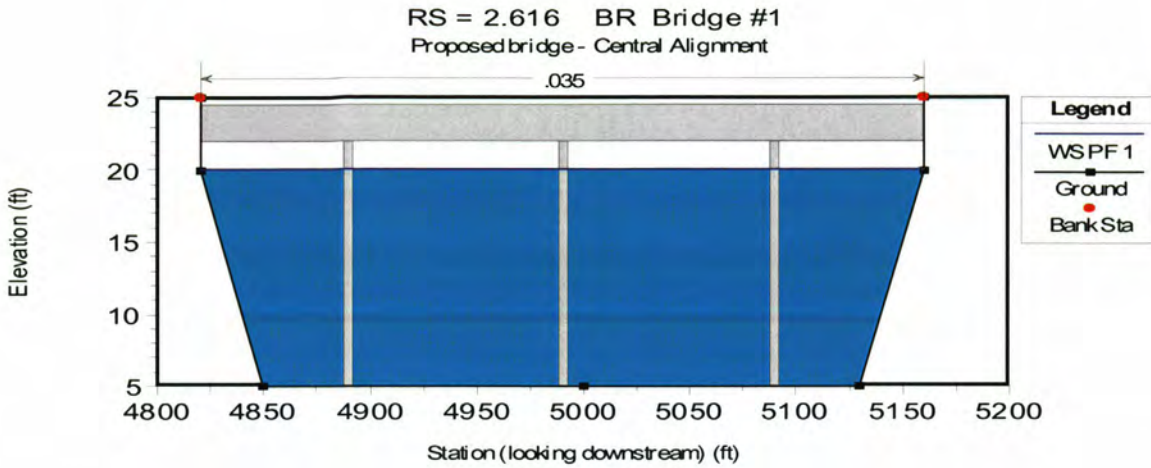


Fig. F-1. Cross-sectional profile at bridge opening

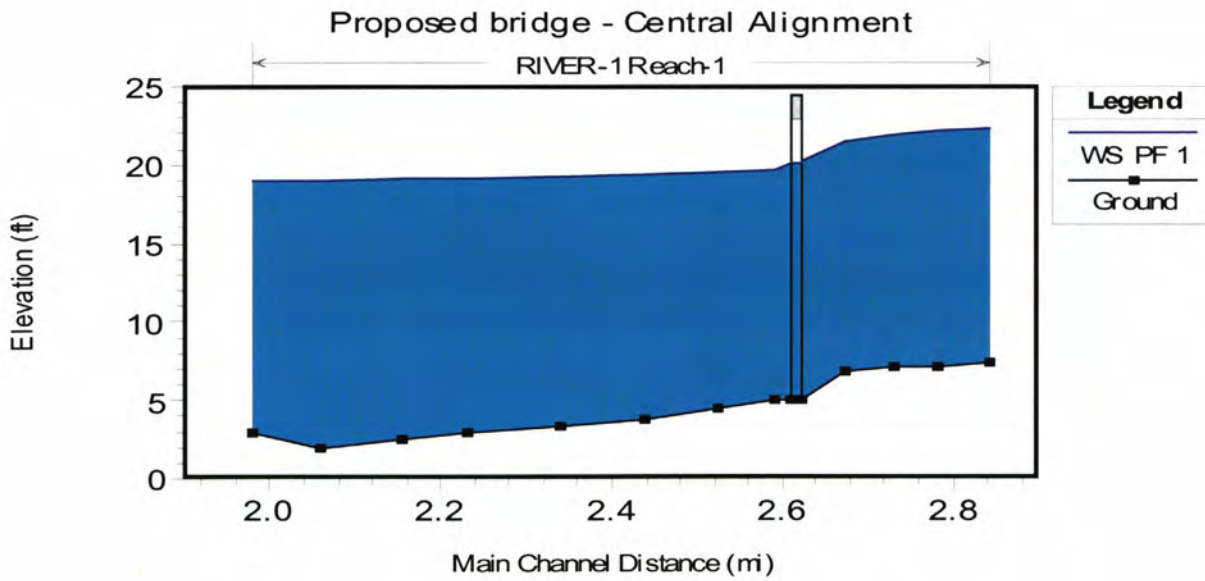


Fig. F-2. Water-surface and channel bed profiles

Table F-1. Computed water-surface elevations for the 100-yr flood

SECTION NUMBER RIVER MILES	Water surface elev. for existing conditions, feet	Water surface for proposed conditions, feet
1.979	19.0	19.0
2.060	19.1	19.1
2.155	19.1	19.1
2.231	19.2	19.2
2.341	19.3	19.3
2.439	19.5	19.5
2.524	19.6	19.6
2.590	19.8	19.8
2.609	19.9	20.0
2.614	20.2	
2.623	20.6	20.2
2.675	21.9	21.4
2.732	22.3	22.0
2.782	22.5	22.2
2.844	22.6	22.3

```
                    HEC-RAS Version 3.1.2 April 2004
                      U.S. Army Corp of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California

          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX

*******************************************************************************

PROJECT DATA
Project Title: SDGO, alternative 1
Project File : sdgo1.prj
Run Date and Time: 6/20/2005 3:37:31 PM

Project in English units

Project Description:
SAN DIEGUITO RIVER WITH PROPOSED BRIDGE REPLACEMENT AT EL CAMINO REAL

FOR RICK ENGINEERING BY HOWARD H. CHANG,  APRIL 2002
    100-YR FLOOD
    SAN
DIEGUITO RIVER WITH PROPOSED BRIDGE REPLACEMENT AT EL CAMINO REAL
    FOR RICK
ENGINEERING BY HOWARD H. CHANG,  APRIL 2002
    100-YR FLOOD


*******************************************************************************

PLAN DATA

Plan Title: Imported Plan 02
Plan File : C:\HEC\RAS\sdgo1.p02

           Geometry Title: Imported Geom 02
           Geometry File : C:\HEC\RAS\sdgo1.g02

           Flow Title    : Imported Flow 02
           Flow File     : C:\HEC\RAS\sdgo1.f02

Plan Summary Information:
Number of:  Cross Sections =   14    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    1    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow


*******************************************************************************

FLOW DATA
```

Flow Title: Imported Flow 02
Flow File : C:\HEC\RAS\sdgo1.f02

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2	PF 3
RIVER-1	Reach-1	2.844	42800	32500	5900

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	PF 1	Known WS = 19	
RIVER-1	Reach-1	PF 2	Known WS = 17.24	
RIVER-1	Reach-1	PF 3	Known WS = 10.5	

GEOMETRY DATA

Geometry Title: Imported Geom 02
Geometry File : C:\HEC\RAS\sdgo1.g02

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.844

INPUT
Description: Revised
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3745	45.5	3767	39	3803	36.6	3810	37.2	3821	40.4
3837	39.4	3850	40	3892	39.4	3910	39.5	3924	41.5
3934	41.5	3952	37.9	3977	30.9	3998	24.3	4010	21.3
4038	18.3	4046	16.4	4056	16.6	4086	13.9	4130	11.5
4187	11	4220	14.2	4232	16.3	4268	19.5	4281	21.4
4298	19.6	4313	15.6	4316	15.5	4327	15.3	4334	16.3
4350	15.9	4365	13	4392	10.1	4456	7.5	4559	8.3
4569	7.7	4587	8.5	4613	11.9	4632	15.5	4641	15.8
4652	14.5	4663	16.4	4690	16.3	4704	13.7	4733	13.6
4764	22.8	4770	22.1	4780	18.5	4790	13.4	4798	7.6
4807	7.4	4810	11.1	4845	7.4	4964	7.5	5141	7.6
5147	9.9	5153	13.4	5180	14	5185	15.7	5196	14.8
5287	14.4	5340	14.4	5427	14.6	5513	14.8	5600	15
5680	15	5760	15	5840	15	5920	15	6000	15
6060	14.7	6120	14.5	6200	15	6256	14.4	6312	13.8
6350	16.2	6366	16	6380	14	6455	13.9	6530	13.7
6599	13.9	6668	14	6716	16	6725	15	6742	16
6758	20	6822	22	6848	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3745	.045	4790	.045	5180	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4790	5180	325	325	325	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3745	4770		T
6090	6848		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6
3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8
4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6
4708	12.9	4727	12.4	4740	11	4763	7.7	4784	7.3
4823	7.1	4994	7.2	5165	7.2	5176	8.7	5184	12.4
5187	12.6	5212	12.8	5218	14.8	5230	14.2	5296	14.1
5326	14.2	5327	14.2	5400	14.5	5455	14.2	5510	14
5590	13.9	5670	13.8	5725	14	5780	14.2	5840	14
5900	13.8	5950	14	6000	14.2	6065	14	6130	13.8
6195	14.1	6260	14.3	6340	14	6420	13.8	6500	13.5
6563	13.7	6626	13.8	6690	14	6700	15.8	6718	15.5
6743	20								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3877	.045	4727	.045	5184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4727	5184	265	265	265	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3877	4710		T
5870	6743		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.732

INPUT
Description: Revised
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3819	29.5	3837	29.1	3837	28.6	3856	28.8	3877	28.4
3877	28.9	3889	28.5	3904	28.6	3912	30.4	3929	29.3
3942	26.9	3949	25.1	3959	22	3967	20.7	3976	20.3
4012	16.6	4041	14.9	4118	12.9	4174	13	4214	13.8
4227	13.7	4277	15.2	4297	14.9	4320	16.8	4329	18.2
4368	13.3	4382	12.8	4405	10.2	4416	9.3	4425	9.2
4430	9.1	4445	10.3	4449	11	4454	11	4460	11.7
4488	11.7	4515	12.3	4541	11.5	4551	10.9	4560	9.3
4569	7.5	4649	7.5	4659	10.3	4695	18.2	4700	19
4714	22.1	4742	24.7	4758	22.5	4766	22.4	4780	18.3
4793	15.5	4818	11.5	4829	7.6	4854	7.2	4998	7.1
5171	7.1	5185	12.2	5211	12.3	5216	14.2	5250	13.9
5335	14	5365	13.5	5450	14.2	5525	13.9	5600	13.7
5675	13.4	5750	13.2	5827	13.5	5905	13.7	5982	14
6060	14.3	6148	14.1	6236	13.9	6324	13.8	6412	13.6
6500	13.4	6566	13.6	6633	13.8	6700	14	6720	12
6730	14	6758	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3819	.045	4793	.045	5185	.035

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4793    5185              300     300     300             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3819    4740                T
    5650    6758                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.675

INPUT
Description: Revised
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    3836      28    3850      26    3887      25    3897    24.2    3898    24.7
    3958    24.2    3984    19.6    3997    18.1    4011    17.3    4063      16
    4077    15.9    4099    17.6    4104    17.7    4108    18.2    4160    15.5
    4170    15.4    4210    13.9    4222      13    4235    12.7    4268      15
    4279    15.5    4295      14    4310    11.7    4320      11    4334    10.6
    4350    11.5    4373    12.2    4407    12.2    4458     9.7    4462     9.5
    4482     9.1    4525    11.6    4633    13.4    4686    15.1    4707    17.2
    4724    19.9    4733    22.1    4742      23    4755    21.8    4763    21.7
    4782    16.1    4787    15.4    4806    14.6    4840    11.7    4852    11.6
    4862    10.7    4873     7.3    4893     6.9    5018     6.8    5119     6.8
    5149     7.2    5151     7.8    5157       8    5168     9.7    5171     9.7
    5174    10.3    5190      12    5204      12    5212    11.5    5219      13
    5224    14.6    5228    13.4    5346    13.8    5370    13.5    5450    14.3
    5533    13.9    5616    13.4    5700      13    5782    13.5    5865      14
    5943    13.7    6021    13.3    6100      13    6186    13.4    6273    13.7
    6360    14.1    6430    13.8    6500    13.5    6555    13.8    6610    14.1
    6660    13.9    6673      14    6700      16    6736      22    6758      24
    6818      26    6822      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3836    .045    4787    .045    5219    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4787    5219              285     273     250             .2       .4
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3836    4745                T
    5410    6822                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.623

INPUT
Description: This is a REPEATED section.
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    4820      25    4820      20    4850       5    5000       5    5130       5
    5160      20    5160      25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    4820    .035    4820    .035    5160    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4820    5160               78      78      78             .3       .5

BRIDGE
```

```
RIVER: RIVER-1
REACH: Reach-1            RS: 2.616

INPUT
Description: Bridge #1

Distance from Upstream XS =      .1
Deck/Roadway Width        =      77
Weir Coefficient          =     2.8
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
    4810    24.5      22    5170    24.5      22

Upstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    4820      25    4820      20    4850       5    5000       5    5130       5
    5160      20    5160      25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    4820    .035    4820    .035    5160    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4820    5160             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
    4810    24.5      22    5170    24.5      22

Downstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    4820      25    4820      20    4850       5    5000       5    5130       5
    5160      20    5160      25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    4820    .035    4820    .035    5160    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4820    5160             .2       .4

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    24.5
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=    4890    Downstream=    4890
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
       4       5       4    22.9
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       4       5       4    22.9

Pier Data
```

```
Pier Station     Upstream=    4990    Downstream=    4990
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
       4       5       4    22.9
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       4       5       4    22.9

Pier Data
Pier Station     Upstream=    5090    Downstream=    5090
Upstream     num=       2
    Width   Elev    Width   Elev
*******************************
       4       5       4    22.9
Downstream     num=       2
    Width   Elev    Width   Elev
*******************************
       4       5       4    22.9

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.7352146
           Max Low Cord                =    22.9

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. US. (ft)          *      21.45  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *      20.16  * E.G. Elev (ft)         *      21.43  *      21.43  *
* Q Total (cfs)          *   42800.00  * W.S. Elev (ft)         *      20.01  *      20.01  *
* Q Bridge (cfs)         *   42800.00  * Crit W.S. (ft)         *      14.04  *      14.04  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      15.01  *      15.01  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       9.57  *       9.57  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    4473.78  *    4473.78  *
* Weir Submerg           *             * Froude # Chl           *       0.46  *       0.46  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   45167.75  *   45167.75  *
* Min El Weir Flow (ft)  *      24.51  * Hydr Depth (ft)        *      13.64  *      13.64  *
* Min El Prs (ft)        *      22.90  * W.P. Total (ft)        *     425.17  *     425.17  *
* Delta EG (ft)          *       0.12  * Conv. Total (cfs)      *   912025.9  *   912025.9  *
* Delta WS (ft)          *       0.15  * Top Width (ft)         *     328.00  *     328.00  *
* BR Open Area (sq ft)   *    5126.00  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       9.57  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.45  *       1.45  *
* Br Sel Method          *    Yarnell  * Power Total (lb/ft s)  *      13.84  *      13.84  *
*********************************************************************************************

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.609

INPUT
Description: This is a REPEATED section.
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    4820      25    4820      20    4850       5    5000       5    5130       5
    5160      20    5160      25
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4820	.035	4820	.035	5160	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4820	5160	100	100	90	.2	.4

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.59

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4010	22	4100	20	4160	20	4210	16	4256	15
4303	14	4351	13.6	4400	13.2	4470	13.9	4540	14.5
4600	14	4678	13.3	4756	12.7	4835	12	4887	11
4940	10	5000	8	5016	6	5025	5	5100	5
5120	6	5142	8	5200	9.76	5208	10	5232	12
5316	12.4	5401	12.8	5485	13.2	5570	13.6	5655	14
5720	14	5775	15	5830	16	5891	17	5953	18
5960	16	5980	15.5	6010	16	6017	18.5	6027	16
6100	14	6155	15	6210	16	6278	16.7	6346	17.3
6415	18	6455	22	6475	24				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4010	.035	4835	.04	5200	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4835	5200	345	345	340	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4010	4800		T
5210	6475		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.524

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3920	22	3945	16	3997	15.6	4050	15.2	4098	15.7
4147	16.2	4233	15.1	4320	14	4400	12.7	4480	11.5
4556	12.4	4633	13.4	4710	14.3	4783	13.1	4856	12
4926	10	4997	8	5013	6	5030	4.5	5085	4.5
5140	4.5	5150	6	5175	8	5250	10	5320	11
5390	12	5460	12.2	5530	12.3	5600	12.5	5686	12.7
5773	12.8	5859	13	5946	13.2	6033	13.3	6120	13.5
6130	14	6140	16	6146	14	6200	14	6275	15
6350	16	6373	18	6430	28				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3920	.035	4856	.04	5320	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4856	5320	450	450	450	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3920	4650		T

```
    5320    6430                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.439

INPUT
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    3680      20    3700      16    3775    14.5    3850      13    3937    13.3
    4025    13.6    4112      14    4200    14.3    4286    13.9    4373    13.5
    4459    13.1    4546    12.7    4633    12.3    4720    11.9    4785    11.9
    4850      12    4895      10    4917       8    4985       6    5050     4.9
    5115     3.8    5120       4    5152       8    5204       9    5256      10
    5320    10.7    5384    11.3    5448      12    5519      12    5590      12
    5662      12    5685      18    5730      18    5740      16    5760    15.3
    5834    15.5    5908    15.8    5982      16    6003      20    6027      22
    6037      27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3680    .035    4895     .04    5256    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4895    5256              520     520     520             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3680    4460                T
    5500    6037                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.341

INPUT
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    3440      24    3473      14    3550    13.3    3600    13.7    3650    14.2
    3737    13.9    3825    13.6    3912    13.3    4000      13    4090    12.9
    4180    12.8    4270    12.7    4360    12.6    4450    12.5    4460    11.5
    4500    11.5    4520    12.5    4573    12.2    4626      12    4704    11.3
    4782    10.7    4860      10    4910       9    4960       8    4990       6
    5025       4    5050     3.3    5110       6    5147      10    5229    10.5
    5312      11    5394    11.5    5477      12    5496      14    5508      16
    5591      16    5674      16    5757      16    5840      16    5855      16
    5885      34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3440    .035    4860    .035    5147    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4860    5147              550     580     600             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3440    4100                T
    5560    5885                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.231
```

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3413	.035	4644	.035	5355	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4644	5355	300	400	430	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3413	3970		T
5900	5900		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.155

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5
4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4
5175	2.5	5200	2.5	5222	4	5238	8	5250	10
5300	9.9	5350	9.8	5415	10.5	5480	11.3	5545	12
5626	13	5708	14	5722	16	5803	18	5834	26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3422	.035	4728	.035	5250	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4728	5250	330	500	450	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.06

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3622	30	3666	14	3743	13.7	3821	13.3	3899	13
3976	12.7	4054	12.3	4132	12	4186	11.2	4240	10.5
4330	11.1	4420	11.7	4501	11.4	4582	11	4663	10.7
4744	10.3	4825	10	4897	4	4958	2	4974	2
5035	4	5058	10	5114	10.2	5170	10.5	5230	10.2
5290	10	5370	9.6	5450	9.2	5530	9.6	5610	10
5665	11	5720	12	5781	15.3	5843	18.7	5905	22

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3622    .035    4825    .035    5058    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4825    5058              480     430     330             .1       .3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 1.979

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    3516      30    3572      14    3588    12.3    3668    12.2    3749    12.2
    3830    12.1    3911    12.1    3992      12    4069    11.6    4146    11.2
    4223    10.9    4300    10.5    4384      11    4468    11.5    4553      12
    4626    12.4    4700    12.7    4776    12.4    4852      12    4863       4
    4890       3    4933       4    4993       5    5053       6    5101       7
    5150       8    5202       9    5254      10    5302    10.2    5350    10.5
    5405    10.4    5460    10.4    5507    10.1    5555     9.8    5568      10
    5619     9.5    5670       9    5693      10    5759      11    5826      12
    5878      14    5930      16    6000    20.7    6070    25.3    6140      30

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    3516    .035    4852    .035    5150    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4852    5150              400     400     400             .1       .3

*******************************************************************************

SUMMARY OF MANNING'S N VALUES

River:RIVER-1
*****************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*Reach-1          *    2.844       *     .045*     .045*     .035*
*Reach-1          *    2.782       *     .045*     .045*     .035*
*Reach-1          *    2.732       *     .045*     .045*     .035*
*Reach-1          *    2.675       *     .045*     .045*     .035*
*Reach-1          *    2.623       *     .035*     .035*     .035*
*Reach-1          *    2.616       *Bridge   *        *        *
*Reach-1          *    2.609       *     .035*     .035*     .035*
*Reach-1          *    2.59        *     .035*      .04*     .035*
*Reach-1          *    2.524       *     .035*      .04*     .035*
*Reach-1          *    2.439       *     .035*      .04*     .035*
*Reach-1          *    2.341       *     .035*     .035*     .035*
*Reach-1          *    2.231       *     .035*     .035*     .035*
*Reach-1          *    2.155       *     .035*     .035*     .035*
*Reach-1          *    2.06        *     .035*     .035*     .035*
*Reach-1          *    1.979       *     .035*     .035*     .035*
*****************************************************************

*******************************************************************************

SUMMARY OF REACH LENGTHS

River: RIVER-1
*****************************************************************
*     Reach       *   River Sta.   *  Left   * Channel *  Right  *
*****************************************************************
*Reach-1          *    2.844       *      325*      325*      325*
*Reach-1          *    2.782       *      265*      265*      265*
*Reach-1          *    2.732       *      300*      300*      300*
*Reach-1          *    2.675       *      285*      273*      250*
```

*Reach-1	* 2.623	* 78*	78*	78*
*Reach-1	* 2.616	*Bridge *	*	*
*Reach-1	* 2.609	* 100*	100*	90*
*Reach-1	* 2.59	* 345*	345*	340*
*Reach-1	* 2.524	* 450*	450*	450*
*Reach-1	* 2.439	* 520*	520*	520*
*Reach-1	* 2.341	* 550*	580*	600*
*Reach-1	* 2.231	* 300*	400*	430*
*Reach-1	* 2.155	* 330*	500*	450*
*Reach-1	* 2.06	* 480*	430*	330*
*Reach-1	* 1.979	* 400*	400*	400*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
*Reach-1	* 2.844	* .1*	.3*
*Reach-1	* 2.782	* .1*	.3*
*Reach-1	* 2.732	* .1*	.3*
*Reach-1	* 2.675	* .2*	.4*
*Reach-1	* 2.623	* .3*	.5*
*Reach-1	* 2.616	*Bridge *	*
*Reach-1	* 2.609	* .2*	.4*
*Reach-1	* 2.59	* .2*	.4*
*Reach-1	* 2.524	* .1*	.3*
*Reach-1	* 2.439	* .1*	.3*
*Reach-1	* 2.341	* .1*	.3*
*Reach-1	* 2.231	* .1*	.3*
*Reach-1	* 2.155	* .1*	.3*
*Reach-1	* 2.06	* .1*	.3*
*Reach-1	* 1.979	* .1*	.3*

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	2.844	PF 1	42800.00	7.40	22.28		22.47	0.000397	3.79	12341.89	2811.52	0.18
Reach-1	2.782	PF 1	42800.00	7.10	22.16		22.35	0.000345	3.67	12437.52	2774.95	0.17
Reach-1	2.732	PF 1	42800.00	7.10	21.89		22.22	0.000616	4.79	9418.66	2743.23	0.22
Reach-1	2.675	PF 1	42800.00	6.80	21.36		21.94	0.001192	6.21	7055.58	2723.96	0.31
Reach-1	2.623	PF 1	42800.00	5.00	20.16	13.77	21.45	0.001422	9.10	4705.12	340.00	0.43
Reach-1	2.616		Bridge									
Reach-1	2.609	PF 1	42800.00	5.00	20.01		21.32	0.001473	9.20	4653.92	340.00	0.44
Reach-1	2.59	PF 1	42800.00	5.00	19.76		21.13	0.002489	9.44	4565.84	2269.54	0.49
Reach-1	2.524	PF 1	42800.00	4.50	19.58		20.25	0.001284	6.78	6621.30	2451.90	0.35
Reach-1	2.439	PF 1	42800.00	3.80	19.45		19.76	0.000583	4.86	9743.17	2317.41	0.24
Reach-1	2.341	PF 1	42800.00	3.30	19.28		19.49	0.000381	4.45	12177.71	2404.90	0.22
Reach-1	2.231	PF 1	42800.00	3.00	19.18		19.30	0.000220	3.19	15687.33	2385.53	0.17
Reach-1	2.155	PF 1	42800.00	2.50	19.13		19.22	0.000170	2.89	18701.16	2354.14	0.15
Reach-1	2.06	PF 1	42800.00	2.00	19.05		19.15	0.000169	3.27	18250.76	2197.55	0.15
Reach-1	1.979	PF 1	42800.00	3.00	19.00	13.18	19.08	0.000145	2.90	19913.77	2420.18	0.14

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)

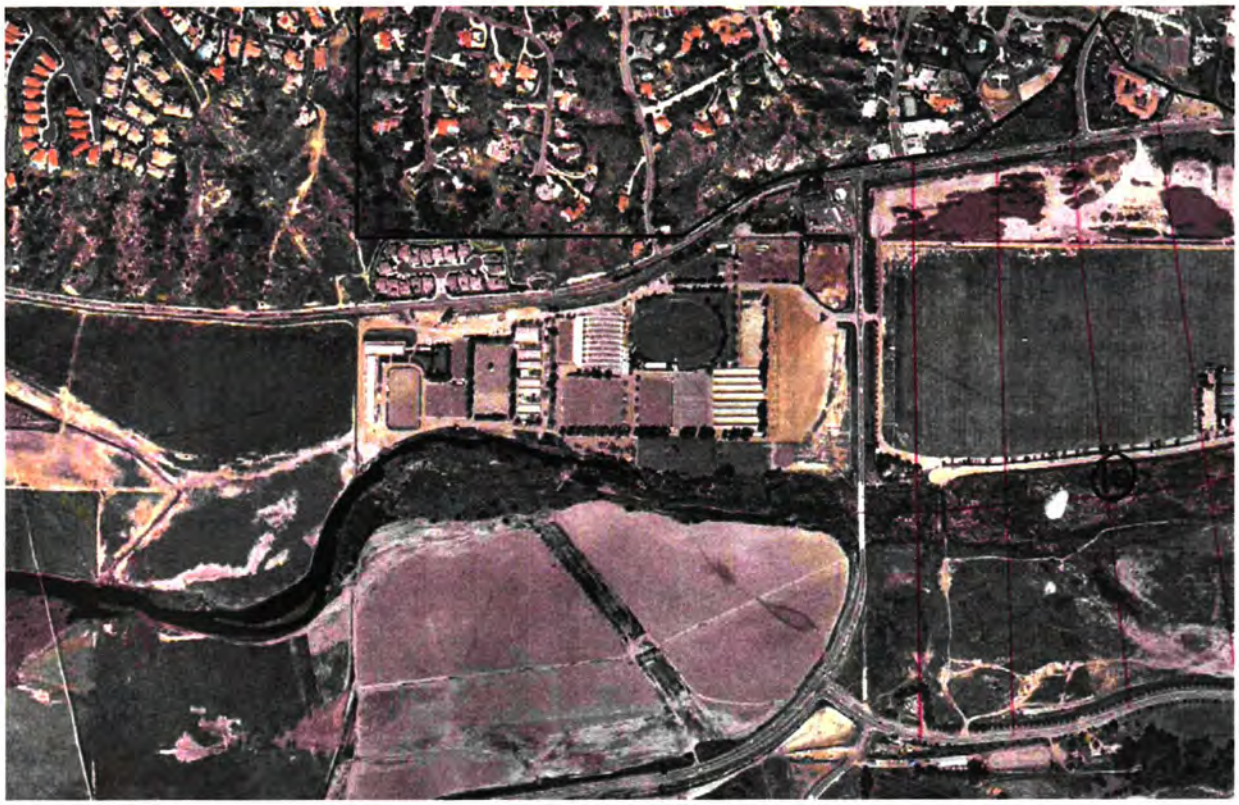
```
* Reach-1     * 2.844       * PF 1        *       22.47 *    22.28 *     0.19 *      0.12 *      0.00 *   133.17 * 20750.76 * 21916.07 *
2811.52 *
* Reach-1     * 2.782       * PF 1        *       22.35 *    22.16 *     0.19 *      0.12 *      0.01 *   447.41 * 24563.66 * 17788.92 *
2774.95 *
* Reach-1     * 2.732       * PF 1        *       22.22 *    21.89 *     0.33 *      0.25 *      0.03 *   158.75 * 26608.49 * 16032.76 *
2743.23 *
* Reach-1     * 2.675       * PF 1        *       21.94 *    21.36 *     0.58 *      0.35 *      0.14 *   184.62 * 34183.70 *  8431.68 *
2723.96 *
* Reach-1     * 2.623       * PF 1        *       21.45 *    20.16 *     1.28 *           *           *          * 42800.00 *          *
340.00 *
* Reach-1     * 2.616       *             *      Bridge *          *          *           *           *          *          *          *
*
* Reach-1     * 2.609       * PF 1        *       21.32 *    20.01 *     1.31 *      0.19 *      0.01 *          * 42800.00 *          *
340.00 *
* Reach-1     * 2.59        * PF 1        *       21.13 *    19.76 *     1.37 *      0.60 *      0.28 *  2178.74 * 39665.49 *   955.77 *
2269.54 *
* Reach-1     * 2.524       * PF 1        *       20.25 *    19.58 *     0.67 *      0.37 *      0.11 *  6578.93 * 36221.07 *          *
2451.90 *
* Reach-1     * 2.439       * PF 1        *       19.76 *    19.45 *     0.31 *      0.24 *      0.03 * 12196.30 * 22196.60 *  8407.10 *
2317.41 *
* Reach-1     * 2.341       * PF 1        *       19.49 *    19.28 *     0.21 *      0.16 *      0.02 * 17150.15 * 15950.03 *  9699.82 *
2404.90 *
* Reach-1     * 2.231       * PF 1        *       19.30 *    19.18 *     0.13 *      0.07 *      0.01 * 11475.01 * 25936.85 *  5388.14 *
2385.53 *
* Reach-1     * 2.155       * PF 1        *       19.22 *    19.13 *     0.09 *      0.07 *      0.00 * 17372.63 * 17994.14 *  7433.23 *
2354.14 *
* Reach-1     * 2.06        * PF 1        *       19.15 *    19.05 *     0.10 *      0.07 *      0.00 * 17433.12 * 11057.27 * 14309.62 *
2197.55 *
* Reach-1     * 1.979       * PF 1        *       19.08 *    19.00 *     0.08 *           *           * 17476.25 * 11725.14 * 13598.62 *
2420.18 *
*****************************************************************************************************************************************
**********

*****************************************************************************

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Imported Pla

River: RIVER-1  Reach: Reach-1     RS: 2.844     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.782     Profile: PF 1
     Warning:The cross-section end points had to be extended vertically for the computed water surface.
River: RIVER-1  Reach: Reach-1     RS: 2.732     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: RIVER-1  Reach: Reach-1     RS: 2.675     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.59     Profile: PF 1
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 2.524     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RIVER-1  Reach: Reach-1     RS: 1.979     Profile: PF 1
```

```
Warning:The parabolic search method failed to converge on critical depth.  The program will try the cross section
        slice/secant method to find critical depth.
```

ATTACHMENT 2

"Hydraulic and Sediment Modeling of the San Dieguito River for Wetland Creation at the JPA/Boudreau Site," prepared by Chang Consultants, dated November 2005.

Hydraulic and Sediment Modeling of the San Dieguito River for Wetland Creation at the JPA/Boudreau Site



Prepared for
Rick Engineering Company
5620 Friars Road
San Diego, CA 92110-2596

Prepared by
Howard H. Chang, Ph.D.,P.E.
November 2005

CHANG Consultants *Hydraulic and Hydrologic Engineering* *Erosion and Sedimentation*	P.O. Box 9492 6001 Avenida Alteras Rancho Santa Fe, CA 92067-4492 TEL: (858) 756-9050, (858) 692-0760 FAX: (858) 756-9460

GLOSSARY OF TERMS

Aggradation: A rise in channel bed elevation, usually caused by sediment deposition.

Alluvial: Relating to, composed of, or found in alluvium

Bank protection: A structure placed on a riverbank to protect the bank against erosion. Such structures are usually made of riprap stones, revetments, dikes, etc.

Bed load: That part of the sediment load that travels in contact with the bed by rolling, sliding and saltation. It is also the coarser portion of the sediment load.

Channel reach: Any stretch of the channel.

Channelization: To make a channel.

Cross sections: Channel sections that are perpendicular to the flow direction that are used to define the river channel geometry for a river study.

Degradation: A lowering of the channel-bed elevation usually caused by erosion.

Drainage basin: A surface area from which rainfall drains toward a single point.

Drop structure: A rigid structure erected across a river channel through which there is a drop in channel-bed elevation.

Erodible boundary model: A model that considers the changes in channel boundary, including channel-bed scour and fill, changes in channel width and changes related to channel curvature.

Erodible bed model: A model that only considers the changes in channel-bed level by assuming that channel width does not change.

Field calibration: The correlation of modeling results using field data. It usually involves fine adjustments of certain parameters used in modeling to improve the correlation.

Flood hydrograph: A relationship showing how the flood discharge varies with time during its occurrence.

Fluvial processes: Processes that are caused by stream action, including sediment transport, flood flow, erosion, deposition, and river channel changes.

Grade control structure: A rigid structure constructed across a river channel used to stabilize the bed elevation at the location. A drop structure is also a grade control structure.

Head cutting: Channel-bed erosion occurring upstream of a sand or gravel pit or any other depression.

Model: For this study, a model is computer software developed to simulate the hydraulics of flow, sediment transport and river channel changes.

Pit capture: A stream is diverted from its normal course into a pit of lower elevation

Scour (general and local): Erosion or removal of material caused by stream action. General scour is caused by the imbalance (non-uniformity) in sediment transport along a river channel. Local scour is caused by any local obstruction to flow, such as bridge piers, abutments, tree trunks, etc.

Sediment delivery: The cumulative amount of sediment that is delivered passing a river section in a specified period of time.

Sediment transport/replenishment: Sediment transport is the movement of sediment by flow measured usually in volume or weight per unit time. Replenishment is sediment supply to make up any previous deficit.

Study channel reach: A river channel reach that is covered in a study. Such a reach is defined by a series of cross sections taken along the channel.

Suspended load: Sediment load that travels in suspension, consisting of the finer portion of the transported sediment.

Tractive force: The force exerted by the flow on the channel boundary or on any object in the river channel, usually measured in force per unit surface area.

Hydraulic and Sediment Modeling of the San Dieguito River For Wetland Creation at the JPA/Boudreau Site

I. INTRODUCTION

Wetland creation is proposed as mitigation for the El Camino Real Bridge project on the San Dieguito River. The selected wetland site is the Joint Power Authority (JPA)/Boudreau property in the floodplain along the south bank of the San Dieguito River, just west of the El Camino Real Bridge. Fig.1 is a map of the San Dieguito River in the vicinity of the existing El Camino Real Bridge. Fig. 2 is an aerial photograph showing the San Dieguito River, the existing El Camino Real Bridge and the JPA/Boudreau property (in lighter color). The diagonal dark strip through the JPA/Boudreau property is a utility corridor.

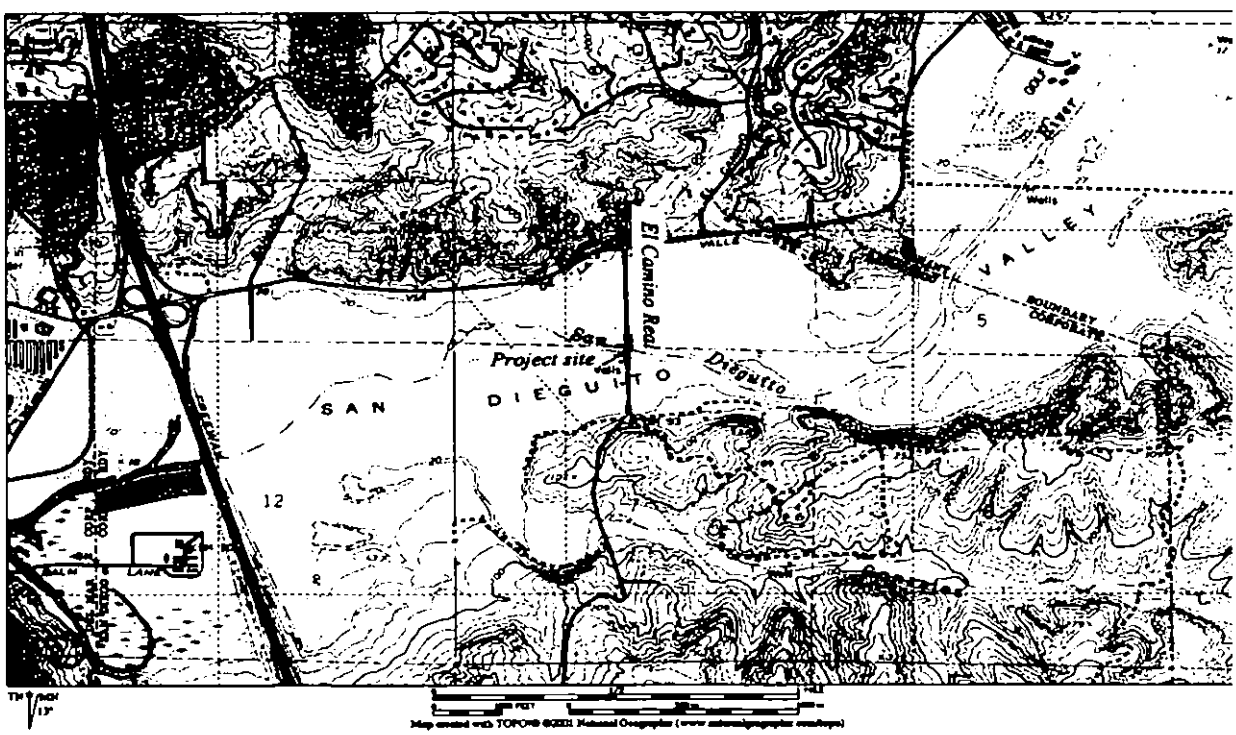


Fig. 1. Map of the San Dieguito River near El Camino Real

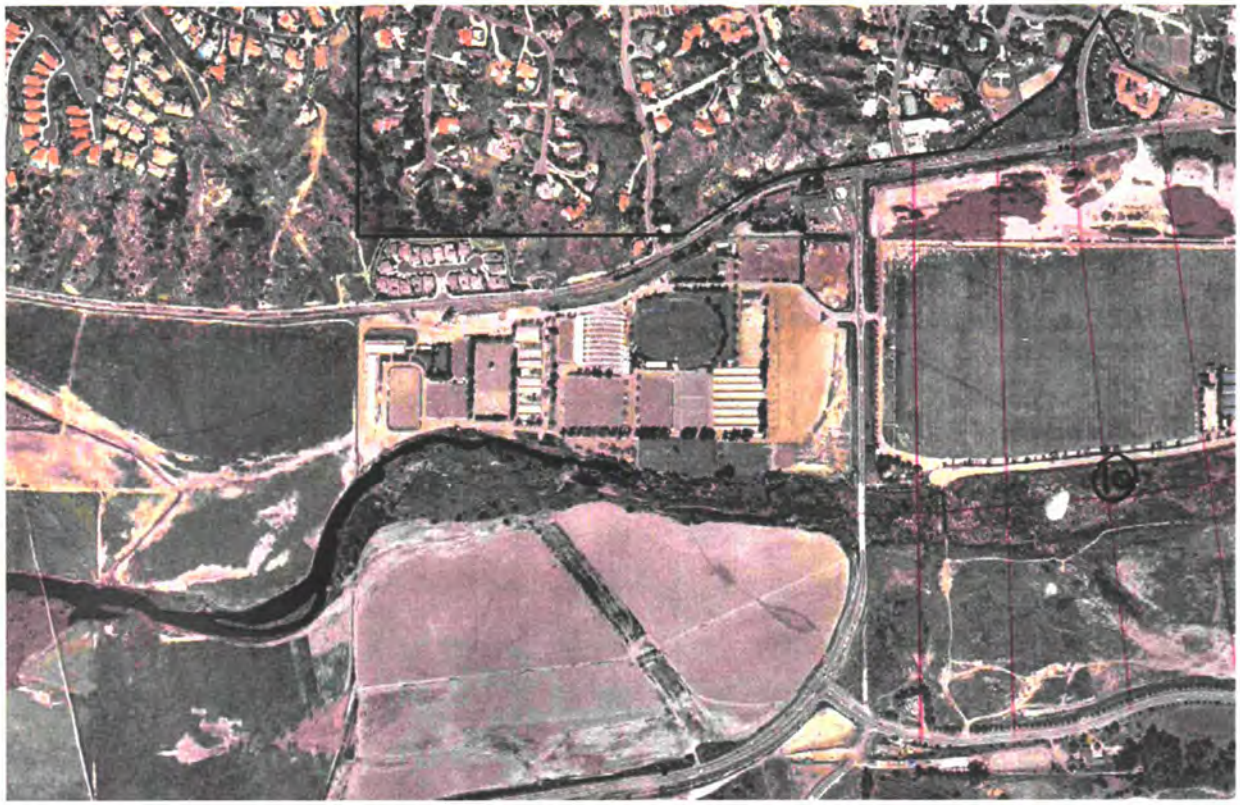


Fig.2. Aerial photograph showing the San Dieguito River, the existing El Camino Real Bridge and the JPA/Boudreau property.

The wetland will be created by lowering the ground surface to a level near the water table. Since the grading for wetland creation will be in the floodplain of the San Dieguito River, it will affect the river's flow pattern and sediment transport. This project may have impacts on the river channel in the following areas:

(1) Flood level

(2) Sediment transport and sand delivery

(3) River channel scour at infrastructure

These potential impacts must be evaluated and mitigated. The wetland creation project must be designed with proper measures to eliminate adverse impacts.

A study has been made to provide the hydraulic design for the wetland and to evaluate potential project impacts. The study covers the hydraulics of flood flow, sediment transport and potential river channel changes. In the study, the river channel geometry is defined at selected channel cross sections. Locations of these cross sections are shown in Figs. 3 and 4. Selected

points of interest and their locations are listed in Table 1.

Table 1. List of important locations along the river channel

Points of interest	Location River miles
River mouth	0
Interstate 5 Bridge	1.355 – 1.391
Existing El Camino Real Br.	2.806 – 2.813
Proposed El Camino Real Br.	2.828 – 2.851
Upstream limit of study	5.839

Fig. 3. Map of the San Dieguito River with locations of cross sections near the project site used for hydraulic study

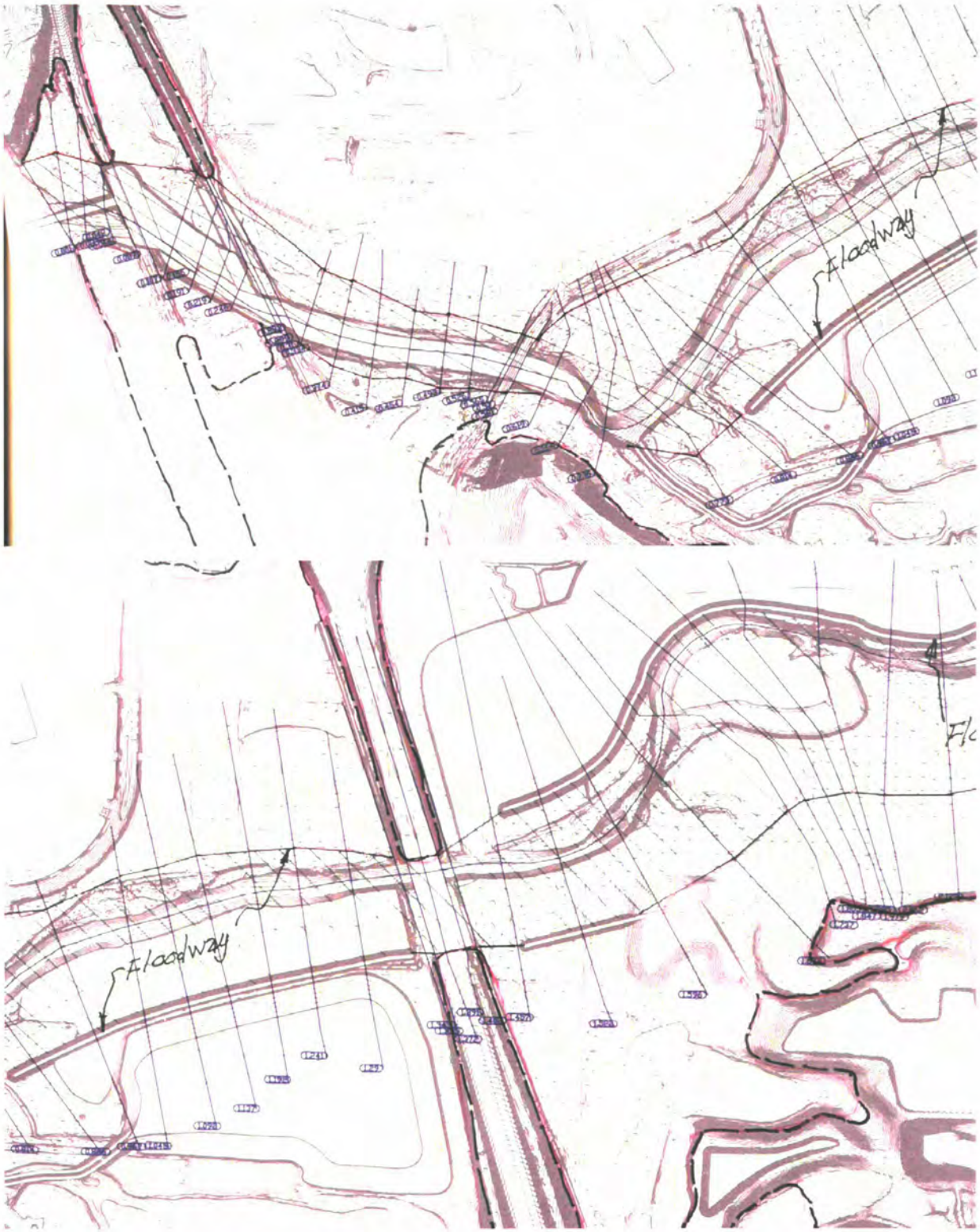


Fig. 4. Map of the San Dieguito River with locations of cross sections used for hydraulic study

II. DATA FOR THE SAN DIEGUITO RIVER

Floods - The San Dieguito River has a total drainage area of 346.5 square miles, of which 303 square miles are above Lake Hodges. Since its completion in 1926, the dam has controlled 87.4 % of the drainage basin. Lake Hodges cuts off the surface runoff of small storms to the lower reach. The reservoir spills during larger storms. Significant spillage of the reservoir occurred in 26 years of the last 78 years (1926-2003). For larger storms, the upper basin above Lake Hodges supplies the discharge in the Lower San Dieguito River, but for smaller storms, the flow in the lower reach is only supplied by runoff from the lower river basin below Lake Hodges. A summary of peak discharges for representative return periods is given in Table 2. There is a lack of sufficient stream flow data for the river channel. The County of San Diego used hydrological simulation to determine the flood discharges. Peak discharges of other floods may be estimated based the assumption that the distribution of peak discharges follows a lognormal distribution.

Table 2. Flood discharges for the lower San Dieguito River

Location	Peak Discharge, cfs		
	10-yr	50-yr	100-yr
Upstream of Camino Del Mar	5,700	31,400	41,800
Upstream of ATSF Railway	5,700	31,400	41,800
Upstream of Jimmy Durante	5,800	32,100	42,400
Upstream of Interstate 5	5,900	32,500	42,800

In the study, the 100-yr flood was used as the basis of evaluation. The hydrograph for the 100-yr flood is shown in Fig. 5.

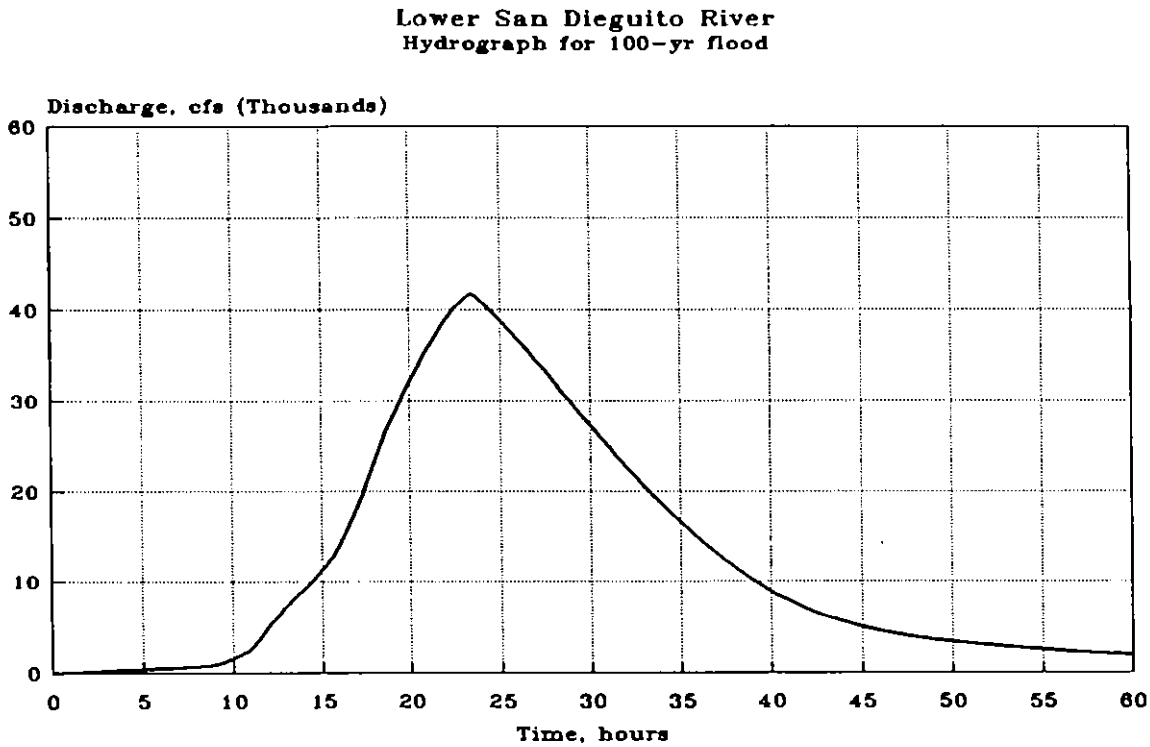
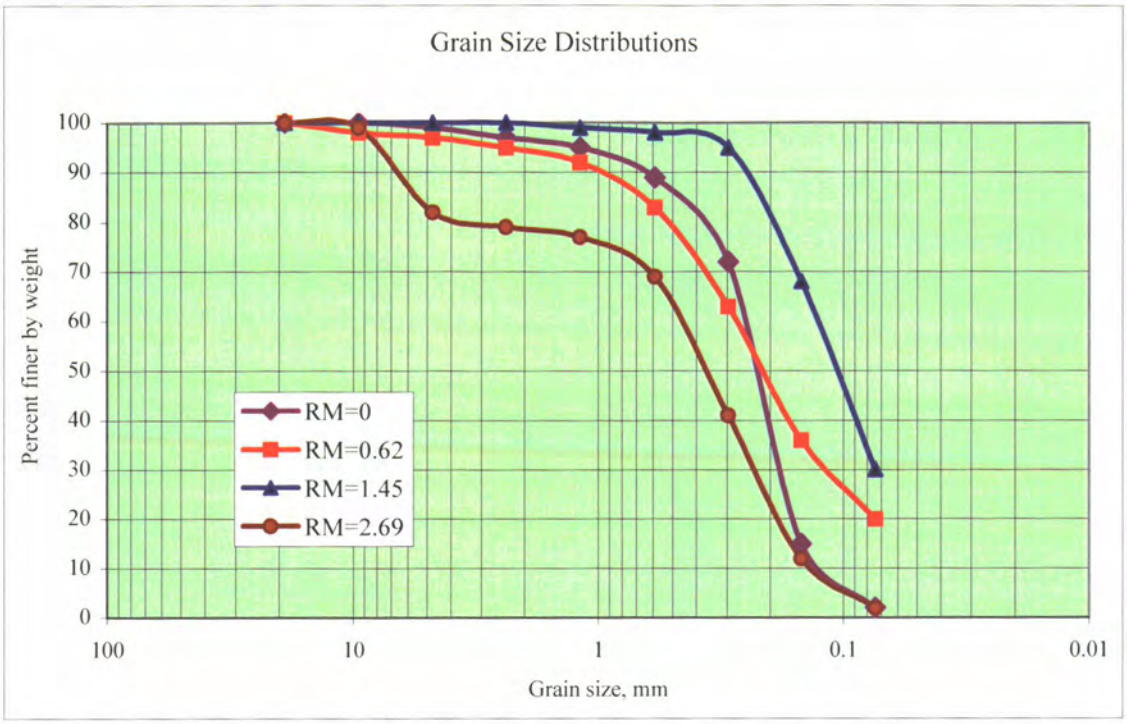


Fig. 5. Hydrograph of the 100-yr flood

Sediment Data - The study reach of the San Dieguito River is a sand bed river. Sediment samples were taken from the river bed at several locations. These samples were analyzed and their grain size distributions are shown in Fig. 6. The bed material consists primarily of sand with small amounts of fines (silt and clay) and gravel.



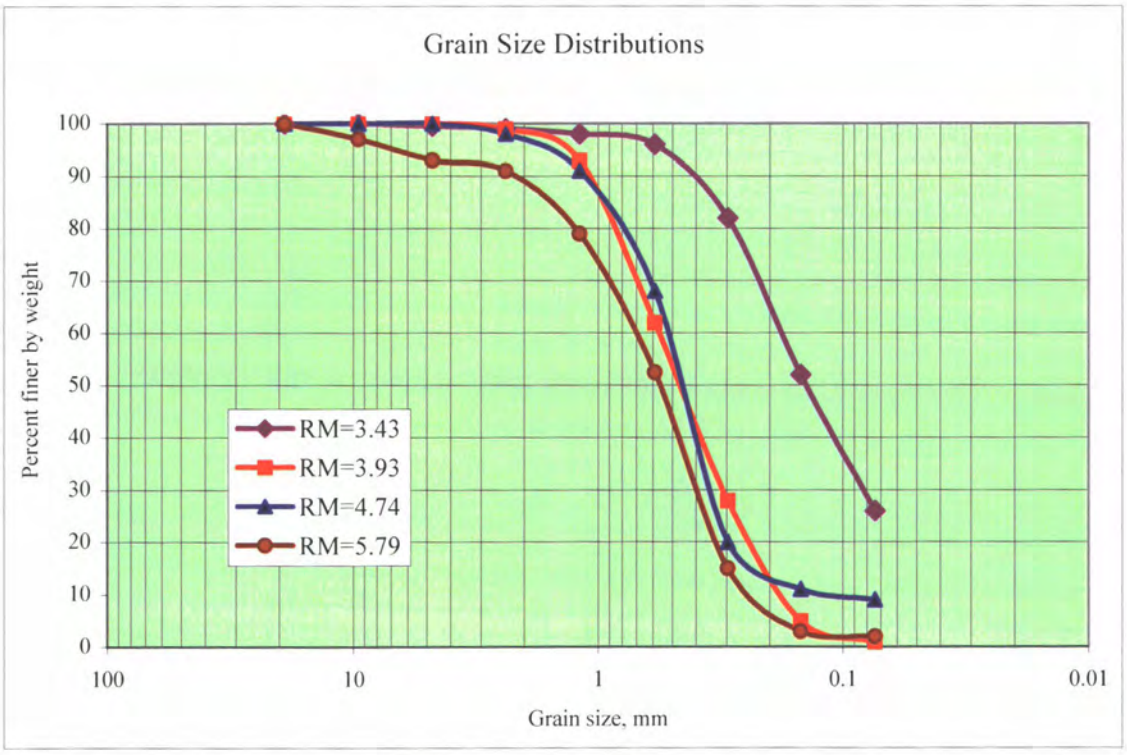


Fig. 6. Grain size distributions

Effective Flow Area and Ineffective Flow Area - The lower San Dieguito River has a main channel and a broad floodplain. Distribution of flow velocity in the floodplain is not uniform, as illustrated in Fig. 7. This velocity distribution was simulated using the two-dimensional hydrodynamic model FESWNS (Federal Highway Administration, 1992). Based on the velocity distribution, the broad floodplain can be divided into an effective flow area and an ineffective flow area. The effective flow area has significant flow velocities and it contributes to the conveyance of most of the flow discharge. The ineffective flow area, on the other hand, has very small flow velocities and it does not contribute significantly to the conveyance of the flow discharge. The effective flow area as delineated using the FESWNS model is shown in the figure to be within the boundaries designated by dashed lines; it is along the main channel of the river and it passes through the bridge openings. The ineffective flow area is outside the effective flow area.

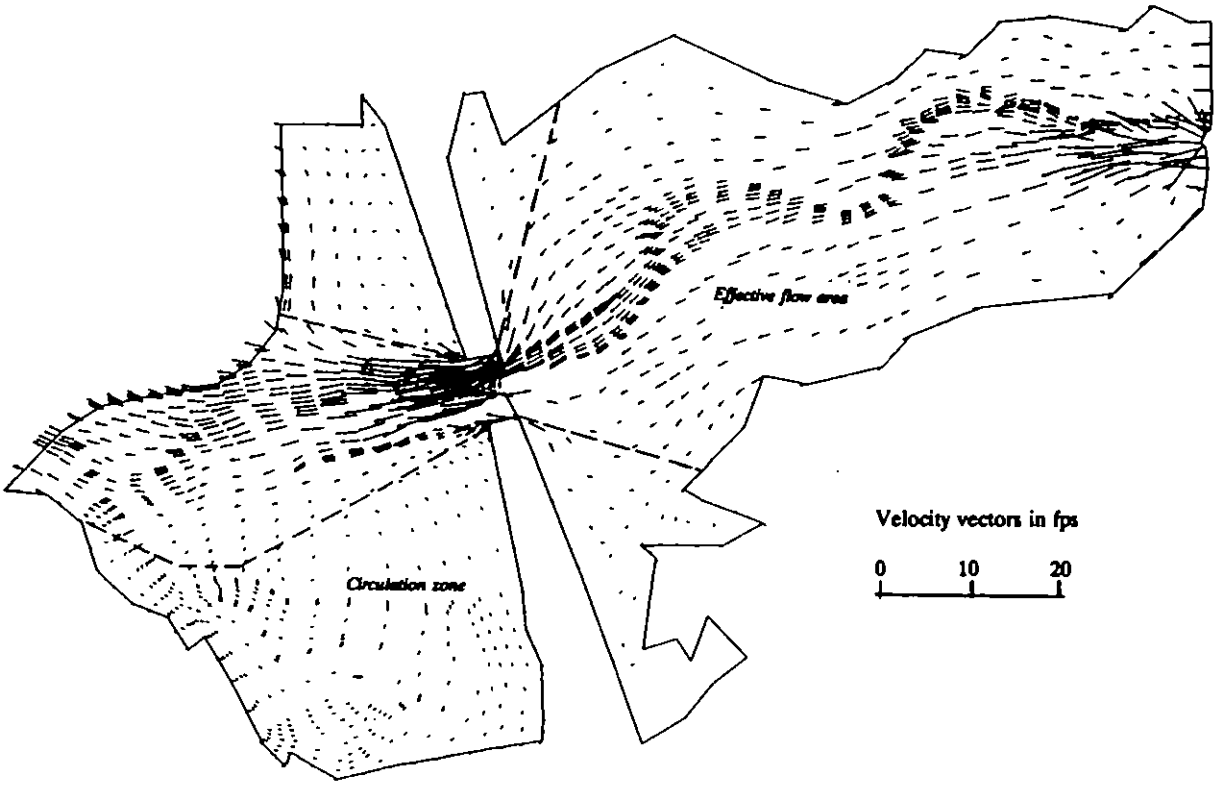


Fig. 7. Sample two-dimensional velocity distribution in the floodplain showing effective and ineffective flow areas (Q = 20,000 cfs)

III. BASIC FEATURES FOR THE WETLAND ALTERNATIVES

The layout, configuration, alignment and other features of the wetland were selected in consideration of the river flow pattern and sediment transport. A total of four alternatives, Alternative 1, Alternative 2, Alternative 2A, Alternative 3, and Alternative 4 were selected, as shown in Figs. 8, 9, 10, 11, and 12, respectively. Alternative 2A is a modified version of Alternative 2. It has the same berm as Alter vie 2, but the overbank area in front of the berm will be lowered by grading. The final alternative for the wetland shall be selected based on the condition that it will have the least effects on the river flow, sediment transport and infrastructure so that potential impacts are minimized. Each alternative as shown has a berm, an inflow weir, an outflow weir, and culverts as described below. Within the wetland for Alternative 1, there is also a utility corridor crossing.

Berm along the River Channel – The selected sites for wetland creation are located in the south overbank area of the San Dieguito River. This area is within the floodplain and therefore subject to flooding during major events. The wetland will be created by lowering the existing ground surface. If not separated from river flow, then flood water can enter and drop down into the wetland to cause head cutting on the edges and sediment deposition in the lower wetland area. In other words, the wetland would be damaged by flood water. For the purpose of preservation, the wetland will be separated from the effective flow area of the river channel. A berm along the edge of the wetland as shown in the figures will be used to separate the wetland from the river flow.

The presence of the berm in the floodplain will reduce the effective flow area of the river channel thereby causing backwater and higher flood level in the river channel. Such an impact on neighboring properties is not permissible. As the berm will impact the flood flow, mitigation measures are thus necessary. In order not to cause any rise of the flood level, a part of the flood discharge will be diverted into the wetland area during high flows. In addition, minor grading of the overbank area between the main channel and the berm is also needed. Details of these measures will be given in a later section. The pre-project flood level will not be raised with these measures.

The berm will have a side slope of 2 ½ to 1 on the river side and 2 to 1 on the wetland side. Analysis for bank protection of the berm will be described in a later section.

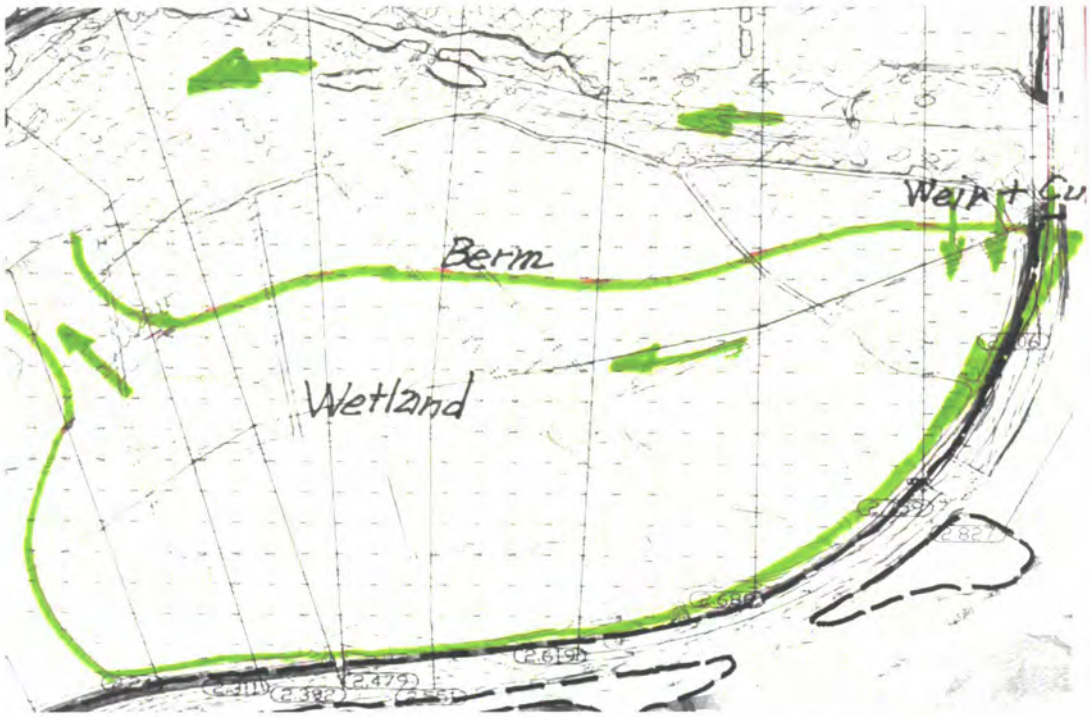


Fig. 8. Plan view of Alternative 1 for the proposed wetland

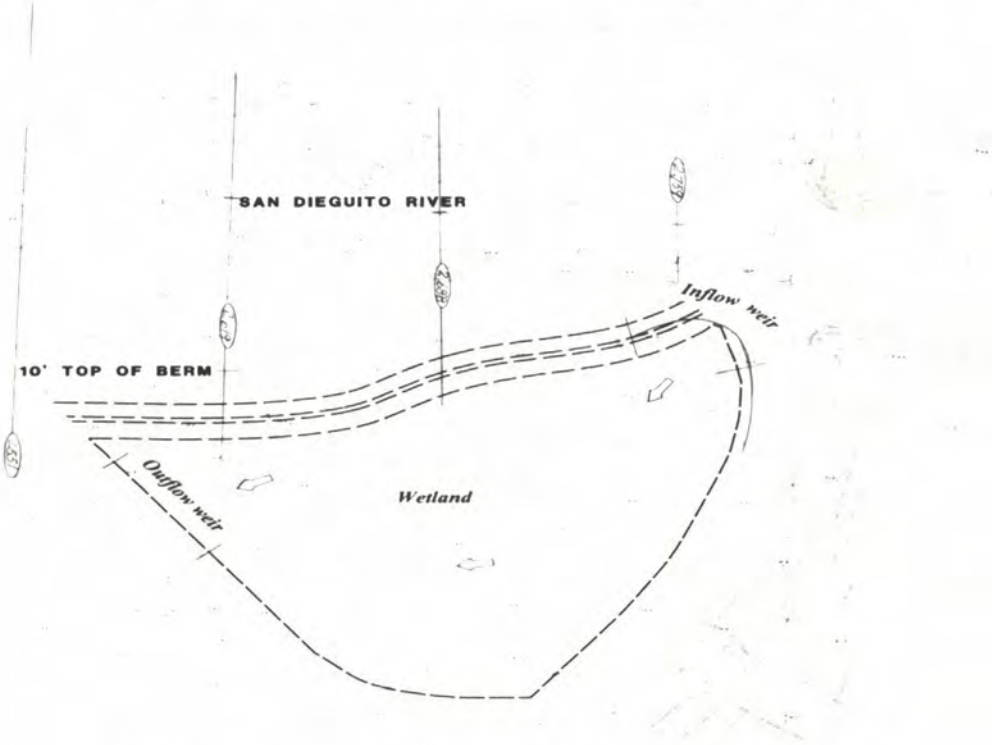


Fig. 9. Plan view of Alternative 2 for the proposed wetland

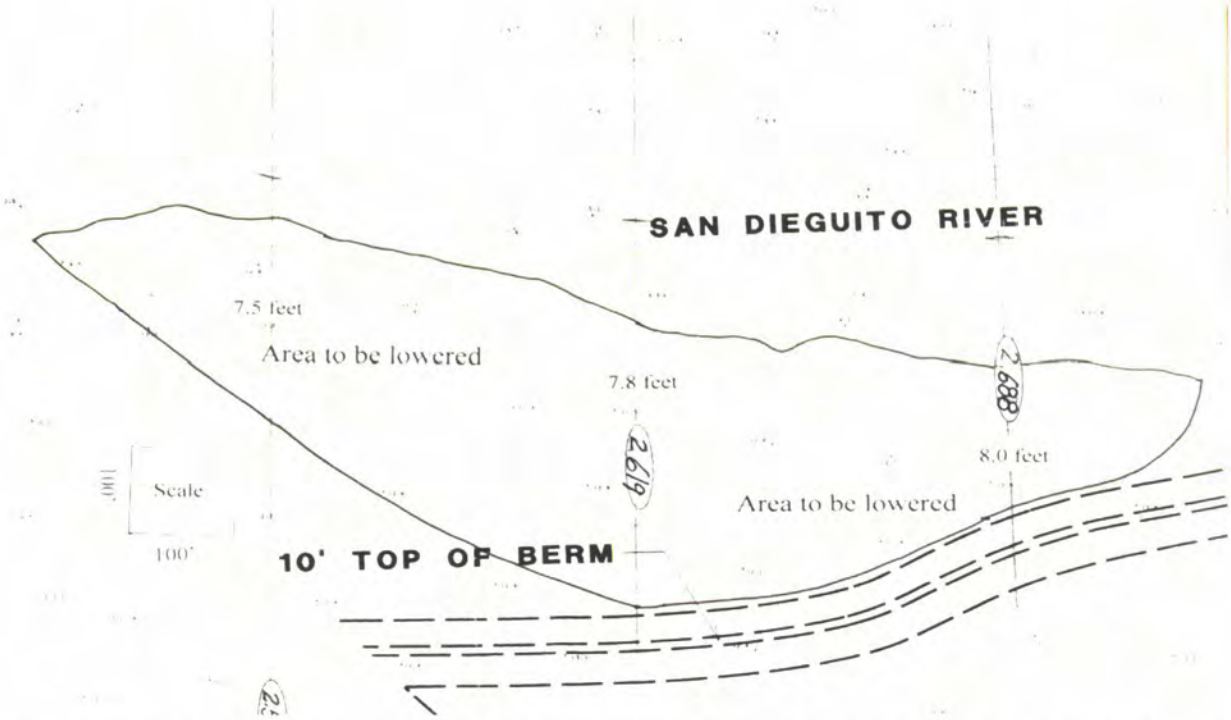


Fig. 10. Plan view of Alternative 2A showing lowered river overbank area in front of the berm

Fig. 11. Plan view of Alternative 3 for the proposed wetland

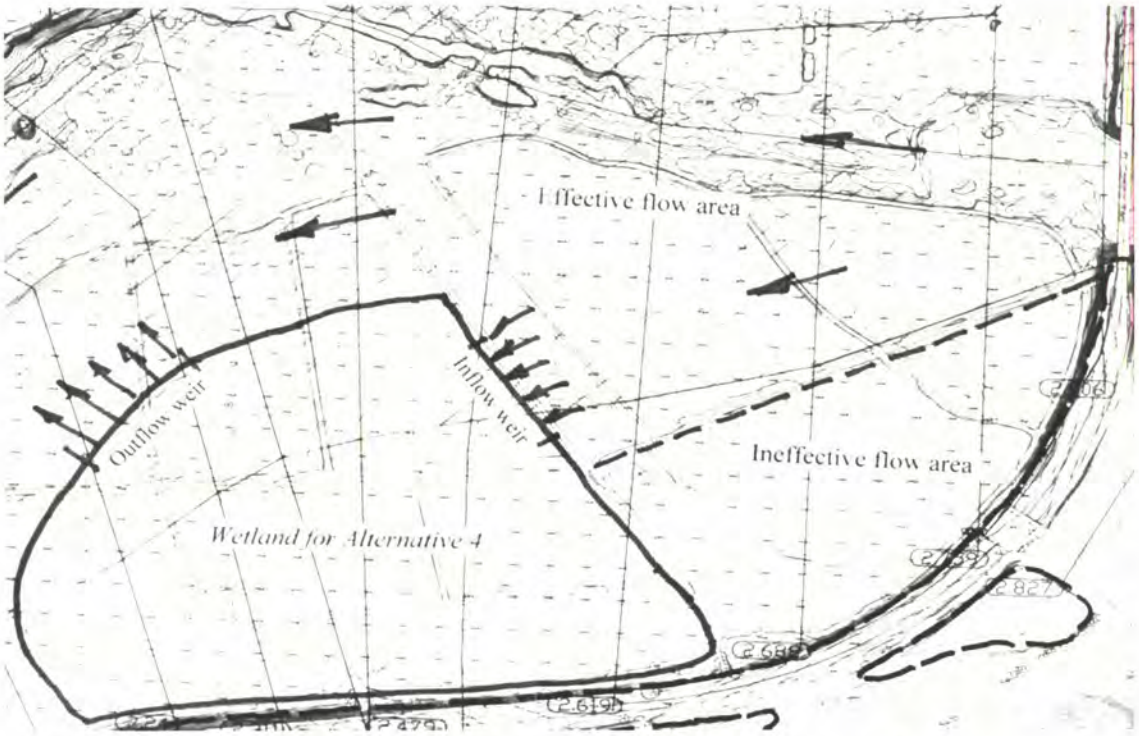


Fig. 12. Plan view of Alternative 4 for the proposed wetland

Weir - In order to mitigate the backwater effects on the river flow by the berm, a portion of the river flow will be removed from the effective flow area of the river channel by diverting it into the wetland in a controlled fashion. For this purpose, a weir will be installed on the berm for flow diversion into the wetland area. The weir is located near the upstream end of the berm; it is an effective flow control device as the flow through the weir is controlled by the weir configuration. Flow diversion into the wetland may also cause damages to the wetland and such potential damages must be avoided. A detailed study will be made to determine the hydraulic design for the diversion weir.

Flow through the weir has a high velocity; therefore, the weir is subject to erosion. To project the structure, the surface of the weir needs to be armored and the armoring protection will have its toe entrenched into the ground.

Culverts - In addition to the weir, flow diversion into the wetland will also be provided by culverts installed at a lower elevation connecting the river channel and the wetland. For Alternatives 1, 2 and 2A, six 5-foot RCP's are recommended, to be installed near Station 2.759.

The invert of the culverts is at the elevation of 6 feet, slightly above the bed elevation of the main channel. For Alternative 4, the wetland is farther away from the main channel. For this reason, only two 5-foot RCP's are recommended; they should be placed near Station 2.240 at an elevation slightly above the bed elevation of the main channel.

The culverts will allow flow diversion into the wetland at low flows; they will also allow flow exchange between the channel and the wetland. With an invert elevation slightly above the river channel bed, the culverts will prevent bed sediment from entering the wetland. In summary, the culverts are used to serve the following functions:

(1) The culverts allow flow exchanges between the channel and the wetland. They provide a source of water for the wetland during low flows.

(2) The culverts provide flow exchange between the river channel and the wetland to allow more rapid equililization of water level between these two bodies of water.

Grading of the Overbank Area between Berm and Main Channel – Minor grading will be made to the south overbank area of the main channel along the north side of the berm. The grading is for the purpose of reducing the flood level in the main channel. For Alternatives 1 and 4, the overbank area at channel stations 2.240, 2.311 and 2.392 shall be lowered to 8 feet. The overbank area at Station 2.479 shall be lowered to 9 feet. For Alternative 2A, the grading will cover a portion of the area in front of the berm along the overbank area of the river channel. The grading plan for Alternative 2A is shown in Fig. 10.

Outflow Weir near Downstream End of Berm – The berm for each alternative has a weir opening near the downstream end of the wetland. For Alternatives 1 and 4, the outflow weir is between Stations 2.240 and 2.311. The opening is a cut in the berm; it has the same dimension as the upstream inflow weir but at a lower crest elevation. The weir serves the primary function for outflow from the wetland back into the river channel during high flows.

During the rising stage of a major flood, the river channel has a higher water surface level than does the wetland; flood water enters the wetland through the culverts as well as the upstream inflow weir. The wetland is refilled through these two conduits. The downstream weir

will prevent river water from entering the wetland at river stages below the weir crest. River water also enters the wetland through the downstream weir when the river stage exceeds the weir crest. In other words, the wetland is refilled through the downstream opening as well as the upstream inflow weir at higher river stages.

During falling flood stage, the water surface in the wetland may be higher than the river stage. Under this situation, flood water in the wetland flows from the east end toward the west end. The flood inflow to the wetland is through the inflow weir and its reenters the main channel through the downstream opening.

Outflow from the wetland through the downstream opening may only occur when the wetland water level is higher than the crest elevation. Flow from the wetland exits into the river channel through the opening and then it spreads out to the overbank area before entering the main channel. The weir opening is subject to scour; therefore, its bed and sides need to be armored and its toe needs to be entrenched into the ground. The weir opening may be a concrete wall imbedded into the ground. Scour protection for the toe is required.

Crossing at Utility Corridor - A utility corridor runs through the wetland for Alternative 1 and it divides the wetland area into two parts. Water flow in the wetland crosses the utility corridor. In order to avoid any flow damage to the utility corridor, drainage facilities shall be required. Culverts will be installed in the utility corridor to pass low flows. Six 5-foot RCP's are recommended; the invert elevation should be slightly above the bed elevation of the wetland. The wetland water level during high flow can be above the ground surface of the utility corridor, flood water crosses the utility corridor by culvert flow and weir flow over the ground surface. The maximum flow rate through the weir and culverts is 7,800 cfs. The surface of the utility crossing may be damaged by scour; therefore scour protection of the utility corridor will be required.

IV. PRELIMINARY ASSESSMENT OF THE FOUR ALTERNATIVES

Alternative 1 – It will be shown that this alternative can work from the hydraulic and sedimentation considerations. A hydraulic analysis of this alternative will be presented in this

report. However, the flow in the wetland will pass through and over the surface of the utility corridor. This surface will need scour protection. This impact needs to be cleared with the owner of the utility corridor. Detailed information for the utility lines is also required in making the final selection.

Alternatives 2 and 2A - It will be shown that this alternative can work from the hydraulic and sedimentation considerations, although it only provides about 10 acres for the wetland. A hydraulic analysis of these alternatives will be presented in this report. However, the flow through the outflow weir will pass over the ground surface of the utility corridor. Since the wetland outflow carries no bed sediment, it has the potential of causing scour of the ground surface. The ground surface at the utility crossing will need scour protection. This impact needs to be cleared with the owner of the utility corridor.

Alternative 3 - For this alternative, the berm is very close to the main channel. This is necessary in order to get enough acreage for the wetland. The maximum wetland area of 15.3 acres for this alternative is still less than 17 acres that are considered desirable.

This alternative will reduce the effective flow area on the south side of the main channel. A large amount of discharge will need to be diverted into the wetland to maintain the same amount of flow in the main channel. This can be done by a longer and lower weir. The inflow and outflow weirs will need armoring as protection against potential erosion damages from river flow. Since the berm is closer to the main channel, it will need bank protection.

Under existing conditions, the width of effective flow is very large at the downstream edge of the wetland site as the flow spreads out to the south floodplain. With the proposed Alternative 3, the northwest end of the berm (downstream end of the wetland) is located close to the main channel. The width of effective flow for the channel is reduced by about 700 feet on the south side due to the presence of the berm and wetland.

In the preliminary plan, the outflow weir is located at the west end of the north berm. Under this situation for Alternative 3, the width of effective flow for the river channel is small at

the northwest corner of the wetland and then it gradually expands toward downstream. At the utility corridor, the width of effective flow is still smaller than the existing width by about 600 feet. This will cause a significant increase of flow velocity in the channel at the utility corridor. The simulated depth of scour at the utility corridor is 2 to 3 feet greater than the existing conditions before the project. This may not be a mitigatable impact.

With the berm for Alternative 3, the width of effective flow for the river channel is small at the northwest corner of the wetland and then it gradually expands toward downstream. The width of effective flow is reduced along the short channel reach just downstream of the wetland site. Such a change will cause higher water surface elevations and flow velocities in the channel. Any rise of the water-surface elevation is not permitted by law unless accepted by the affected property owners.

To get around this problem, the outflow weir for the wetland is moved so that it is installed on the west berm. With this new weir location, the south overbank area can remain in the effective flow area. The high velocities and water-surface elevations in the main channel can be mitigated by the scheme. However, the clear water released from the wetland site will flow over the utility corridor to cause severe scour at the ground surface. The ground surface of the utility corridor should be armored for a length of at least 4 hundred feet. This measure needs to be cleared with the owners of the utility corridor.

Alternative 4 - The preliminary plan has the north berm of the wetland close to the main channel. The north berm needs to stay back from the south bank of the main channel, to avoid excessive flow diversion into the wetland and bank protection for the berm. The plan shown in Fig. 11 shows the berm that stays back from the main channel. With this berm alignment, the wetland will still have enough acreage for at least 17 acres.

The east and north berms for this alternative will reduce the width of effective flow along the adjacent channel reach. This alternative may thus cause higher flood level along the channel reach. To get around this problem, the inflow can be admitted into the wetland through a weir installed on the east berm facing the upstream direction of the flow. With this scheme, the same

effective flow area between the wetland and El Camino Real can be maintained. The weir has a crest elevation higher than the adjacent floodplain; it will provide scour protection of the ground surface at the utility corridor.

The floodplain near the northeast corner of the berm is subject to local scour by the river flow. Since this scour will affect the ground surface of the utility corridor. Protection of the berm near the corner and adjacent ground surface will be needed. It will not be heavy armoring.

V. METHODS OF ANALYSIS

Stream channel scour consists of general scour and local scour. General scour is related to the sediment supplied to and transported out of a channel reach. Local scour is due to a local obstruction to flow by a bridge pier/bent or abutment.

To determine general scour, it is necessary to consider the sediment supply by flow to the channel reach and sediment removal out of the reach. Sediment delivery in the stream channel and supply to the subject area is related to the flood hydrograph, channel geometry, and sediment characteristics, etc. To account for these factors, it requires mathematical simulation of the hydraulics of stream flow, sediment transport and stream channel changes.

Mathematical Model for General Scour - The FLUVIAL-12 model (Chang, 1988) is employed for this project. For a given flood hydrograph, the FLUVIAL model simulates spatial and temporal variations in water-surface elevation, sediment transport and channel geometry. Scour and fill of the streambed are coupled with width variation in the prediction of river channel changes. Computations are based on finite difference approximations to energy and mass conservation that are representative of open channel flow.

The model simulates the inter-related changes in channel-bed profile and channel width, based upon a stream's tendency to seek uniformities in sediment discharge and power expenditure. At each time step, scour and fill of the channel bed are computed based on the

spatial variation in sediment discharge along the channel. Channel-bed corrections for scour and fill will reduce the non-uniformity in sediment discharge. Width changes are also made at each time step, resulting in a movement toward uniformity in power expenditure along the channel. Because the energy gradient is a measure of the power expenditure, uniformity in power expenditure also means a uniform energy gradient or linear water surface profile. A river channel may not have a uniform power expenditure or linear water-surface profile, but it is constantly adjusting itself toward that direction. The model was calibrated using 12 sets of field data. Such calibration studies are as listed in the Users Manual for FLUVIAL-12. Most of the calibration studies were peer-reviewed.

Selection of the Engelund-Hansen Formula —The Engelund-Hansen formula was selected for the study for the following reasons:

(1) The selection was based on the most extensive evaluation of formulas made by Brownlie (see Fig. 13); the Engelund-Hansen formula has the best correlation with field data.

(2) The Engelund-Hansen formula was used in many studies in this region. The results of these studies were verified by field data.

(3) In a calibration study of the FLVUAIL-12 model, the results generated by the Engelund-Hansen formula can be correlated with the measured channel changes in the San Dieguito River during the 1993 flood.

Engelund-Hansen Formula - Engelund and Hansen (1967) applied Bagnold's stream power concept and the similarity principle to obtain their sediment transport equation:

$$f' \varphi = 0.1 \, (\tau_*)^{5/2} \tag{1}$$

with $$f = \frac{2gRS}{U^2} \tag{2}$$

$$\varphi = \frac{q_s}{\gamma_s \left[(s - 1)\, g d^3\right]^{1/2}}, \qquad \tau_* = \frac{\tau_o}{(\gamma_s - \gamma)\, d} \tag{3}$$

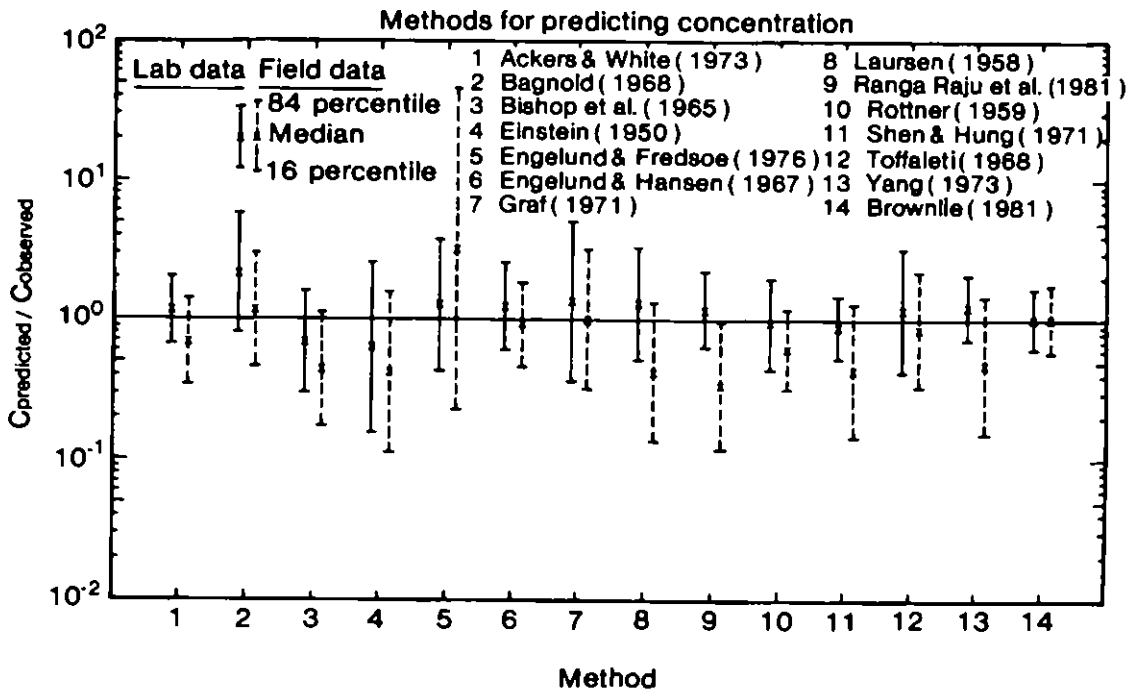


Fig. 13. Evaluation of sediment transport formulas by Brownlie

where f is the friction factor, d is the median fall diameter of the bed material, φ is the dimensionless sediment discharge, s is the specific gravity of sediment, and τ_* is the dimensionless shear stress or the Shields stress. Substituting Eqs. 2 and 3 into Eq. 1 yields

$$C_s = 0.05 \frac{s}{s-1} \frac{US}{[(s-1)gd]^{1/2}} \left[\frac{RS}{(s-1)d}\right]^{1/2} \tag{4}$$

where C_s (= Q_s/Q) is the sediment concentration by weight. This equation relates sediment concentration to the U-S product (which is the rate of energy expenditure per unit weight of water) and the R-S product (which is the shear stress). Strictly speaking, the Engelund-Hansen formula should be applied to streams with a dune bed in accordance with the similarity principle. However, it can be applied to upper flow regime with particle size greater than 0.15 mm without serious error.

V. HYDRAULIC DESIGN FOR THE WEIR

The proposed project includes a berm and two weirs installed near the east and west ends of the berm. Since the berm reduces the effective flow area of the river channel, it would cause backwater effects, i.e. higher flood level. The weirs are a scheme developed to eliminate the backwater effects. Each weir is a cut in the berm. In order to achieve the objective of reducing the backwater effects in the river channel, a sufficient discharge must be admitted into the wetland. On the other hand, the weir flow discharge must be small enough so that it will not cause damages to the wetland.

In order to develop the desired weir configuration, a weir with a vertical side slope (rectangular weir) was first assumed and different sets of weir lengths and crest elevations were tested. Based on the test results, the following geometric features for the weir were selected:

Weir length: 250 feet

For Alternative 1: Inflow weir crest elevation: 14.5 feet.
Outflow weir crest elevation: 12.0 feet

For Alternatives 2 and 2A: Inflow weir crest elevation: 14.5 feet.
Outflow weir crest elevation: 12.5 feet

For Alternative 4: Inflow weir crest elevation: 13.6 feet.
Outflow weir crest elevation: 11.6 feet

The performance and effectiveness of the weirs were analyzed as described below.

In subsequent development, weirs with a side slope were considered. Such weirs are trapezoidal in cross-sectional shape and they may therefore be referred to as trapezoidal weirs. A flat side slope for the weir will allow human passage along the top of the berm, thereby eliminating the need of a bridge over the weir opening. Two different flat side slopes were considered; these are: (1) the 5 horizontal units to one vertical unit side slope, and (2) the 12 horizontal units to one vertical unit side slope.

Rating Curves for Weir Flow - Weir flow occurs when the river stage exceeds the weir crest elevation. Based on the results of FLUVIAL-12 modeling, the river stage at the east inflow

weir location reaches the crest elevation at the discharge of 12,000 cfs, which is the peak discharge of the 20-yr flood. In other words, weir flow occurs only during floods that are greater than the 20-yr flood.

The discharge overflowing the crest of a rectangular weir was computed based on the following equation for broad-crested weirs (Chow, *Open Channel Hydraulics*, MacGraw-Hill, 1959):

$$Q = 3.09\ H^{3/2}\ L \tag{5}$$

In which, Q is the weir discharge in cfs; H is the total head above the weir crest; L is the weir length of 250 feet. Based on this equation, weir discharges at various stages were computed as summarized in Table 3. The stage-discharge relation, or the rating curve, for the weir of Alternatives 1, 2 and 2A is also shown in Fig. 14. The rating curve for the weir of Alternative 4 has the same shape, except the discharge starts at the crest elevation of 13.6 feet.

The last column in Table 3 is based on results from the FLUVIAL-12 model. At the peak 100-yr flood discharge of 42,800 cfs, the weir flow is 7,864 cfs, which is roughly 18.4 % of the peak flood flow. The diverted discharge into the wetland is reintroduced into the main channel through the outflow weir west of the wetland; the combined flood flows continue downstream.

Table 3. Stage-discharge relations for the river and rectangular weir (Alternatives 1, 2 and 2A)

River stage Feet	Head over weir feet	Weir discharge cfs	River discharge Cfs
14.5	0	0	12,000
15.0	0.5	273	13,000
15.5	1.0	772	15,000
16.0	1.5	1,418	18,000
16.5	2.0	2,193	21,000
17.0	2.5	3,051	24,000
17.5	3.0	4,010	27,000

18.0	3.5	5,053	32,000
18.5	4.0	6,174	36,000
19.0	4.5	7,367	40,000
19.2	4.7	7,864	42,800

For a weir with a trapezoidal cross section, the discharge of flow over the weir crest is given by the equation (Chow, *Open Channel Hydraulics*, MacGraw-Hill, 1959):

$$Q = \frac{5.671\,[(L+zy)y]^{1.5}}{(L+2zy)^{0.5}} \tag{6}$$

In which, L is the weir length that is also the bed width of the trapezoidal channel; z is the side slope in horizontal units for one vertical unit; and y is water depth over the weir crest. The total head H (or the river stage) above the weir crest is computed from the equation

$$H = y + V^2/2g \tag{7}$$

In order to develop the trapezoidal weir configuration for the selected side slopes, different sets of weir lengths and crest elevations were tested. The purpose of these tests was to match the performance of the trapezoidal weir with that of the rectangular weir, which has a vertical side slope. Based on the test results, it was concluded that the same weir crest elevation of 14.5 feet could be used for trapezoidal weirs. The weir lengths were adjusted for the trapezoidal weirs; the selected weir lengths are summarized in Table 4. The rating curves for these three weir configurations are plotted as shown in Fig. 14 for comparison. It is easy to see that these rating curves are closely similar. In other words, at a river stage, closely similar discharges will be diverted into the northeastern tidal basin through these weirs.

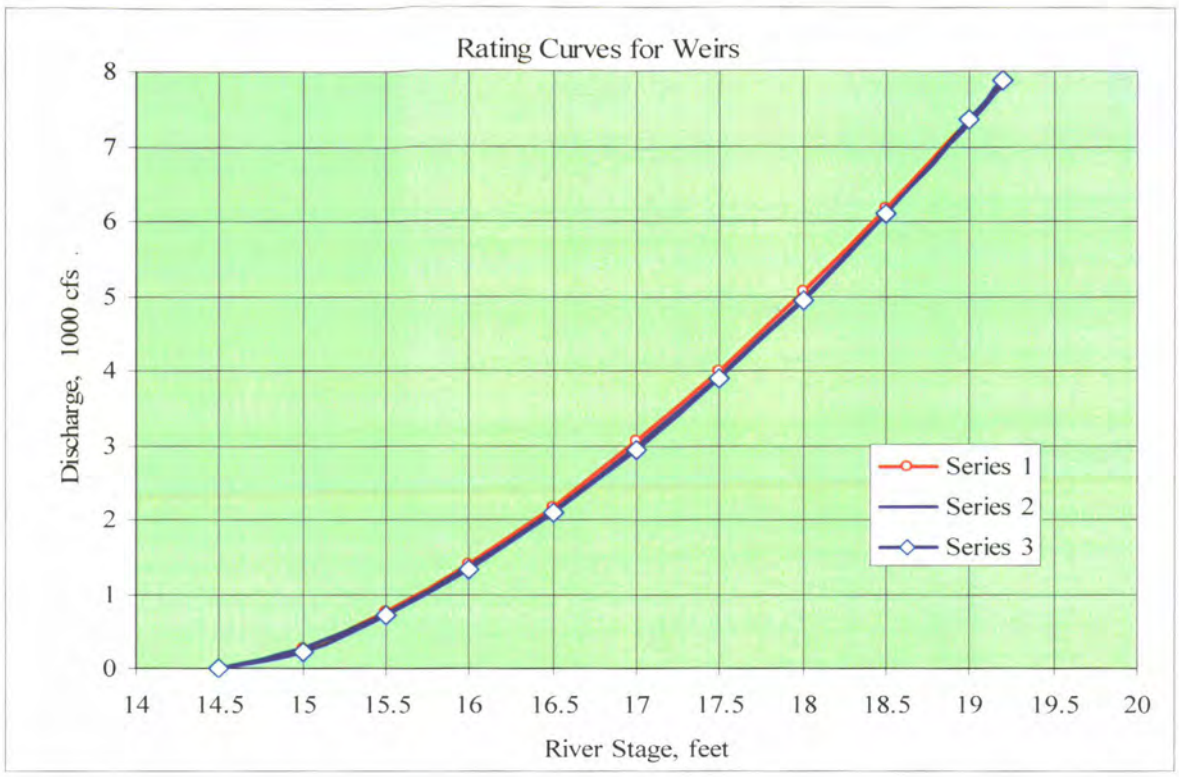


Fig. 14. Rating curves for weirs of Alternatives 1, 2 and 2A (Series 1 is for rectangular weir with L=250 feet; Series 2 is for the trapezoidal weir with L=240 feet and z = 5; and Series 3 is for the trapezoidal weir with L=230 feet and z = 12)

Table 4. Summary of weir configurations

Side slope	Crest elevation, ft	Weir length, ft
0 (rectangular weir)	14.5	250
5 to 1 (trapezoidal weir)	14.5	240
12 to 1 (trapezoidal weir)	14.5	230

Modification of Flood Hydrograph - When a portion of the flood discharge is diverted into the wetland basin through the weir. The flood discharge in the river channel adjacent to the berm is reduced. The reduction is from Station 2.311 to Station 2.759 for Alternative 1; it is from Station 2.619 to Station 2.759 for Alternative 2; and from Station 2.311 to Station 2.551 for Alternative 4. The station numbers are in river miles. The reduction of river discharge is equal to

the weir discharge and it varies in direct relation to the river stage. In the modeling study, the modified flood hydrograph was used for the river reach adjacent to the berm. At the confluence of the main channel and the west weir outflow, the diverted flow is again reintroduced into the main channel and the combined discharge was used in the modeling study.

Effects of Diverted Flow through the Weir on the Wetland - Since a portion of the flood flow will be routed through the wetland, the effects of this flow on the wetland need to be investigated. The flow through the wetland has the maximum discharge of 7,840 cfs during the peak 100-yr flood for both alternatives. The flow velocity through the wetland depends on the wetland configuration. For the proposed design, the wetland for Alternative 1 has a width of about 250 feet and a flow depth of at least 13 feet. With the discharge of 7,840 cfs, the velocity is computed to be 2.4 feet per second. The velocity through the wetland is much smaller for Alternatives 2 and 4. Such velocities are small and they should only have limited effects on scour. It may therefore be concluded that the flow through the wetland will not cause scour damages. Of course, the weirs and their adjacent areas need to be hardened. However, the flow velocity over the utility corridor for Alternative 1 can be quite high; therefore, the surface of the utility corridor needs scour protection.

Suspended sediment load and floating debris will be transported into the wetland during weir flows. Suspended load and floating debris should not be significant maintenance problems for the tidal basin for the following reasons.

(1) The occurrence of weir flow is very rare; its return period is about 20 years.
(2) The duration of weir flow is much shorter than the flood duration. As shown in Fig. 5, the 100-yr flood has the duration of roughly 50 hours, but the duration of weir flow is less than 30 hours. The discharge of weir flow is very small during most of the flow period.
(3) Only the suspended load in the top layer of the river flow can be transported into the wetland. It consists of the finest portion of the suspended load, or the wash load. In sedimentation engineering, it is well known that the wash load has a very slow settling velocity and it tends to stay in suspension for a long period of time. For this reason, much of the wash load, after entering the wetland, will actually be transported out of the wetland to re-enter the downstream river channel.

(4) Floating debris is normally near the water surface but with most of its volume submerged in the water. In order for the debris to be carried into the wetland, it will require a certain water depth for the weir flow. The maximum water depth over the weir crest is about 5 feet. Because of the limited water depth, large debris may not be carried into the wetland basin. Smaller pieces that enter the wetland may also be transported out of the basin.

Summary and Conclusions: Alternatives have been developed to protect the wetland and to eliminate the backwater effects of the proposed wetland on the river channel. Each alternative includes two weirs installed on the berm. A portion of the flood flow in the river channel will be diverted into the wetland through a weir. For a rectangular weir, a weir length of 250 feet and crest elevation of 14.5 feet have been selected for Alternatives 1, 2 and 2A based on performance and effectiveness, evaluated based on hydraulic computations and FLUVIAL-12 modeling. For Alternative 4, the diversion weir has the same dimension but its crest elevation is 13.6 feet.

The 100-yr water-surface elevations for the river channel were simulated using the FLUVIAL-12 model for the existing conditions without the berms and the weir and proposed conditions with the berms and weir. The comparison will be presented in a later section of the report; it shows that these two water-surface profiles are closely similar with only minor differences for Alternatives 1, 2, 2A and 4. Water-surface elevations for the proposed conditions are generally lower. Backwater effect due to proposed wetland project is totally eliminated.

With flow diversion through the weir, the flow velocity through the wetland varies with its configuration. The maximum velocity through the outlet channel is computed to be 2.4 feet per second for Alternative 1 and even smaller for Alternatives 2, 2A and 4. Such velocities are small and they should not have significant scouring effects. It may therefore be concluded that the flow through the wetland will not cause scour damages. Of course, the weir structure and the utility corridor for Alternative 1 need scour protection.

The potential impact of the weir flow on wetland sedimentation was also analyzed. For Alternatives 1, 2, 2A and 4, the weir crest elevations are above the adjacent ground surface elevation by about 2-3 feet. For this reason, bed sediment will not be transported into the wetland; the potential for siltation due to bed sediment in the wetland is insignificant. Suspended sediment load and floating debris will be transported into the wetland during weir flows. The effects of siltation due to suspended load and floating debris are not significant maintenance problems for the wetland.

VI. MODELING FOR EXISTING CONDITIONS AND PROPOSED CONDITIONS

The FLUVIAL-12 model was used to simulate the hydraulics of river flow, sediment transport, together with potential changes in river channel geometry during the 100-yr flood. Modeling runs were made for the river channel under existing conditions and with the proposed wetland restoration project. The existing and proposed conditions are defined as follows:

Existing Conditions (Pre-Project Conditions): This pertains to the river channel with the completed Edsion/JPA project as proposed, the existing El Camino Real Bridge, the recently completed grading at the Fairbanks Country Club. It does not include the proposed wetland project.

Proposed Conditions (Post-Project Conditions): This pertains to the river channel with the completed Edsion/JPA project as proposed, the proposed El Camino Real Bridge, the recently completed grading at the Fairbanks Country Club. It also includes the proposed wetland project. The results for these two cases are compared in order to assess the wetland project impacts. The modeled results pertaining to water-surface profiles, bridge hydraulics, sediment delivery, and river channel scour are presented and described below:

Channel-Bed and Water-Surface Profiles Based on the FLUVIAL-12 Model - This river reach is subject to scour during major floods; therefore, the water-surface profile is affected by the scour development. Channel-bed scour has the direct effect of lowering the flood level. For this reason, a water-surface profile computed using the FLUVIAL-12 model with scour

consideration should be lower than the corresponding profile obtained based on the HEC-2 model that assumes rigid channel boundary.

Figure 15 shows the simulated water-surface profile and channel-bed profile changes during the 100-yr flood for the existing conditions. Figs. 16, 17, 18, and 19 show the simulated water-surface profiles and channel-bed profile changes during the 100-yr flood for Alternatives 1, 2, 2A and 4, respectively. It can be seen that the channel bed is susceptible to changes during a major event. More pronounced channel bed scour is predicted at the channel bend at Station 2.311. The scour depth at the channel bend is directly related to the flood discharge; it is the greatest near the peak flow and it tends to be refilled, at least in part, during the falling flood discharge.

The computed water-surface elevations are based on the peak 100-yr flood discharge. Numerical comparison of the water-surface elevations for these two conditions as given in Table 5 shows that these two water-surface profiles are closely similar with only minor differences. Water-surface elevations for the proposed conditions are generally lower. Since a portion of the flow is diverted into the wetland through a weir, backwater effects due to wetland is eliminated. Since the proposed project will not cause increased flood level, the project will have no flooding impacts.

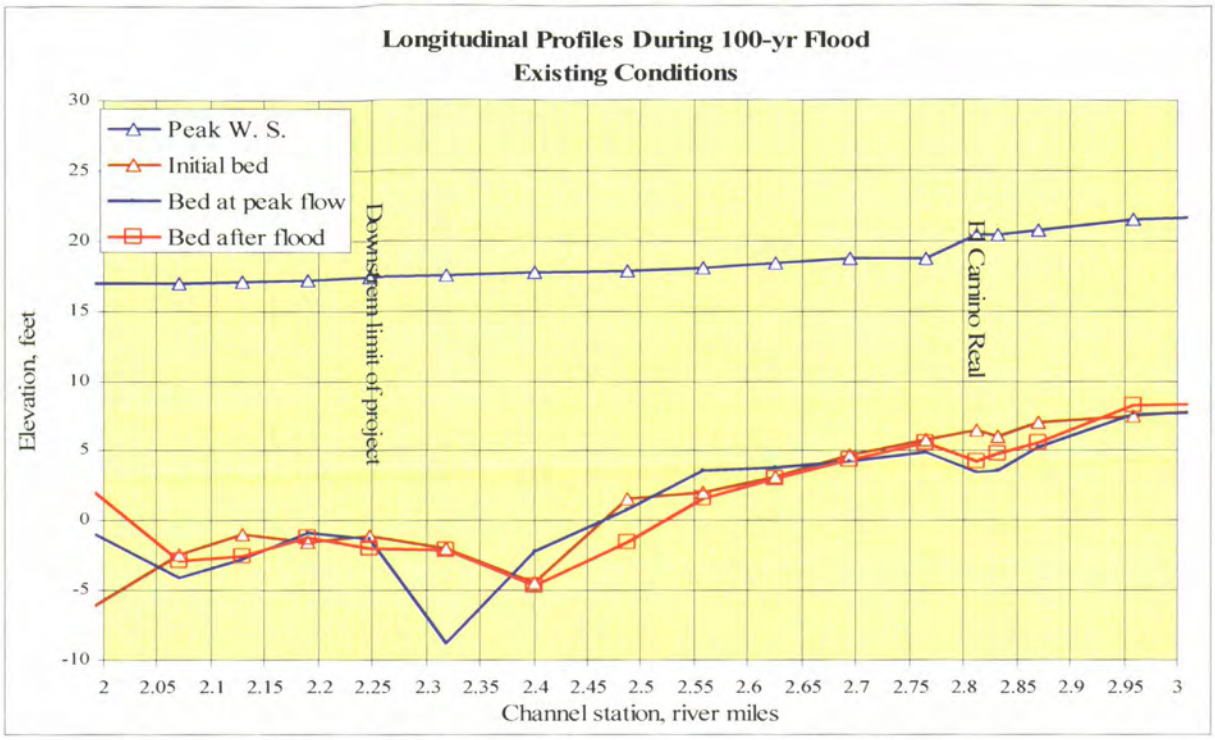


Fig. 15. Water-surface and channel-bed profile changes during 100-yr flood for existing conditions

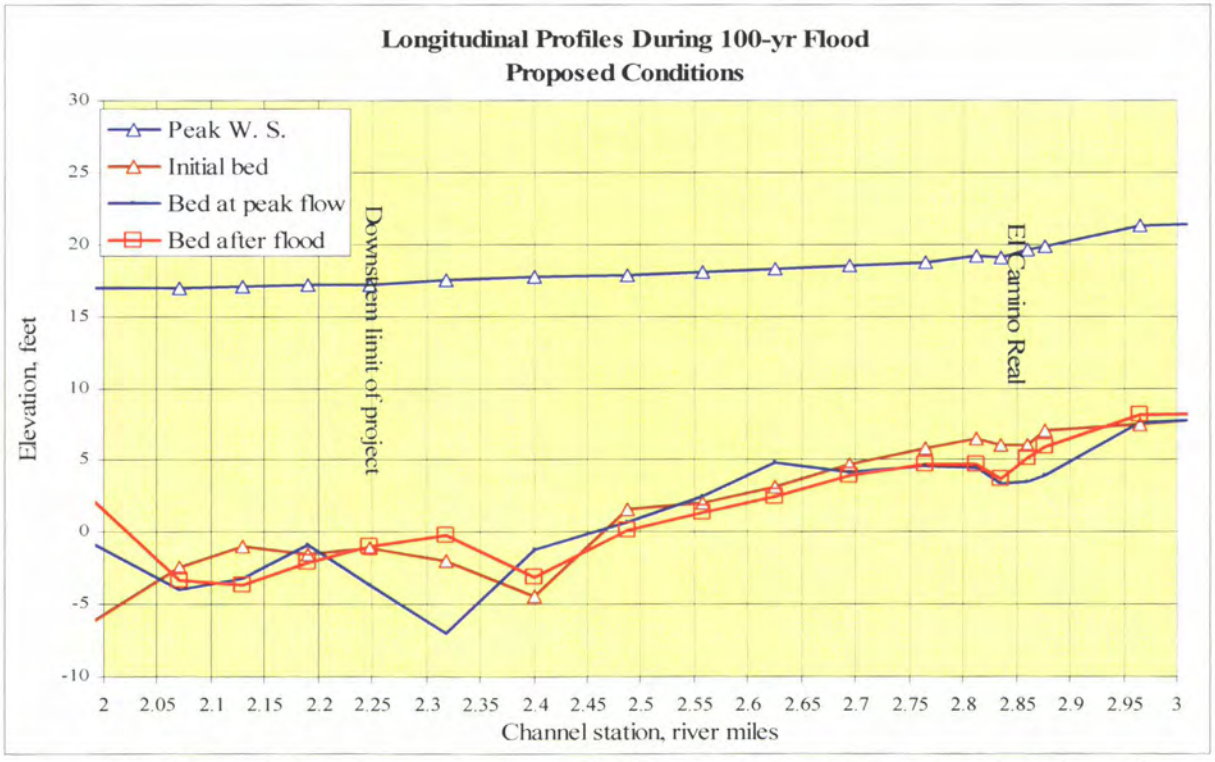


Fig. 16. Water-surface and channel-bed profile changes during 100-yr flood for Alternative 1 For proposed Alternative 1

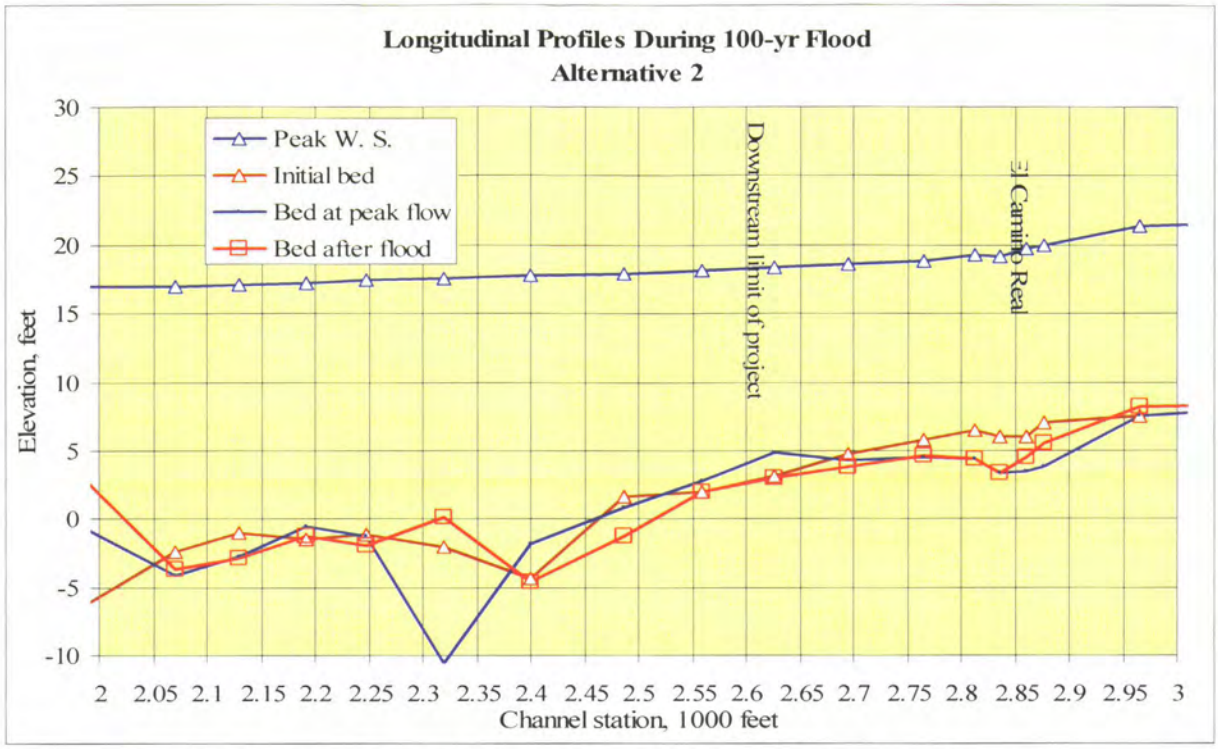


Fig. 17. Water-surface and channel-bed profile changes during 100-yr flood
For proposed Alternative 2

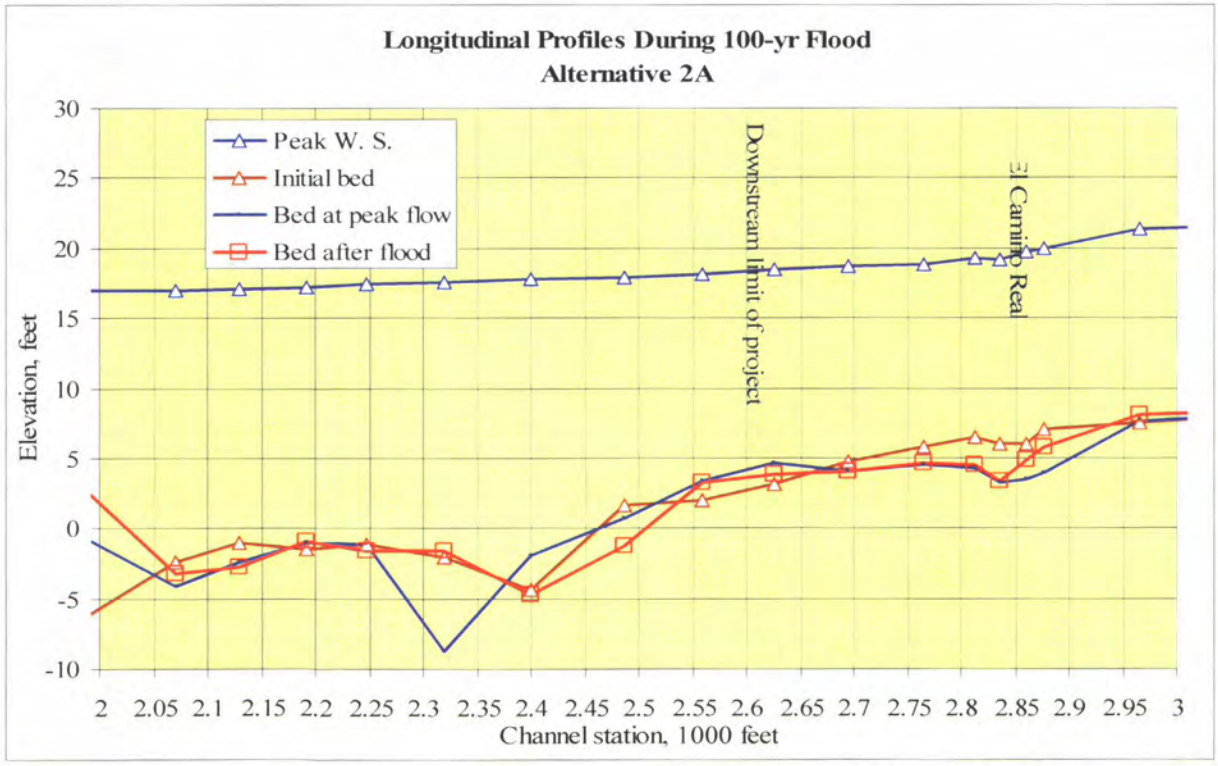


Fig. 18. Water-surface and channel-bed profile changes during 100-yr flood
For proposed Alternative 2A

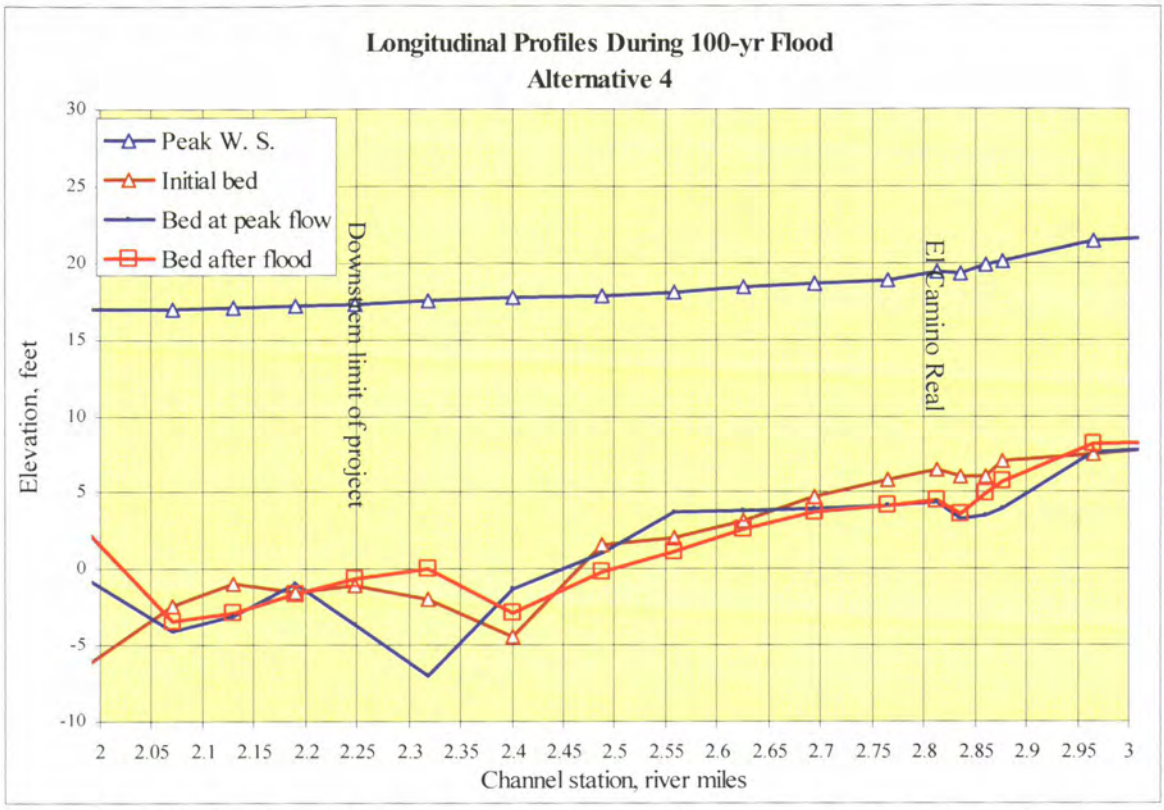


Fig. 19. Water-surface and channel-bed profile changes during 100-yr flood
For proposed Alternative 4

Table 5. Comparison of computed for 100-yr flood elevations based on FLUVIAL-12

Section river mile	Location	Computed water-surface elevation feet, NGVD				
		Existing conditions	Alternative 1	Alternative 2	Alternative 2A	Alternative 4
2.062		17.0	17.0	17.0	17.0	17.0
2.122		17.1	17.1	17.1	17.1	17.1
2.183		17.2	17.2	17.2	17.2	17.2
2.240	Downstream limit Alternative 4	17.4	17.2	17.4	17.3	17.3
2.311		17.5	17.5	17.5	17.5	17.5
2.392		17.7	17.7	17.7	17.7	17.7
2.479		17.9	17.9	17.9	17.8	17.8
2.551		18.1	18.1	18.1	18.1	18.1
2.619		18.4	18.3	18.4	18.4	18.4
2.688		18.7	18.6	18.6	18.7	18.7
2.759		18.8	18.7	18.8	18.8	18.8
2.806	Upstream limit of wetland for Alternatives 1, 2 & 2A	20.4	19.2	19.3	19.3	19.5
2.827	New El Camino Real Br.	20.5	19.0	19.2	19.2	19.3
2.865		20.8	19.9	20.0	20.1	19.9

Simulation of Sediment Delivery - Sediment delivery is defined as the cumulative amount of sediment that has been delivered passing a certain channel section for a specified period of time, that is,

$$Y = \int_T Q_s \, dt \tag{8}$$

where Y is sediment delivery (yield); Q_s is sediment discharge; t is time; and T is the duration. The sediment discharge Q_s pertains only to bed-material load of sand, gravel and cobble. Fine sediments of clay and silt constituting the wash load may not be computed by a sediment transport formula. Sediment delivery is widely employed by hydrologists for watershed management; it is used herein to keep track of sediment supply and removal along the channel reach.

Spatial variations in sediment delivery are manifested as channel storage or depletion of sediment associated stream channel changes since the sediment supply from upstream may be different from the removal. The spatial variation of sediment delivery depicts the erosion and deposition along a stream reach. A decreasing delivery in the downstream direction, i.e. negative gradient for the delivery-distance curve, signifies that sediment load is partially stored in the channel to result in a net deposition. On the other hand, an increasing delivery in the downstream direction (positive gradient for the delivery-distance curve) indicates sediment removal from the channel boundary or net scour. A uniform sediment delivery along the channel (horizontal curve) indicates sediment balance, i.e., zero storage or depletion. Channel reaches with net sediment storage or depletion may be designated in each figure on the basis of the gradient. From the engineering viewpoint, it is best to achieve a uniform delivery, the non-silt and non-scour condition, for dynamic equilibrium.

Sediment Delivery toward Downstream by the 100-yr Flood – The Edison/JPA wetland restoration project is located immediately downstream from this proposed wetland project site. It is important to assess the impacts of this project on the Edison/JPA project. The Edison/JPA project has been designed to maintain the natural sand flow along the river channel and to deliver natural sand supply to the beach. The impacts of this project on the Edison/JPA project are measured by the sediment delivery toward downstream from this project site.

Spatial variations in sediment delivery by the 100-yr flood along the river channel downstream of the project site are shown in Fig. 16 for the existing conditions and proposed

Alternative 1, respectively. The spatial patterns are similar; they both show a general increasing and decreasing trends of delivery toward the downstream direction, depicting the general pattern of erosion and deposition. Total deliveries of sediment at selected river stations for both cases are listed in Table 6 for comparison.

Table 6. Comparison of computed sediment deliveries by the 100-yr flood

Section river mile	Location	Computed sediment delivery Tons				
		Existing conditions	Alternative 1	Alternative 2	Alternative 2A	Alternative 4
2.240	Downstream limit of wetland	$3.53X10^4$	$3.66X10^4$	$3.98X10^4$	$3.82X10^4$	$3.69X10^4$
2.311	Upstream limit of Edison project	$3.52\ X10^4$	$3.57\ X10^4$	$3.87X10^4$	$3.81X10^4$	$4.42X10^4$

As shown in Fig. 20 and Table 6, there is more sediment delivery toward the channel reach where the Edsion/JPA project starts under the proposed conditions. In other words, the supply of river sand will not be reduced by the proposed wetland creation project.

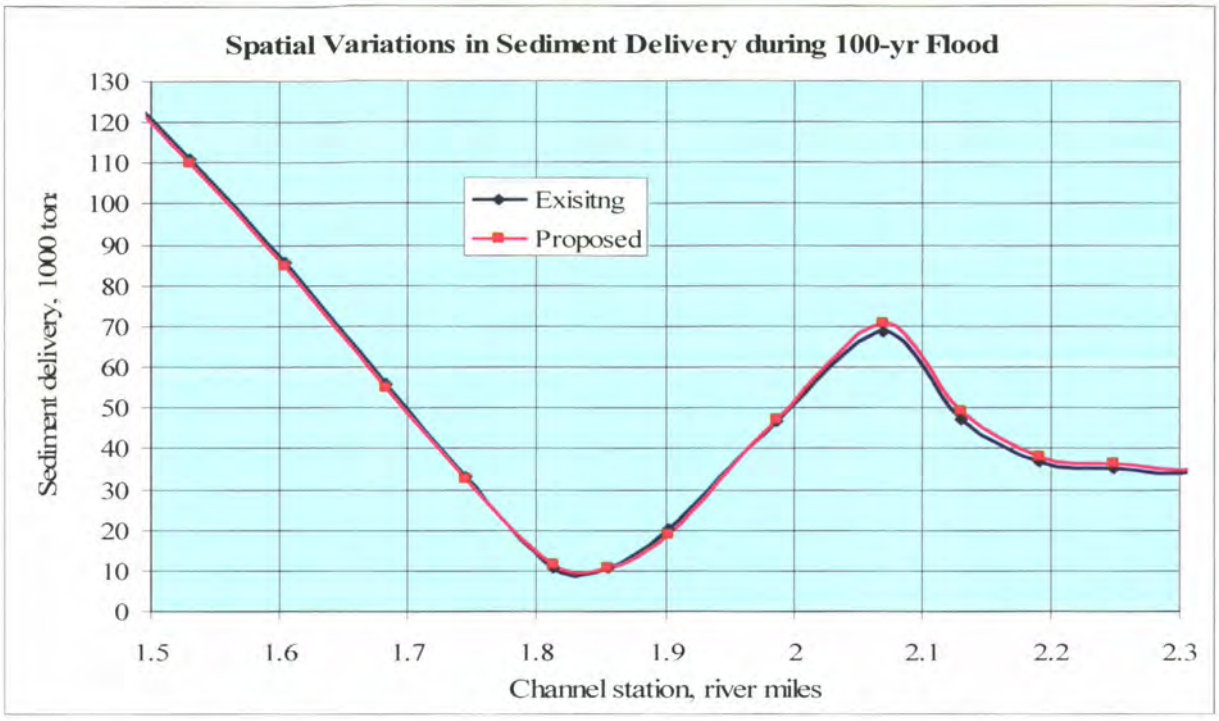


Fig. 20. Spatial variations in sediment delivery by the 100-yr flood along the river channel downstream of project site for existing and proposed conditions

Scour Impacts by the Wetland Project - The San Dieguito River is subject to changes, especially during major floods. Simulated channel bed scour and fill are depicted by the changes in longitudinal channel bed profiles in Figs. 15, 16, 17, 18 and 19. The most pronounced scour is at Station 2.311; it occurs at the toe of the concave bank of a channel bend along a proposed Edison berm. The Edison berm has been designed to have bank protection with adequate toe entrenchment. For the rest of the channel reach, the figures show that the potential scour and fill are quite limited. In other words, the channel bed for the rest channel reach is predicted to have only minor scour changes during the 100-yr flood.

The utility corridor at Station 2.479 is subject to minor channel bed scour. Simulated changes in channel cross section at the corridor are shown in Fig. 21 for the existing conditions; they are shown in Fig. 22 for the proposed Alternative 1, in Fig. 23 for the proposed Alternative 2, in Fig. 24 for Alternative 25, and in Fig. 25 for Alternative 4. The maximum scour occurs in the main channel. It reaches the minimum elevation of -1.6 feet for the existing conditions; it reaches 0.2 foot for the proposed Alternative 1; it reaches -1.2 for Alternative 2; it reaches -1 for

Alternative 2A, and it reaches 0 for proposed Alternative 4. Therefore, the proposed project will not increase channel bed scour at the utility corridor.

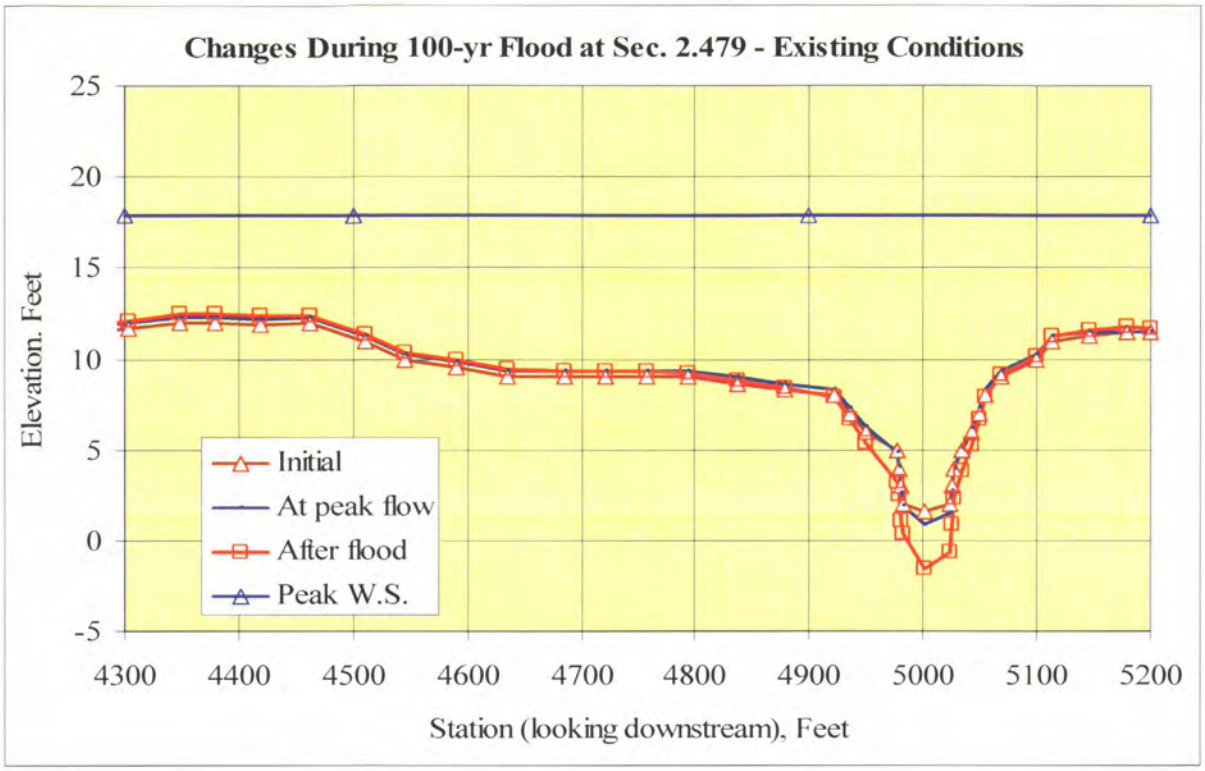


Fig. 21. Simulated changes in channel cross section at utility corridor under existing conditions

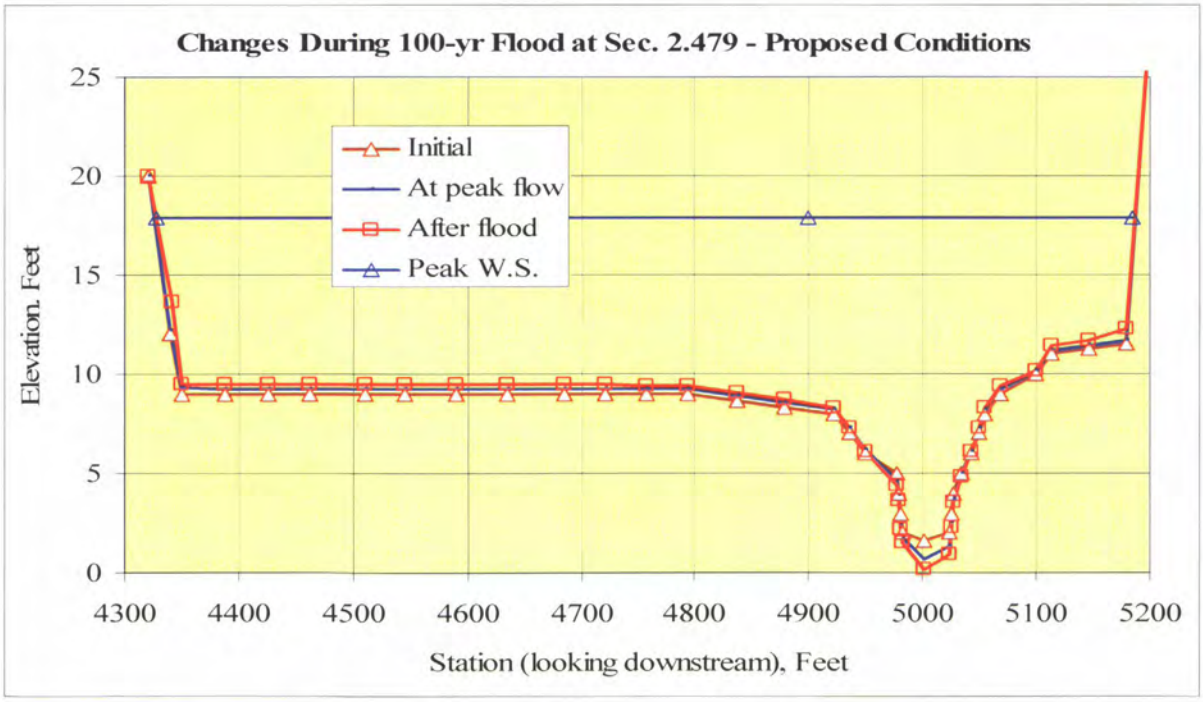


Fig. 22. Simulated changes in channel cross section at utility corridor for Alternative 1

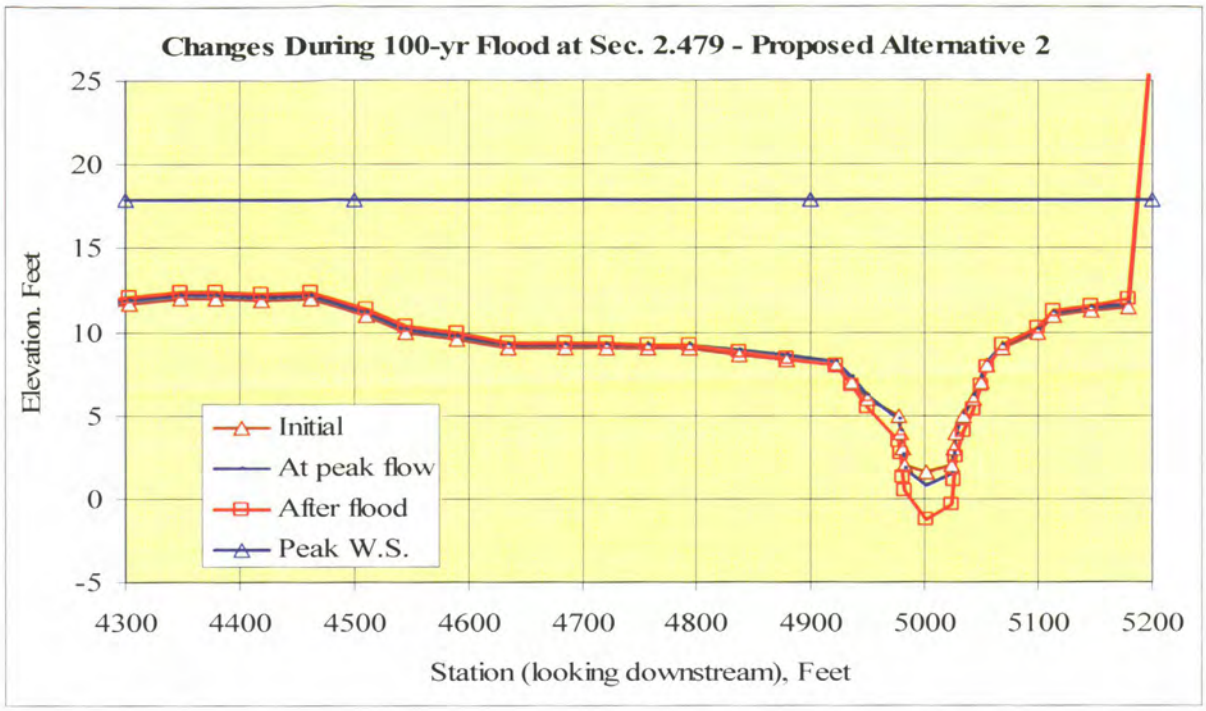


Fig. 23. Simulated changes in channel cross section at utility corridor for Alternative 2

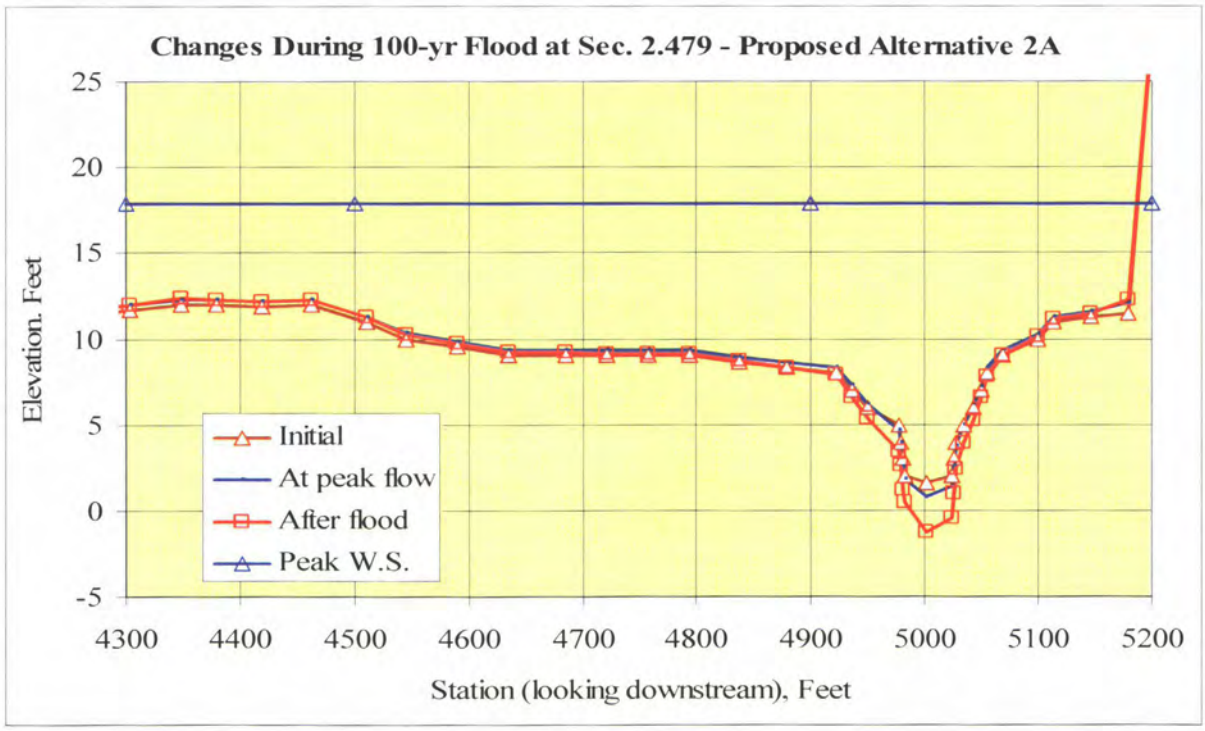


Fig. 24. Simulated changes in channel cross section at utility corridor for Alternative 2A

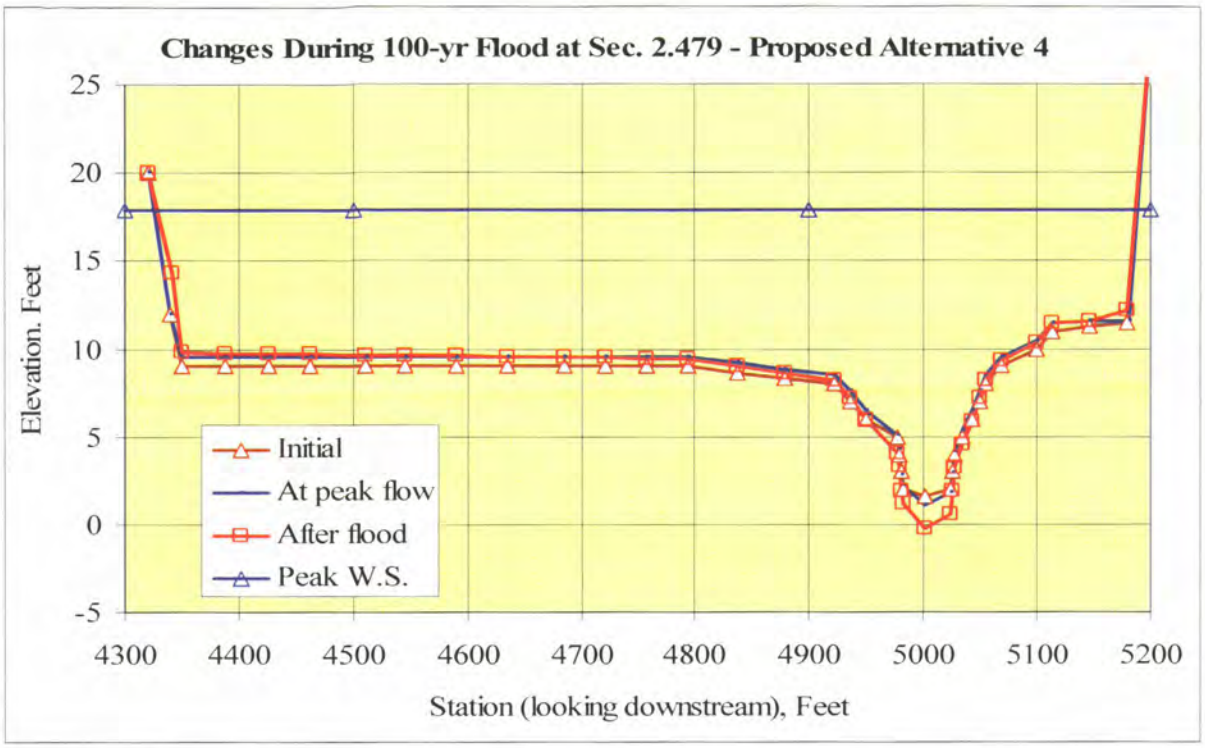
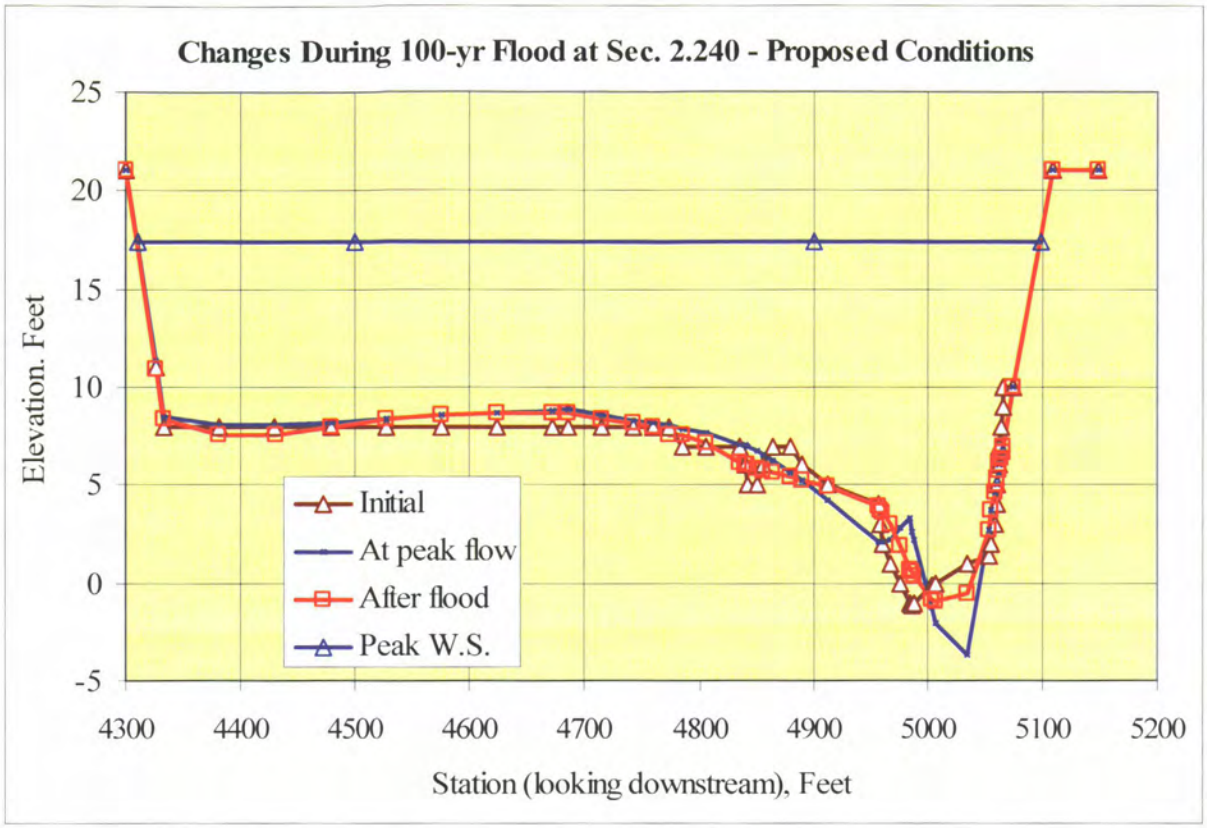


Fig. 25. Simulated changes in channel cross section at utility corridor for Alternative 4

Cross-Sectional Profile Changes and Velocity Distributions – Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2 and 4 are shown in Fig. 26; those for Alternative 2A are shown in Fig. 27. Each figure also shows the velocity distribution at the peak flow. Note that all cross sections are viewed toward downstream. The berms for these alternatives have the same location along the left bank. The cross-sectional profiles for Alternative 2A also show the proposed grading on the left overbank of the main channel.

Simulated changes in cross-sectional profiles at Stations 2.240 and 2.311 are characterized by channel bed scour near the toe of bank protection along the right bank. Channel bed scour occurs at the concave bank when the channel curvature impinges on the bank with the thalweg located near the channel bank. It can be seen from the velocity distribution curves that the maximum flow velocities at Stations 2.240 and 2.311 are also near the concave bank (right bank) along the thalweg. For all channels stations, the simulated velocities along the proposed berm will be used as the criterion to determine the type of required bank protection.



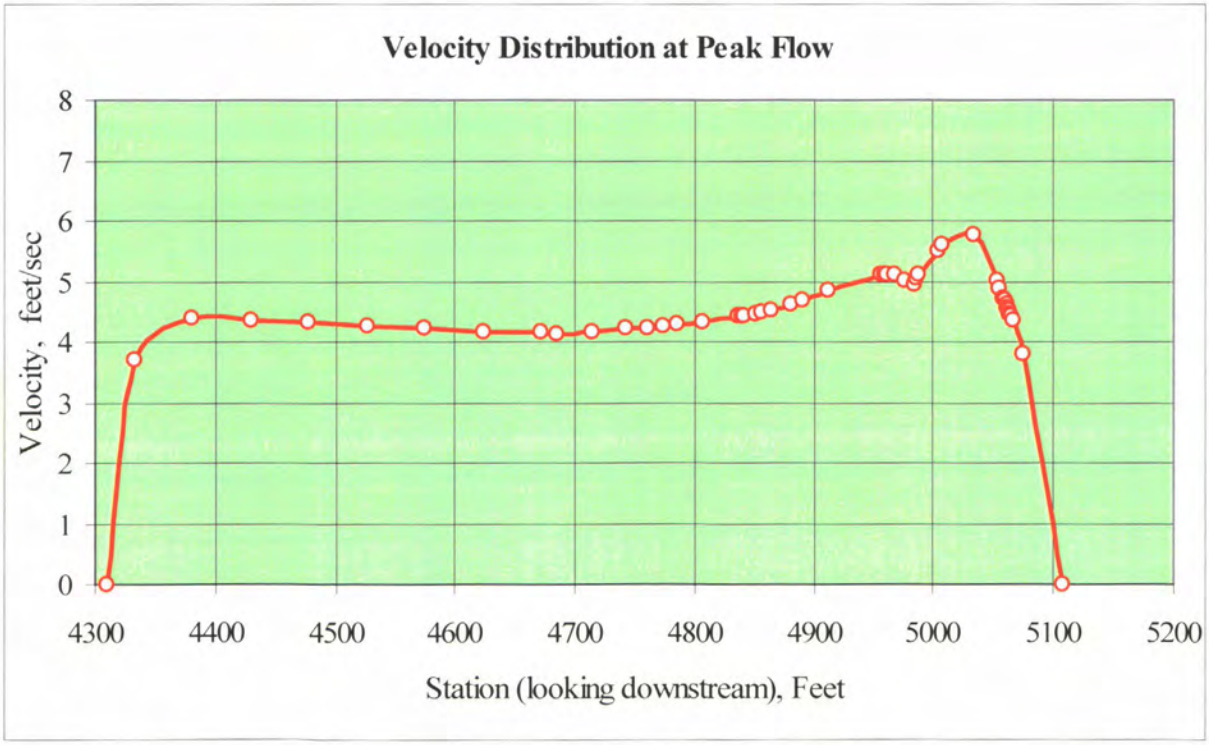
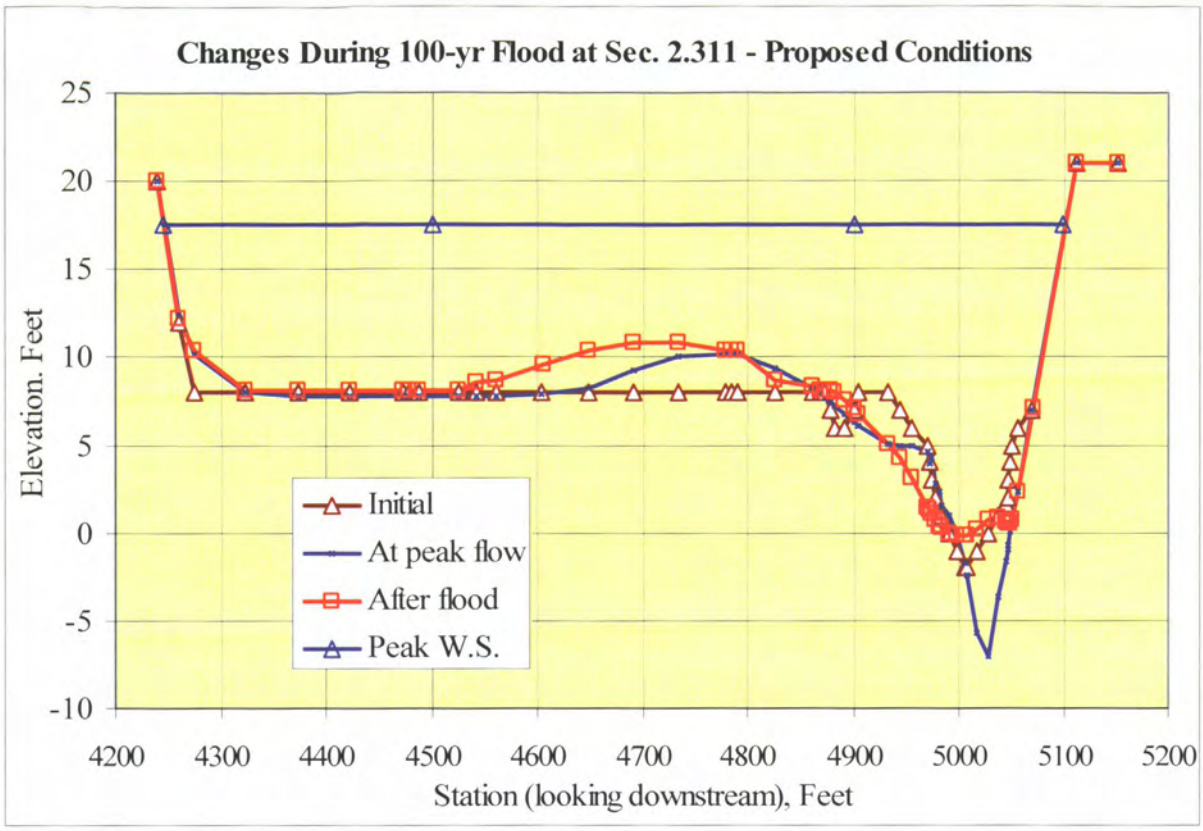


Fig. 26. Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2, and 4 together with velocity distribution at peak flow.



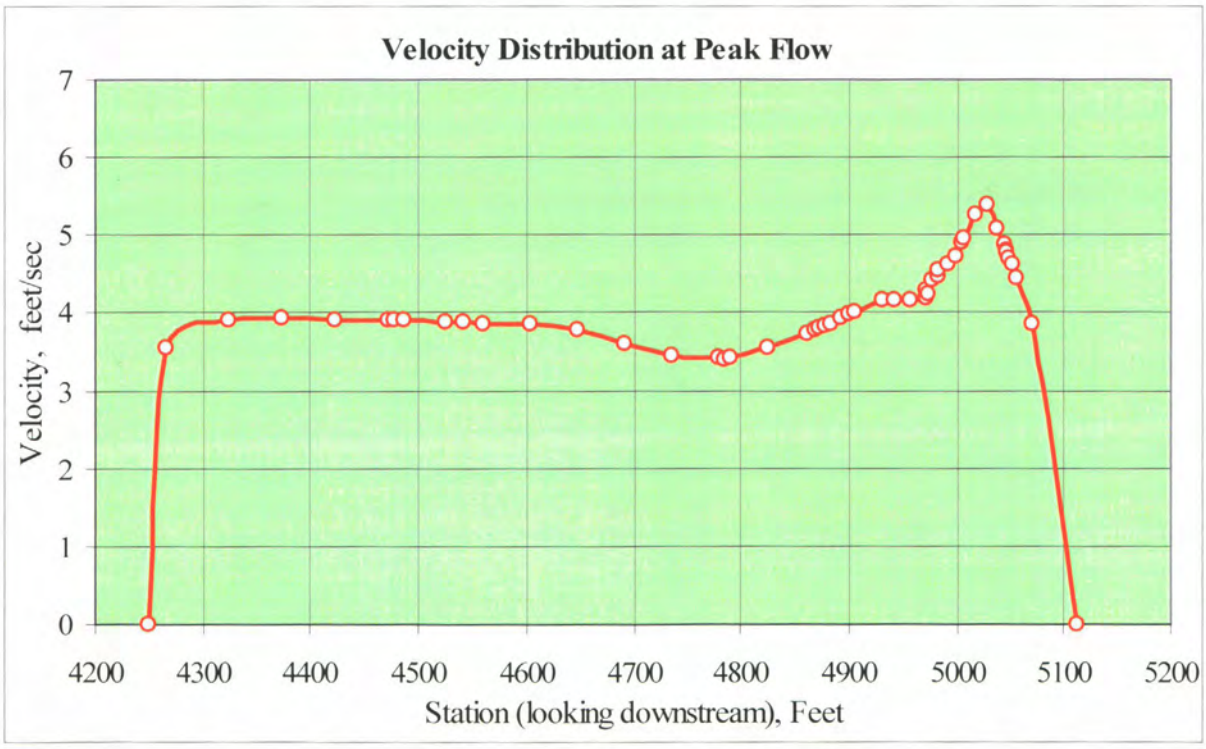
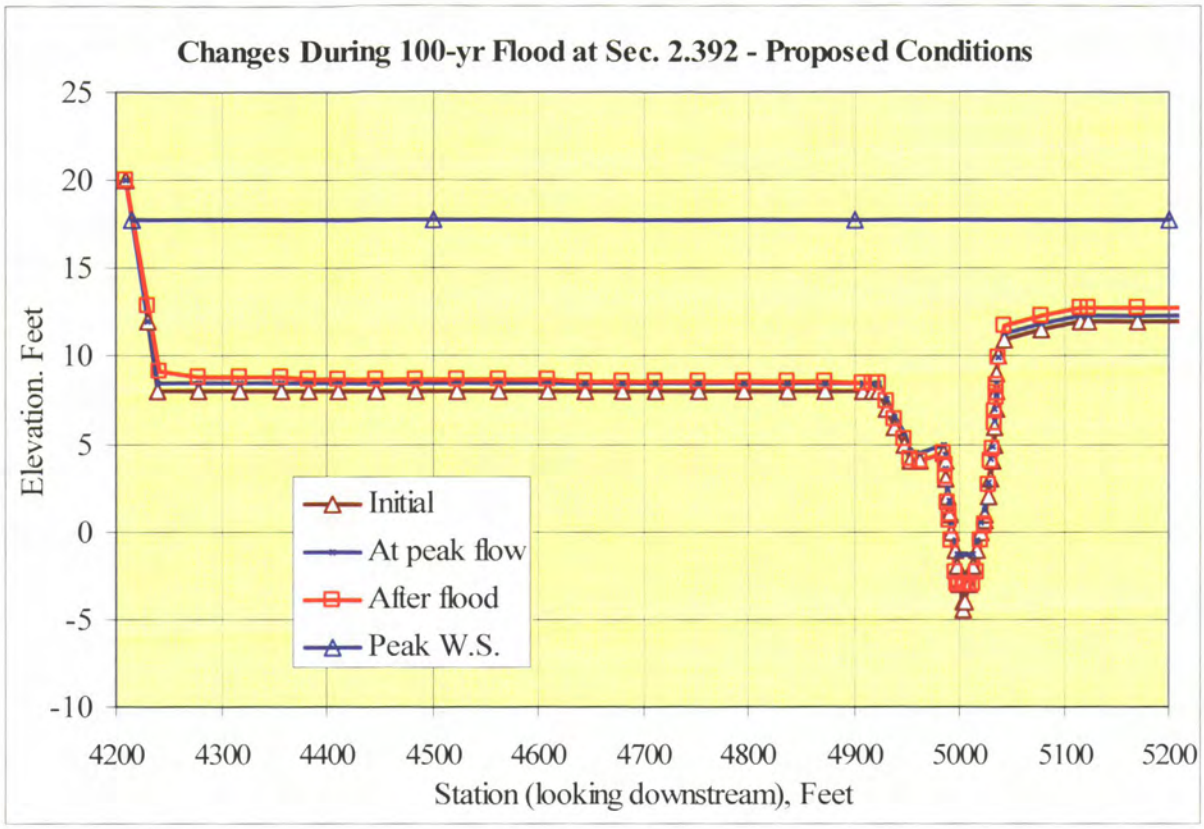


Fig. 26(continued). Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2 and 4 together with the velocity distribution at peak flow.



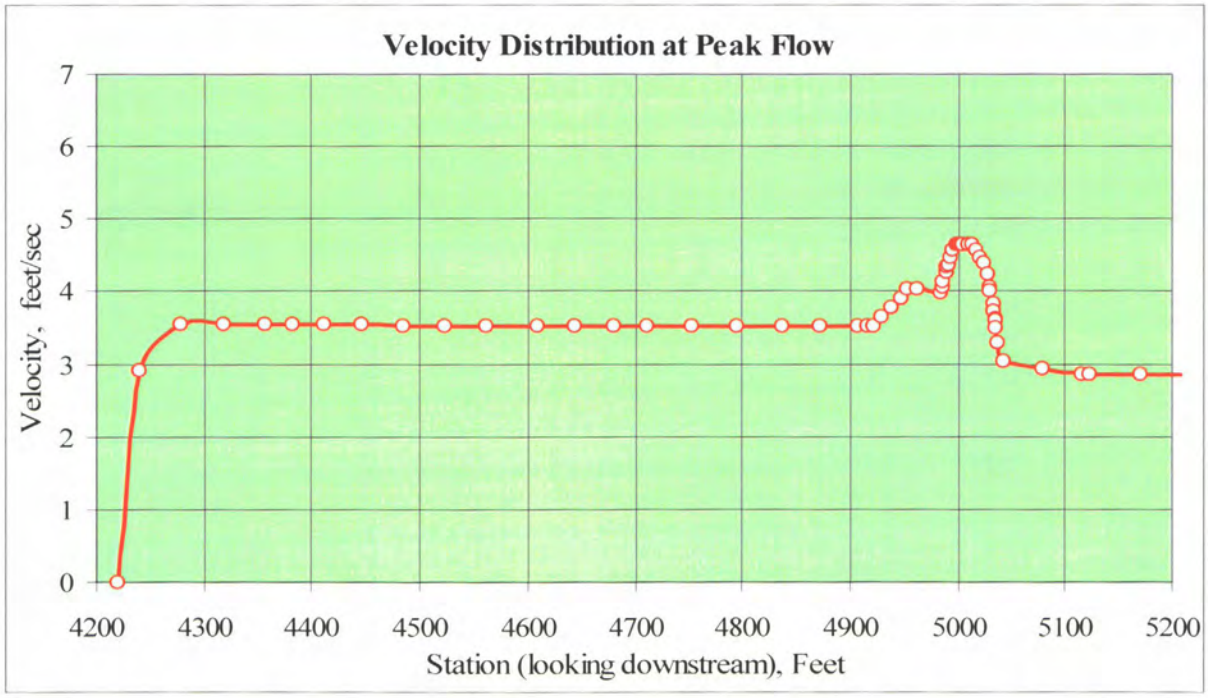
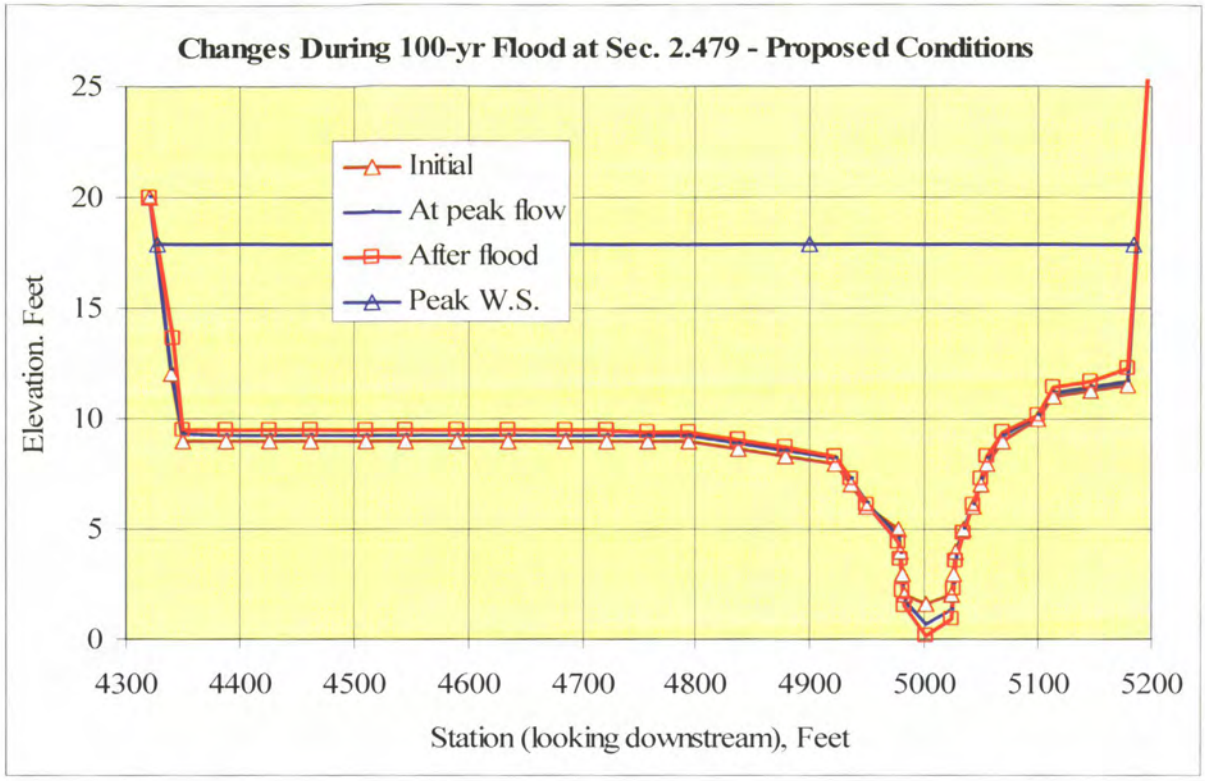


Fig. 26(continued). Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2 and 4 together with velocity distribution at peak flow.



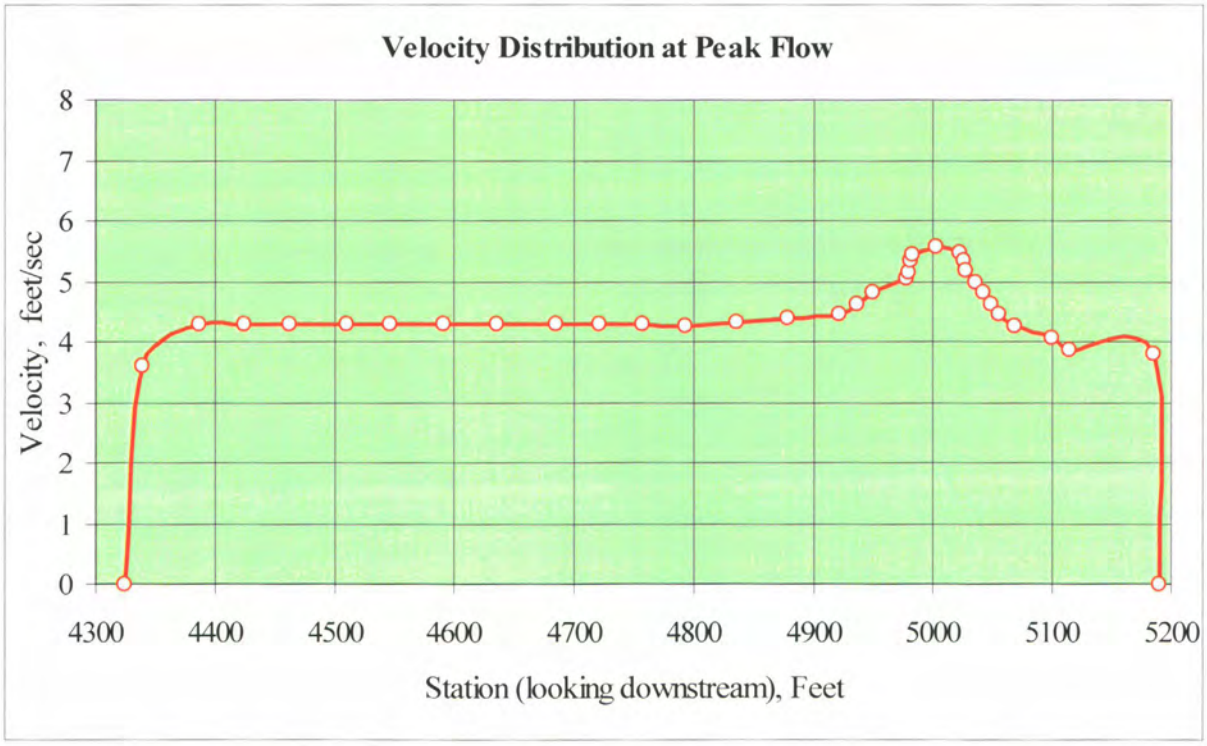
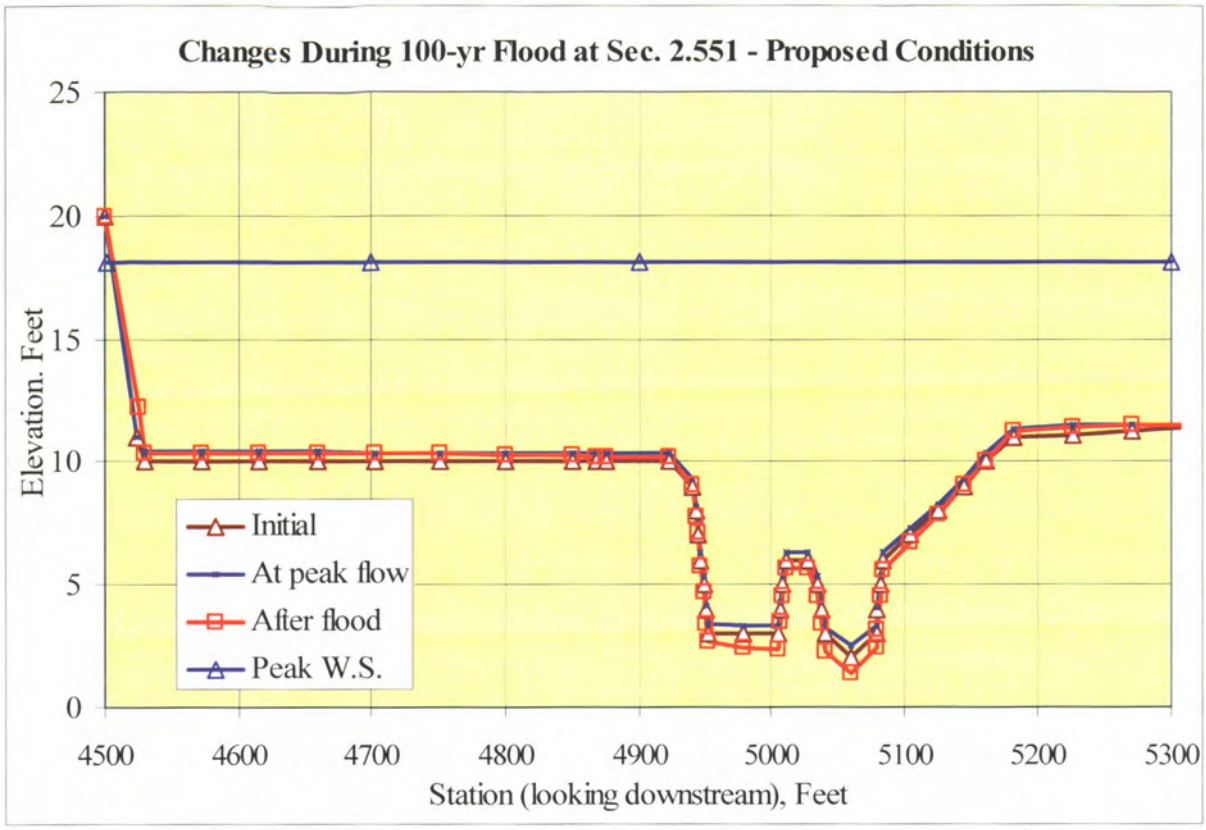


Fig. 26(continued). Simulated cross-sectional changes during the 100-yr flood For Alternatives 1, 2 and 4 together with velocity distribution at peak flow



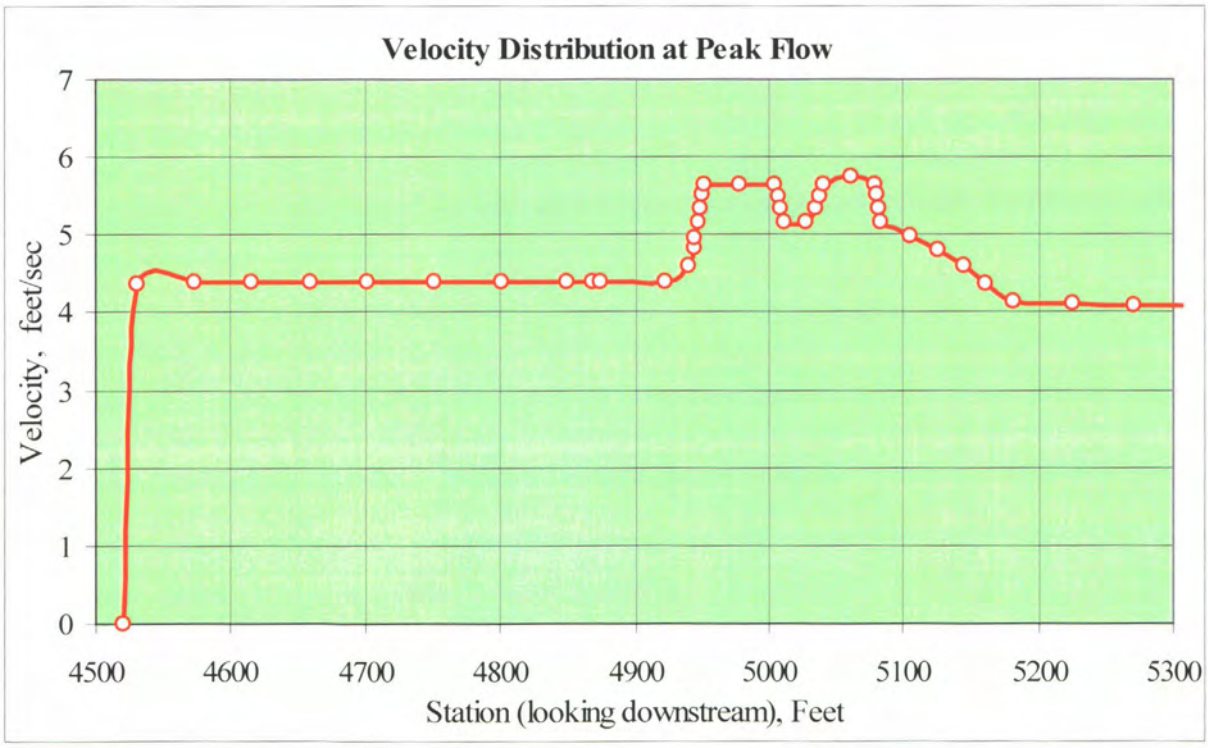
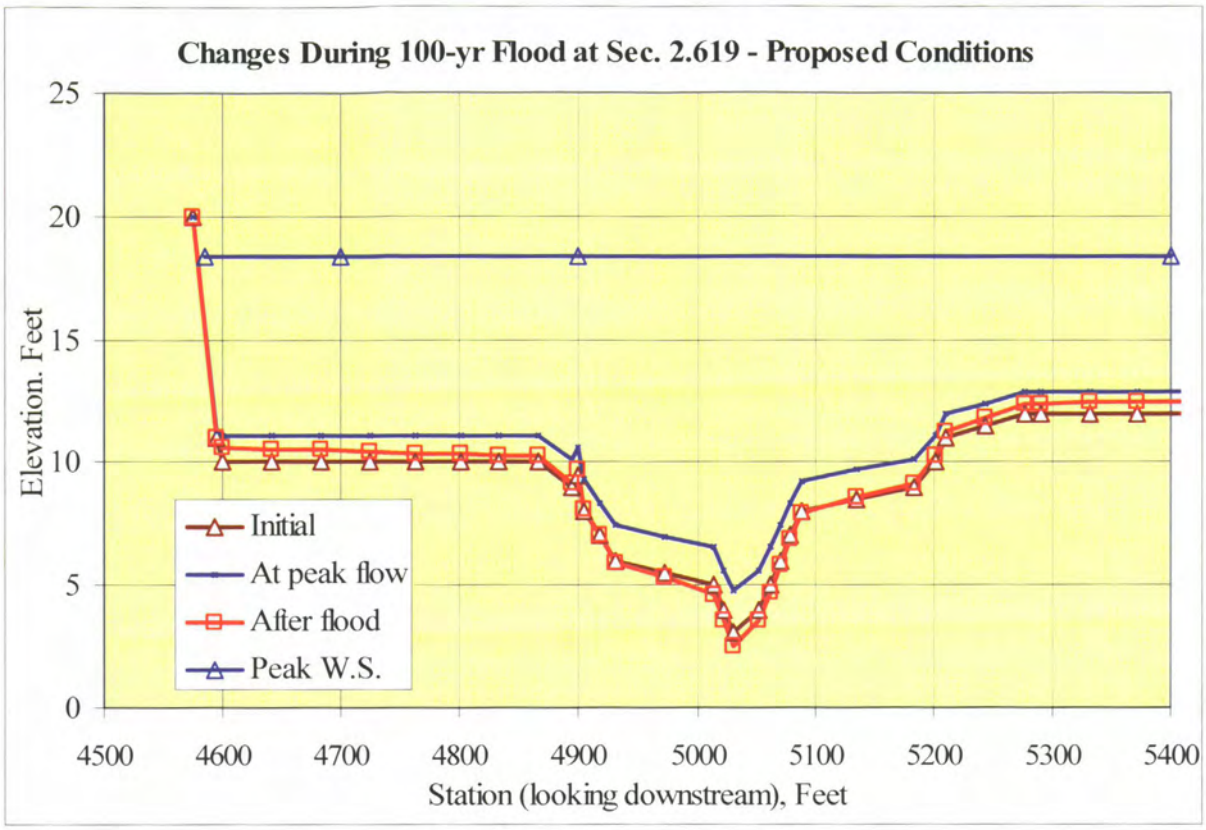


Fig. 26(continued). Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2 and 4 together with velocity distribution at peak flow.



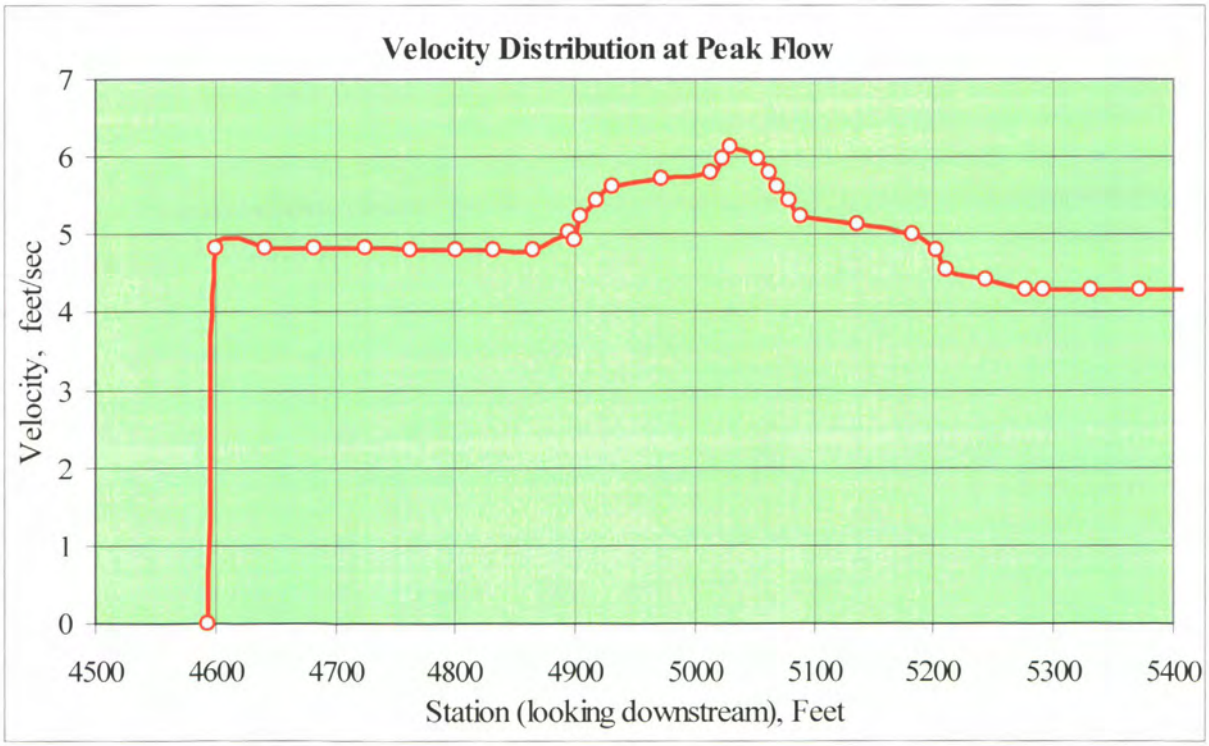
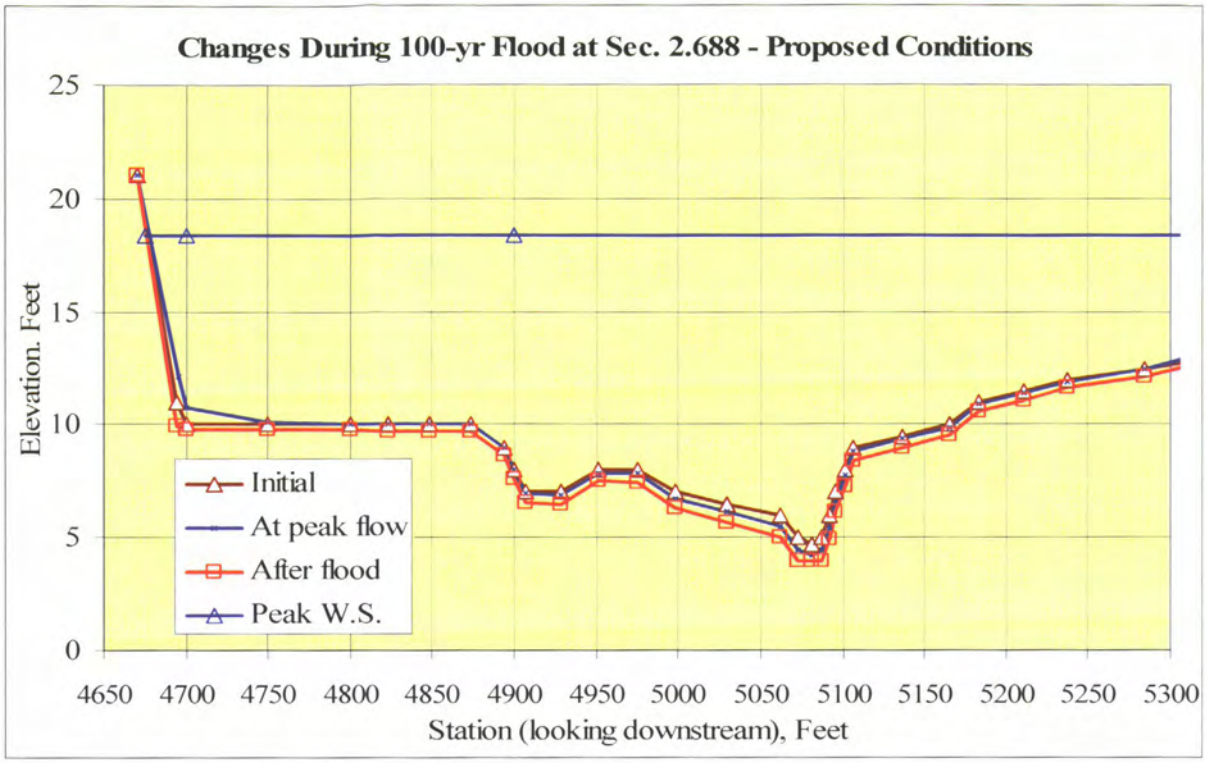


Fig. 26(continued). Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2 and 4 together with velocity distribution at peak flow



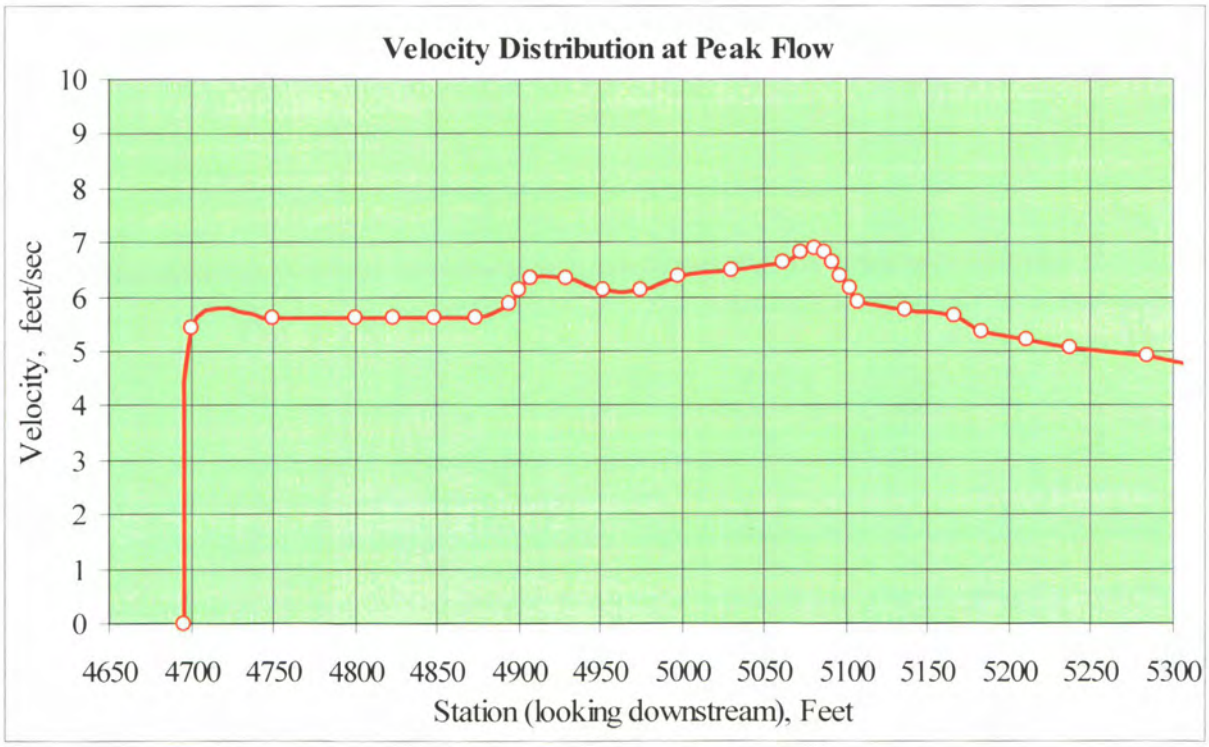
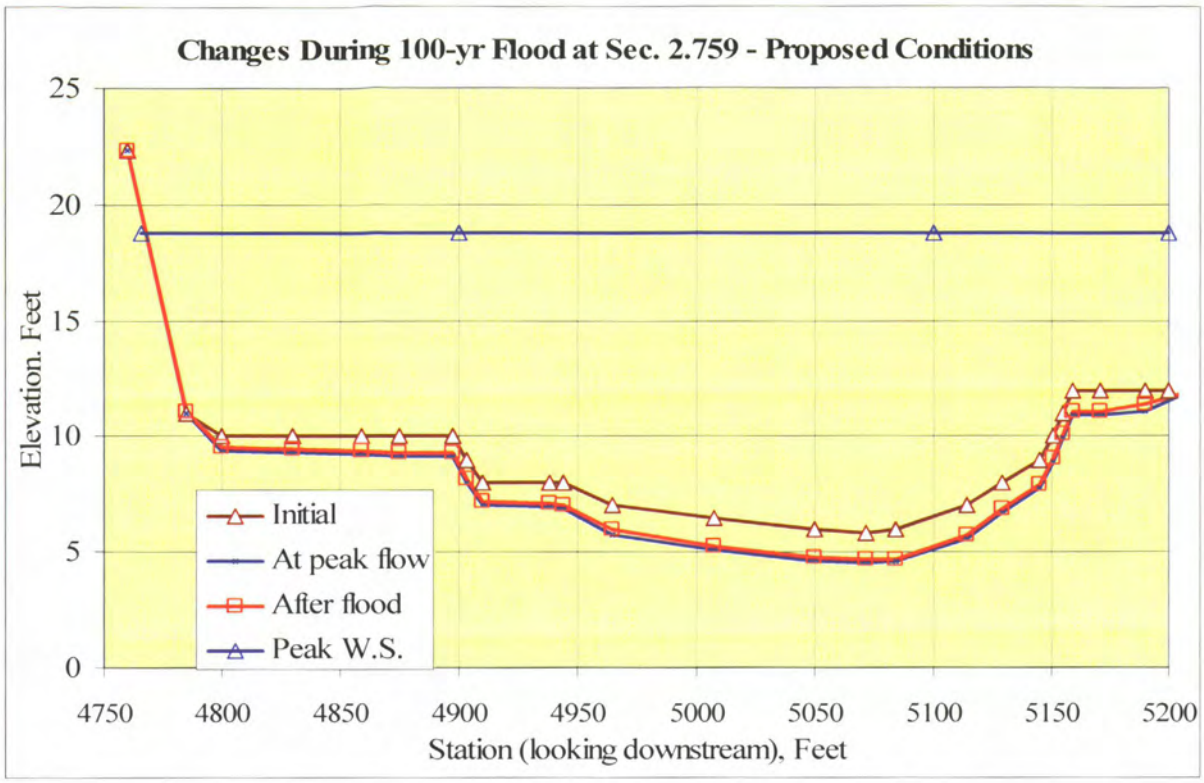


Fig. 26(continued). Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2 and 4 together with velocity distribution at peak flow



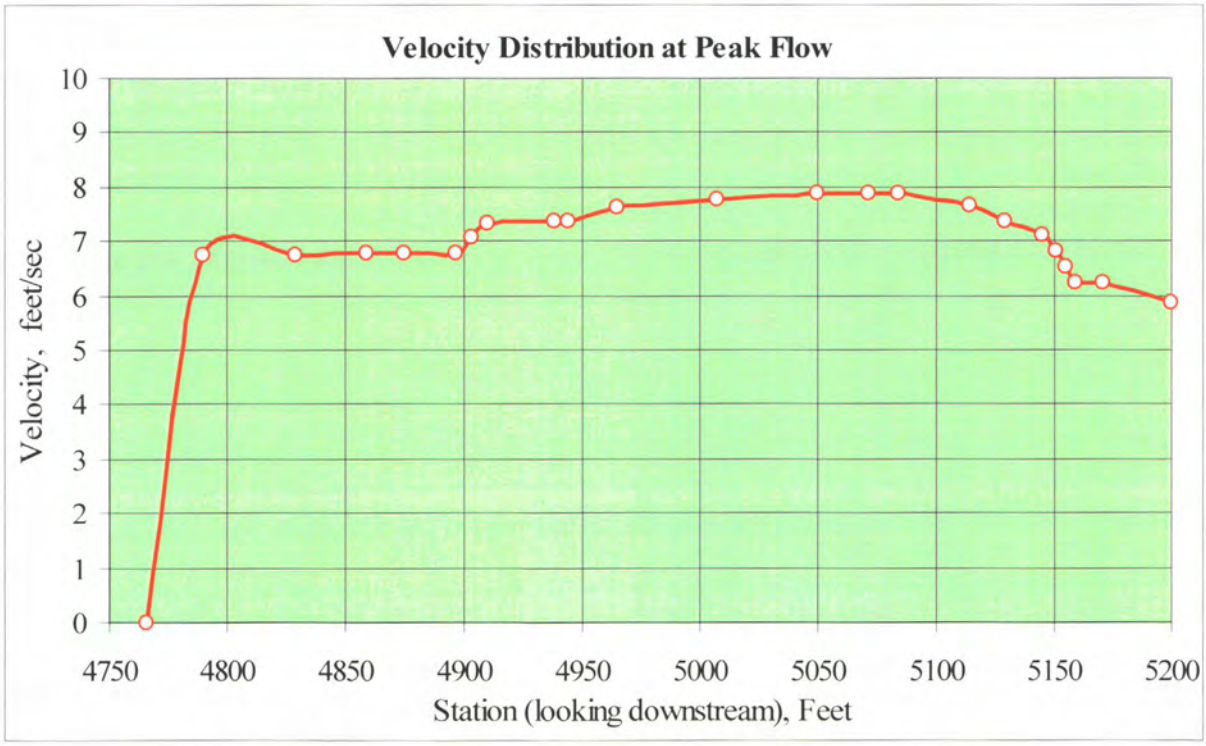
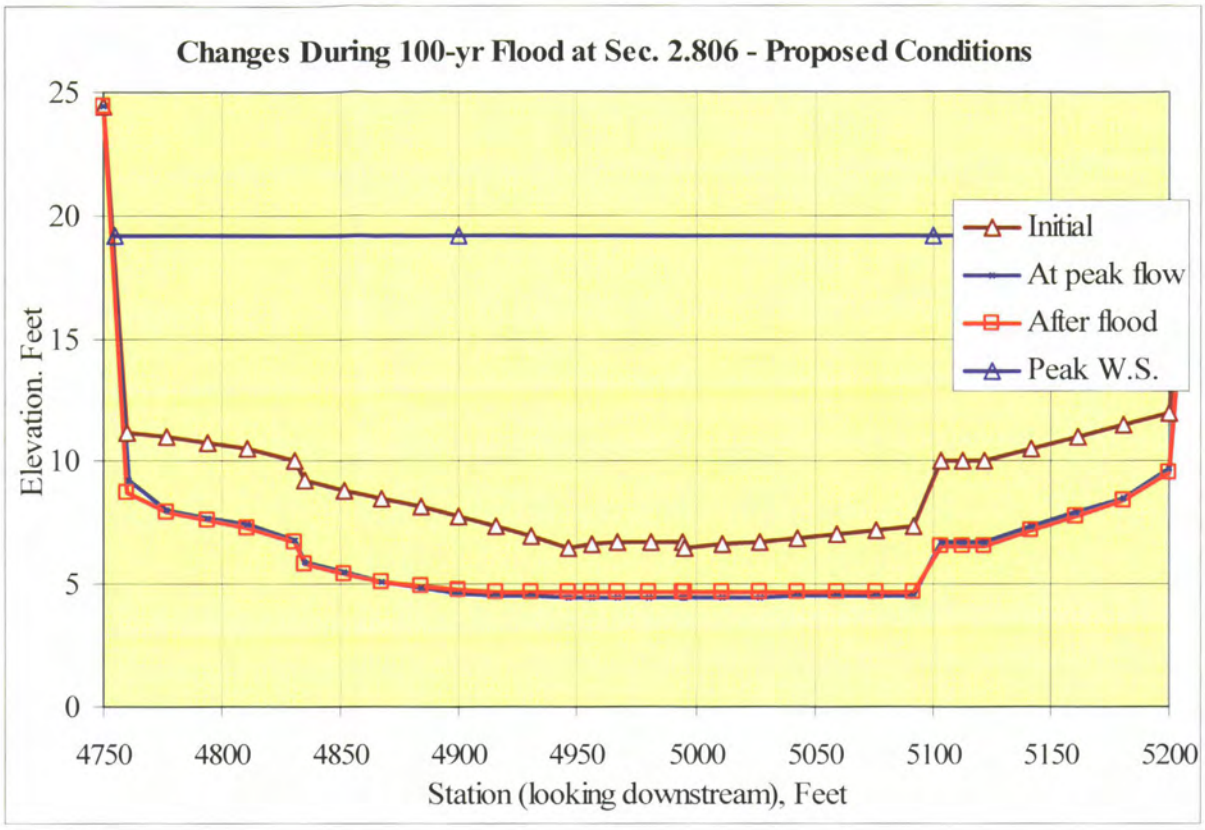


Fig. 26(continued). Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2 and 4 together with velocity distribution at peak flow



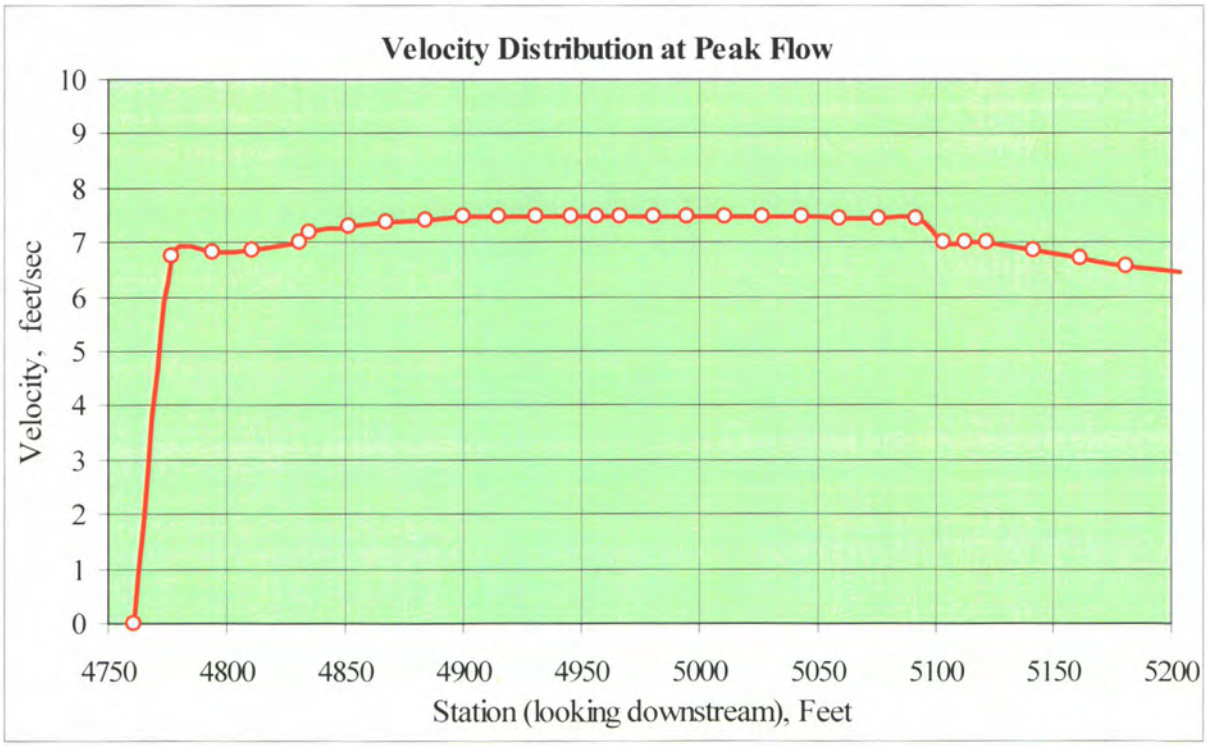
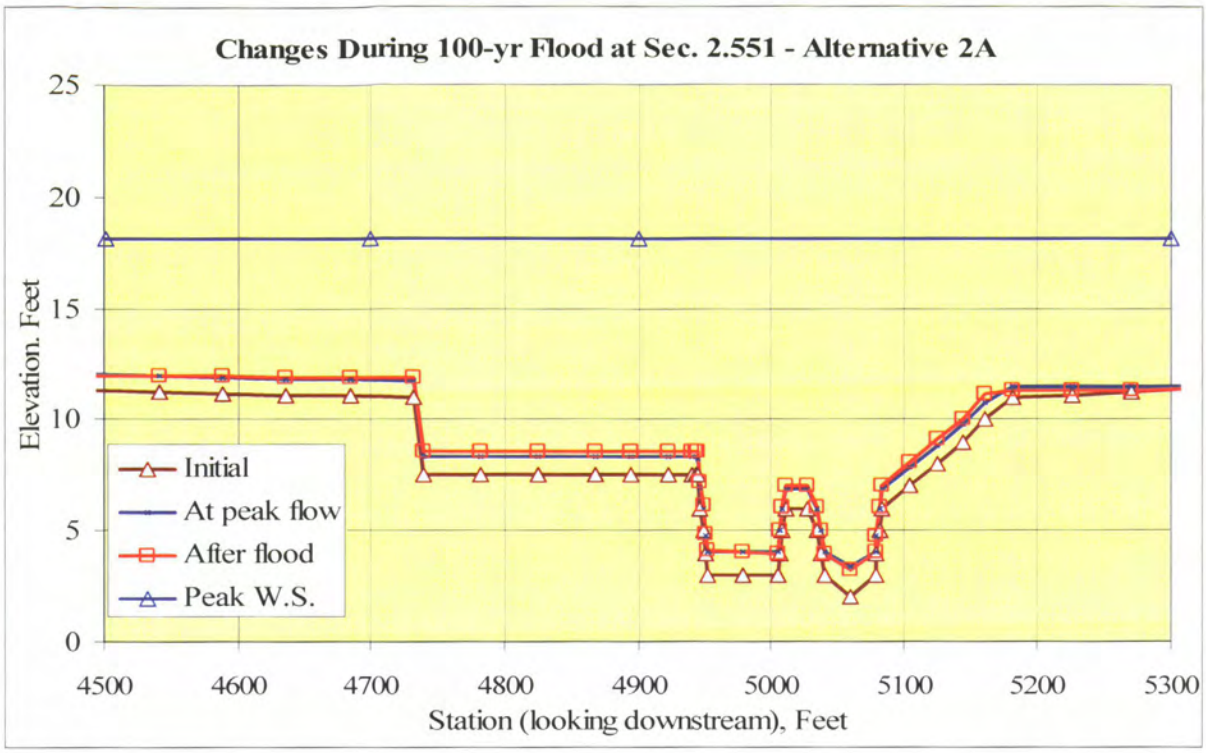


Fig. 26(continued). Simulated cross-sectional changes during the 100-yr flood for Alternatives 1, 2 and 4 together with velocity distribution at peak flow



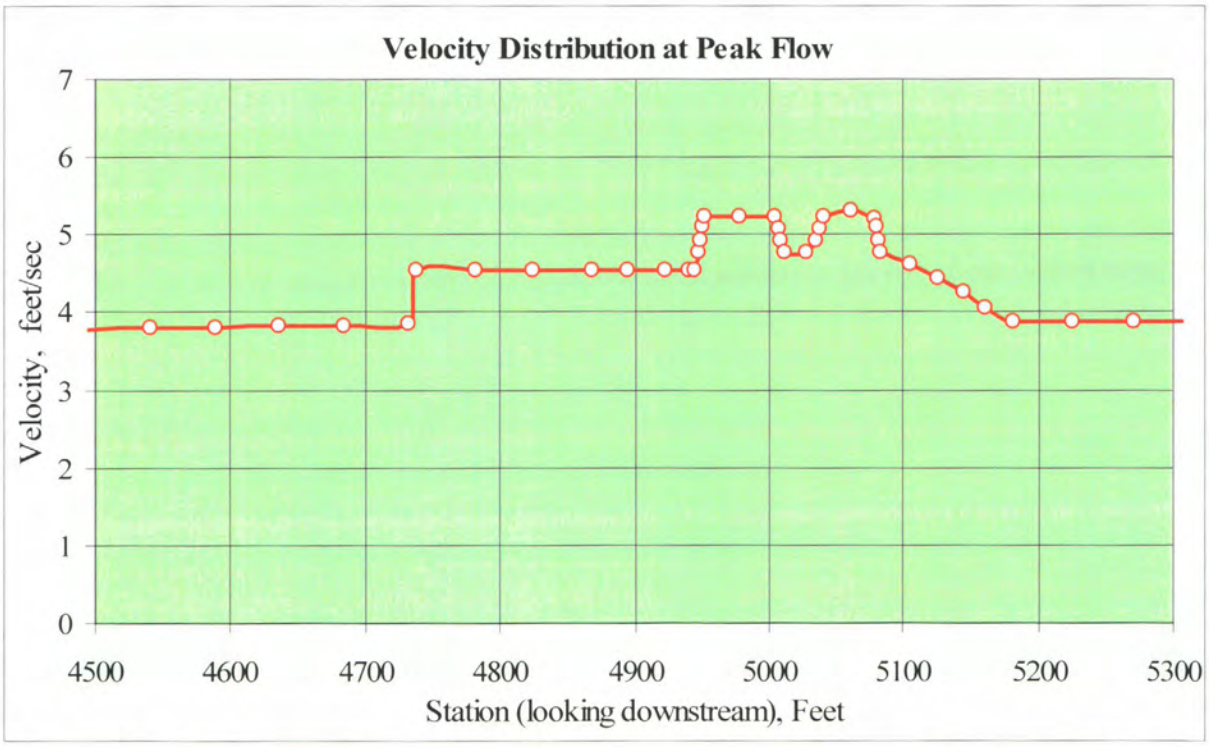
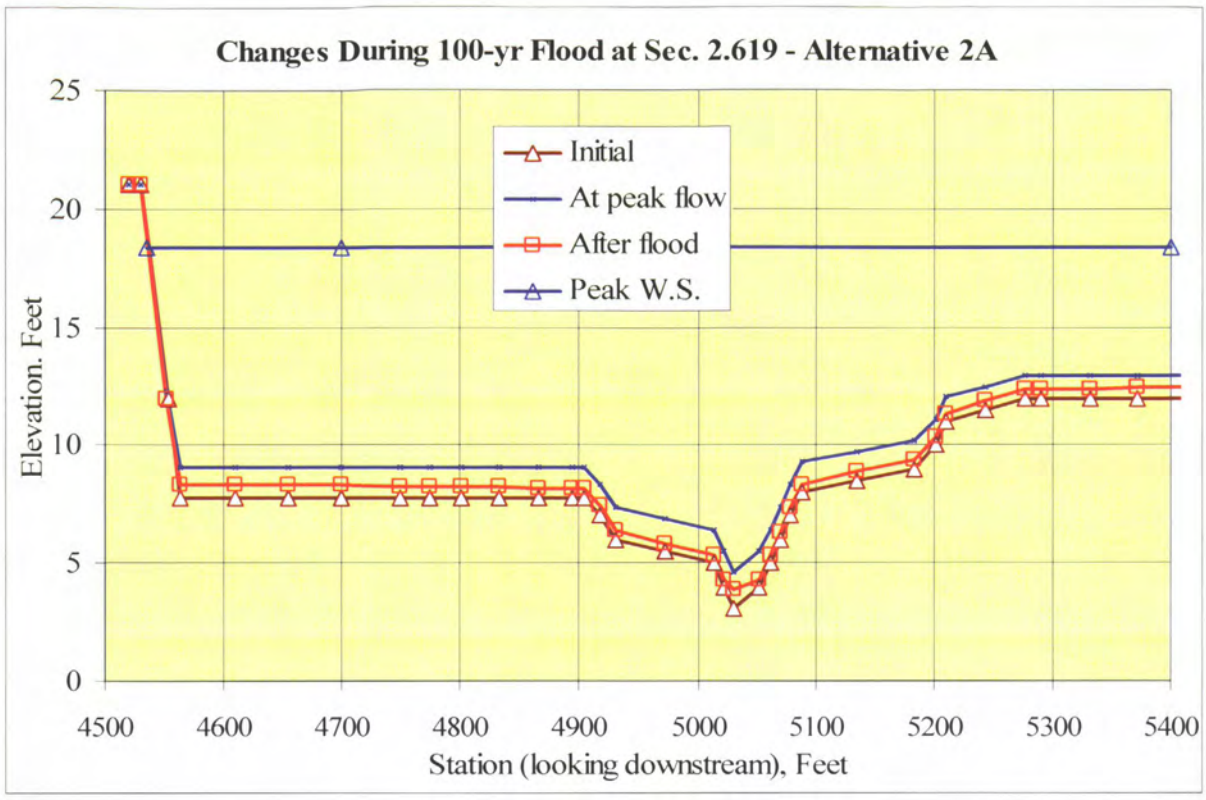


Fig. 27. Simulated cross-sectional changes during the 100-yr flood for Alternative 2A together with velocity distribution at peak flow



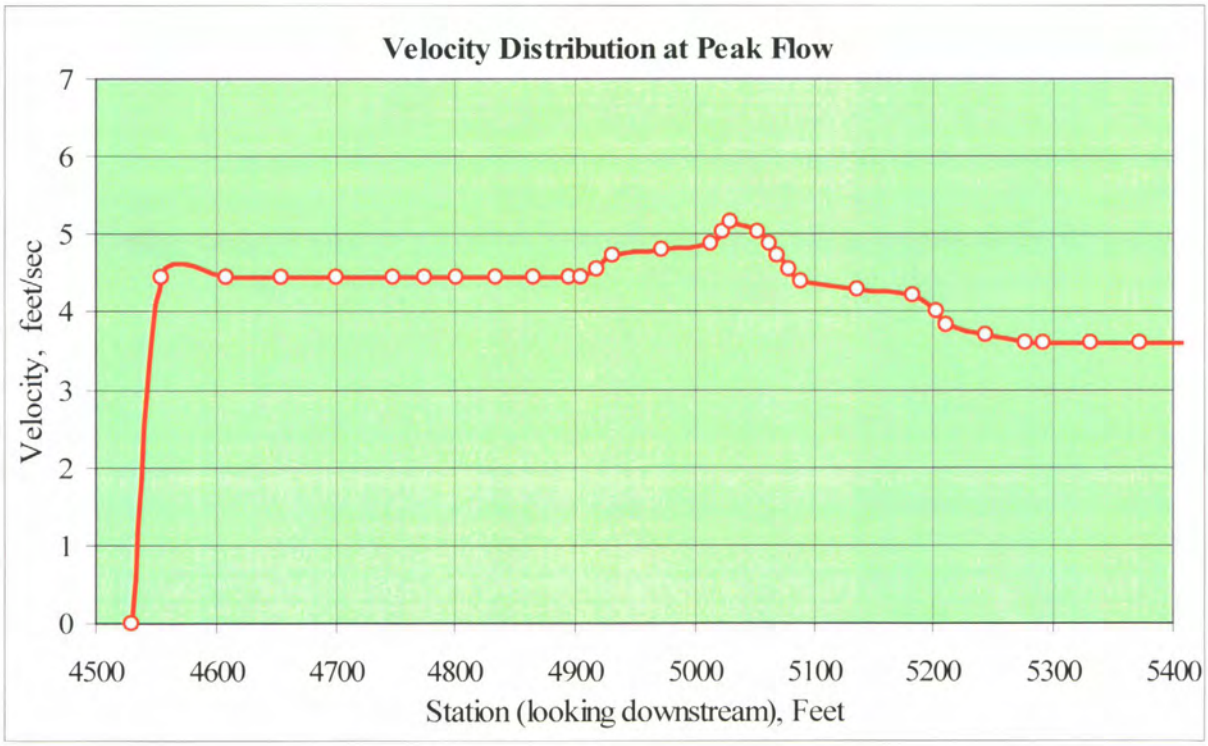
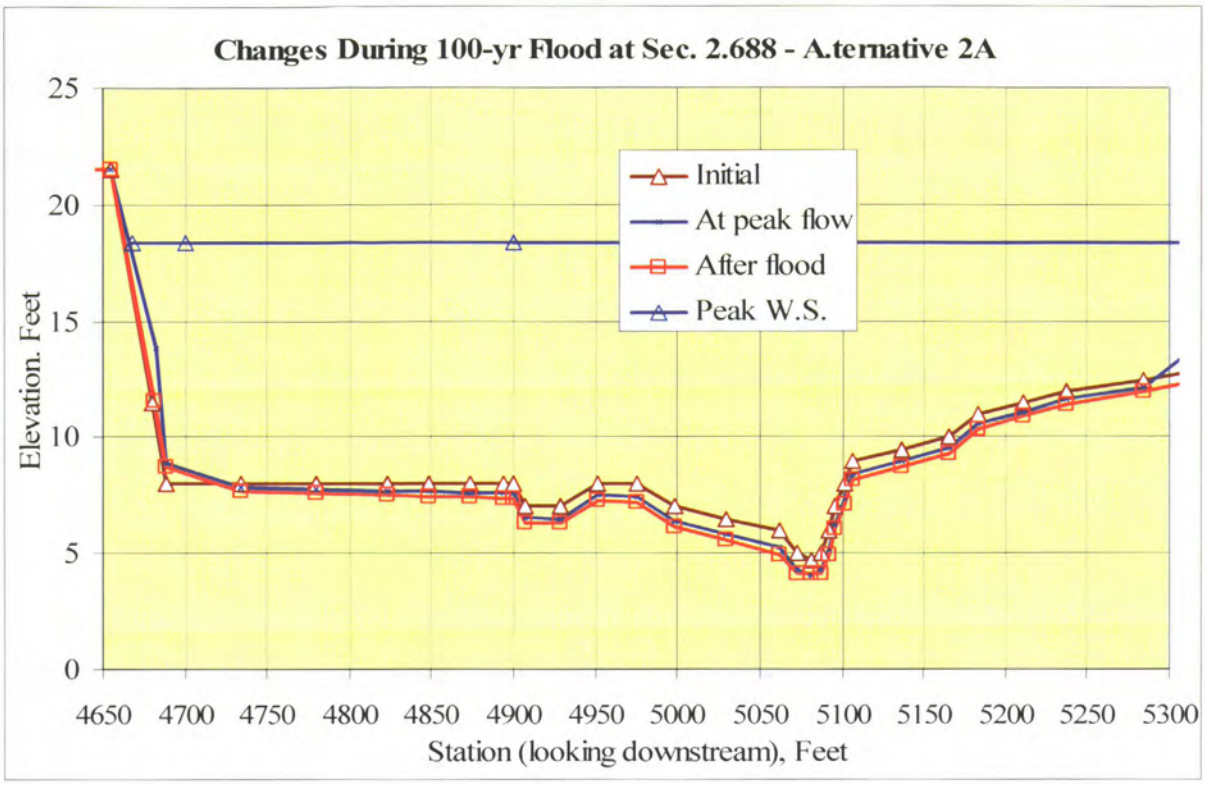


Fig. 27(continued). Simulated cross-sectional changes during the 100-yr flood for Alternative 2A together with velocity distribution at peak flow



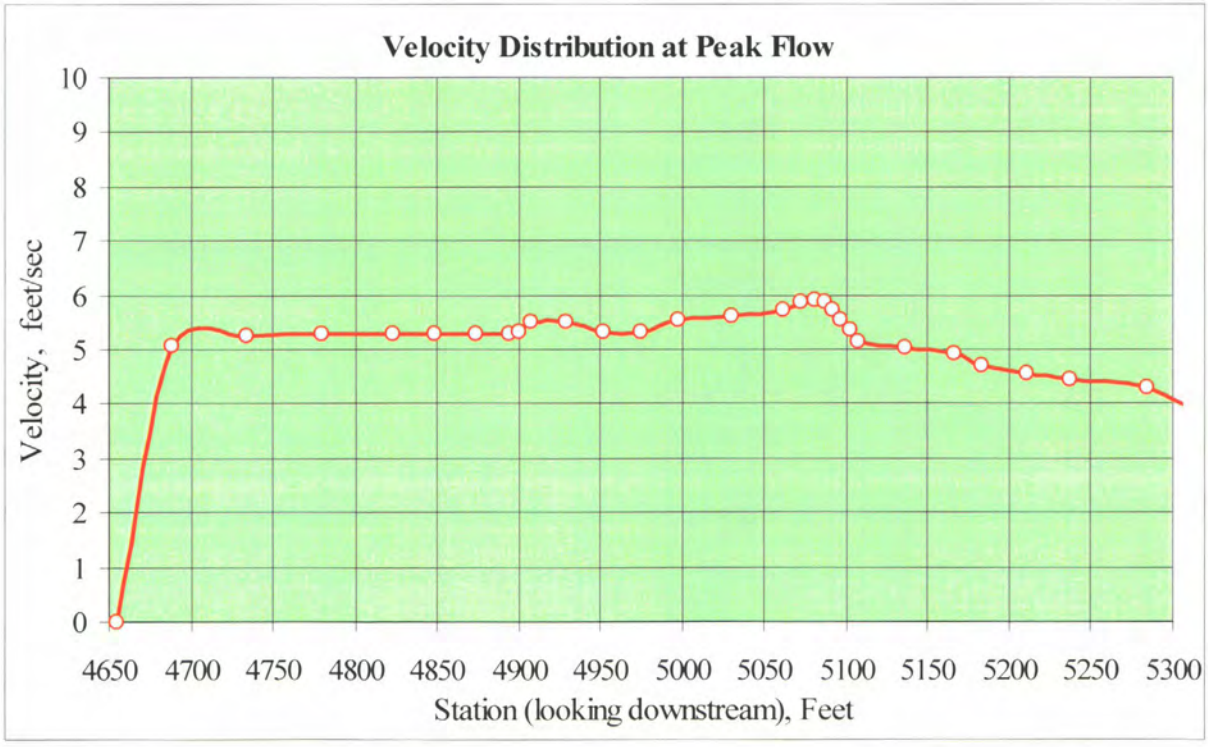


Fig. 27(continued). Simulated cross-sectional changes during the 100-yr flood for Alternative 2A together with velocity distribution at peak flow

VII. DESIGN RECOMMENDATIONS

Plan views of the selected wetland alternatives are shown in Figs. 8, 9, 10, 11 and I2. The wetland creation project has several features, including a berm, two weirs, culverts, overbank grading, and utility corridor crossing as described below.

Berm along the River Channel – In order to preserve the wetland, a berm is recommended to separate the wetland from the effective flow area of the river channel. Details for the berm are given below

Alignment of the berm: The alignment of the berm is shown in Fig. 8 for Alternative 1, in Fig. 9 for Alternatives 2 and 2A, and in Fig. I2 for Alternative 4.

Side slopes: The berm will have a side slope of 2 ½ to 1 on the river side and 2 to 1 on the wetland side.

Top of berm elevations: The top of berm should be above the 100-yr water surface. Recommended top of berm elevations are listed in Table 6; they were selected based on the computed water-surface profile at the 100-yr peak discharge plus a freeboard.

Table 6. Recommended top of berm elevations

Channel station river mile	Computed water-surface elevation feet		Recommended Top elevation feet
	per HEC-2	per FLUVIAL-12	
2.240	19.7	17.2	20.0
2.311	19.8	17.4	20.0
2.392	20.0	17.7	20.1
2.479	20.0	17.9	20.3
2.551	20.1	18.1	20.4
2.619	20.2	18.3	20.5
2.688	20.2	18.6	20.7

	Computed water-surface elevation feet		
2.759	20.2	18.7	21.0
2.806	20.5	19.2	21.2
2.828	20.5	19.0	21.2

Bank Protection for Berm: The velocity is used as a criterion to assess the need for bank protection for the berm. For a berm that is made of cohesive materials, planted with vegetation, and parallel to flow, the permissible velocity of 6 feet per second is normally used as the criterion for bank stability. In other words, a berm that meets these conditions does not require additional protection. Velocity distributions for the berm along the wetland are shown in Figs. 26 and 27. The near berm velocities downstream from channel station 2.688 are lower than 6 feet per second. The berm is more or less parallel to the river flow and it shall be constructed with cohesive materials and planted with vegetation. For this reason, additional bank protection is not needed for the stretch of the berm.

For Alternatives 1, 2 and 2A, the berm upstream from Station 2.688 has velocities higher than 6 feet per second; therefore, it will need bank protection. For Alternative 4, the northeast corner of the berm has locally high velocity due to river flow around the corner; the berm will need bank protection near the corner on the river side.

Since velocities near the berm for both alternatives are generally lower than 10 feet per second, heavy bank protection using riprap is not recommended. There are other materials that can be considered. An example is the geofabric material Vmax, which can be found at the following website.

http://www.nagreen.com/vmax3/index.tpl

The photograph in Fig. 28 shows an example of Vmayx protection on a bank.

Fig. 28. Bank protected with the geofabric material Vmax

Toe entrenchment of bank protection: The toe of bank protection must entrench beyond the potential scour. For this project, the recommended toe elevations of bank protection are about 5 feet below the potential scour. The 5-foot margin is a safety factor used to account for uncertainties, such as erratic hydrologic phenomenon, bank settlement, local scour due to tree trunks, etc.

Inflow Weir - In order to mitigate the backwater effects on the river flow by the berm, a portion of the river flow will be removed from the effective flow area by diverting it into the wetland in a controlled fashion. For this purpose, a weir shall be installed on the berm for flow diversion into the wetland area. The location of the inflow weir is shown in Fig. 8 for Alternative 1, in Fig. 9 for Alternatives 2 and 2A, and in Fig. 12 for Alternative 4. The inflow weir is near the upstream end of the wetland, and it is an effective flow control device. The amount of flow through the weir is controlled by the weir configuration. The weir may be rectangular or trapezoidal in cross-sectional shape. Their geometric features are summarized in Table 4. The

weir is subject to erosion; therefore, its bed and sides need to be armored and its toe needs to be entrenched into the ground.

Table 4. Summary of weir configurations

Side slope	Crest elevation, ft		Weir length, ft
	Alternatives 1,2 & 2A	Alternative 4	
0 (rectangular weir)	14.5	13.6	250
5 to 1 (trapezoidal weir)	14.5	13.6	240
12 to 1 (trapezoidal weir)	14.5	13.6	230

Culverts - In addition to the weir, flow diversion into the wetland will also be provided by culverts installed at a lower elevation connecting the river channel and the wetland. For Alternatives 1, 2 and 2A, six 5-foot RCP's are recommended, to be installed near Station 2.759. The invert of the culverts is at the elevation of 6 feet, slightly above the bed elevation of the main channel. For Alternative 4, the wetland is farther away from the main channel. For this reason, only two 5-foot RCP's are recommended; they should be placed near Station 2.240 at an elevation slightly above the bed elevation of the main channel.

The culverts will allow flow diversion into the wetland at low flows; they will also allow flow exchange between the channel and the wetland. With invert elevation above the river channel bed, the culverts will prevent bed sediment from entering the wetland.

Grading of the Overbank Area between Berm and Main Channel – Minor grading will be made for Alternatives 1 and 4 to the south overbank area of the main channel along the north side of the berm. The grading is for the purpose of reducing the flood level in the main channel. The overbank area at channel stations 2.240, 2.311 and 2.392 shall be lowered to 8 feet. The overbank area at Station 2.479 shall be lowered to 9 feet. For Alternative 2A, the grading

will cover a portion of the area in front of the berm along the overbank area of the river channel. The grading plan for Alternative 2A is shown in Fig. 10.

Outflow Weir near Downstream End of Berm – The berm has a weir opening near the downstream end of the wetland. The opening is a cut in the berm; it has the same dimension as the upstream inflow weir but it is at a lower crest elevation. The outflow weir has the crest elevation of 12.0 feet for Alternative 1, the crest is at 12.5 feet for Alternatives 2 and 2A, and the crest elevation is 11.6 feet for Alternative 4. The weir serves the primary function for outflow from the wetland back into the river channel.

During the rising stage of a major flood, the river channel has a higher water surface level than does the wetland; flood water enters the wetland through the culverts as well as the upstream inflow weir. The wetland is refilled through these two conduits. The downstream weir will prevent river water from entering the wetland at river stages below the weir crest. River water also enters the wetland through the downstream weir when the river stage exceeds the weir crest. In other words, the wetland is refilled through the downstream opening as well as the upstream inflow weir at higher river stages.

During falling flood stage, the water surface in the wetland may be higher than the river stage. Under this situation, flood water in the wetland flows from the east end toward the west end. The flood inflow to the wetland is through the inflow weir and its reenters the main channel through the downstream weir opening.

Outflow from the wetland through the downstream opening may only occur when the wetland water level is higher than the weir crest. Flow from the wetland exits into the river channel through the opening and then it spreads out to the overbank area before entering the main channel. The weir structure is subject to scour; therefore, its bed and sides need to be armored and its toe needs to be entrenched into the ground. The weir opening may be a concrete wall imbedded into the ground. Scour protection for the toe is required.

Crossing at Utility Corridor for Alternative 1 - A utility corridor runs through the wetland under Alternative 1 and it divides the wetland area into two parts. Water flow in the wetland crosses the utility corridor. In order to avoid any flow damage to the utility corridor, drainage facilities shall be required. Culverts will be installed in the utility corridor to pass low flows. Six 5-foot RCP's are recommended; the invert elevation should be slightly above the bed elevation of the wetland. The wetland water level during high flow can be above the ground surface of the utility corridor, flood water crosses the utility corridor by culvert flow and weir flow over the ground surface. The maximum flow rate through the weir and culverts is 7,800 cfs. The surface of the utility crossing may be damaged by scour; therefore scour protection of the utility corridor will be required.

Protection of Utility Crossing for Alternatives 2 and 2A – The outflow from the wetland will occur over the utility crossing. Since the wetland outflow carries no bed sediment, it may cause scour of the downstream ground surface. Channel bed scour due to wetland outflow consists of local scour and general scour. Local scour would occur as the outflow through the weir impinges on the ground surface at a high speed. General scour would occur further away from the immediate downstream area of the weir; it is due to the removal of sediment by the flowing water. Because of the flat ground slope, the flow velocity is small, except in the area immediately below the weir crest. To prevent scour, the following measures are recommended:

(1) For the ground area within 15 feet downstream of the weir crest, rock riprap may be placed on the ground surface used as a protection against local scour from the water jet impinging on the ground.

(2) For areas outside the 15 feet vicinity of the weir, geofabric, such as Vmax, may be used to protect the ground surface of the utility corridor against potential scour. The outflow from the weir may be assumed to expand at the 45 degree angle in order to determine the extent of protection coverage.

Protection of Utility Crossing for Alternative 4 - The overbank area of the channel just outside the northeast corner of the wetland is subject to local scour during high flow. Therefore the utility corridor near the northeast corner of the wetland will need protection. Since the flow

has a limited velocity, light protection using Vmax is acceptable. The material should be placed slightly under the ground surface at the utility corridor and keyed down into the ground for about 5 feet.

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Chang, H. H., *Fluvial Processes in River Engineering*, John Wiley & Sons, New York, NY, 1988, 432 pp.

Engelund, F. and Hansen, E., A Monograph on Sediment Transport in Alluvial Streams, Teknisk Vorlag, Copenhagen, Denmark, 1967.

Vanoni, V., *Sedimentation Engineering*, ASCE Manual 54, 1975.

APPENDIX A. INPUT/OUTPUT DESCRIPTIONS FOR FLUVIAL-12

I. INPUT DESCRIPTION

The basic data requirements for a modeling study include (1) topographic maps of the river reach from the downstream end to the upstream end of study, (2) digitized data for cross sections in the HEC-2 format with cross-sectional locations shown on the accompanying topographic maps, (3) flow records or flood hydrographs and their variations along the study stream reach, it any, and (4) size distributions of sediment samples along the study reach. Additional data are required for special features of a study river reach.

The HEC-2 format for input data is used in all versions of the FLUVIAL model. Data records for HEC-2 pertaining to cross-sectional geometry (X1 and GR), job title (T1, T2, and T3), and end of job (EJ), are used in the FLUVIAL model. If a HEC-2 data file is available, it is not necessary to delete the unused records except that the information they contain are not used in the computation. For the purpose of water- and sediment-routing, additional data pertaining to sediment characteristics, flood hydrograph, etc., are required and supplied by other data records. Sequential arrangement of data records are given in the following.

Records	**Description of Record Type**
T1,T2,T3	Title Records
G1	General Use Record
G2	General Use Records for Hydrographs
G3	General Use Record
G4	General Use Record for Selected Cross-Sectional Output
G5	General Use Record
G6	General Use Record for Selecting Times for Summary Output
G7	General Use Record for Specifying Erosion Resistant Bed Layer
GS	General Use Records for Initial Sediment Compositions
GB	General Use Records for Time Variation of Base-Level
GQ	General Use Records for Stage-Discharge Relation of Downstream Section
GI	General Use Records for Time Variation of Sediment Inflow
X1	Cross-Sectional Record
XF	Record for Specifying Special Features of a Cross Section
GR	Record for Ground Profile of a Cross Section
SB	Record for Special Bridge Routine
BT	Record for Bridge Deck Definition
EJ	End of Job Record

Variable locations for each input record are shown by the field number. Each record has an input format of (A2, F6.0, 9F8.0). Field 0 occupying columns 1 and 2 is reserved for the required record identification characters. Field 1 occupies columns 3 to 8; Fields 2 to 10 occupy 8 columns each. The data records are tabulated and described in the following.

T1, T2, T3 Records - These three records are title records that are required for each job.

Field	Variable	Value	Description
0	IA	T1	Record identification characters
1-10	None		Numbers and alphameric characters for title

G1 Record - This record is required for each job, used to enter the general parameters listed below. This record is placed right after the T1, T2, and T3 records.

Field	Variable	Value	Description
0	IA	G1	Record identification characters
1	TYME	+	Starting time of computation on the hydrograph, in hours
2	ETIME	+	Ending time of computation on the hydrograph, in hours
3	DTMAX	+	Maximum time increment Δt allowed, in seconds
4	ISED	1	Select Graf's sediment transport equation.
		2	Select Yang's unit stream power equation. The sediment size is between 0.063 and 10 mm.
		3	Select Engelund-Hansen sediment equation.
		4	Select Parker gravel equation.
		5	Select Ackers-White sediment equation.
		6	Select Meyer-Peter Muller equation for bed load.
5	BEF	+	Bank erodibility factor for the study reach. This value is used value between 0 and 1 may be used.
6	IUC	0	English units are used in input and output.
		1	Metric units are used in input and output.
7	CNN	+	Manning's *n* value for the study reach. This value is used for a section unless otherwise specified in Field 4 of the XF record. If bed roughness is computed based upon alluvial bedforms as specified in Field 5 of the G3 record, only an approximate *n* value needs to be entered here.
8	PTM1	+	First time point in hours on the hydrograph at which summary output and complete cross-sectional output are requested. It is usually the peak time, but it may be left blank if no output is requested.

9	PTM2	+	Second time point on the hydrograph in hours at which summary usually the time just before the end of the simulation. This field may be left blank if no output is needed.
10	KPF	+	Frequency of printing summary output, in number of time steps.

G2 Records - These records are required for each job, used to define the flow hydrograph(s) in the channel reach. The first one (or two) G2 records are used to define the spatial variation in water discharge along the reach; the succeeding ones are employed to define the time variation(s) of the discharge. Up to 10 hydrographs, with a maximum of 120 points for each, are currently dimensioned. See section II for tributaries. These records are placed after the G1 record.

Field	**Variable**	**Value**	**Description**
First G2			
0	IA	G2	Record identification characters
1	IHP1	+	Number of last cross section using the first (downstream most) hydrograph. The number of section is counted from downstream to upstream with the downstream section number being one. See also section II.
2	NP1	+	Number of points connected by straight segments used to define
3	IHP2	+	Number of last section using the second hydrograph if any. Otherwise leave it blank.
4	NP2	+	Number of points used to define the second hydrograph if any. Otherwise leave it blank.
5	IHP3	+	Number of last section using the third hydrograph if any. Otherwise leave it blank.
6	NP3	+	Number of points used to define the third hydrograph if any. Otherwise leave it blank.
7	IHP4	+	Number of last section using the fourth hydrograph if any. Otherwise leave it blank.
8	NP4	+	Number of points used to define the fourth hydrograph if any. Otherwise leave it blank.
9	IHP5	+	Number of last section using the fifth hydrograph if any. Otherwise leave it blank.
10	NP5	+	Number of points used to define the fifth hydrograph if any. Otherwise leave it blank.

Second G2: Note that this record is used only if more than 5 hydrographs are used for the job. It is necessary to place a negative sign in front of NP5 located in the 10th field of the first G2 record as a means to specify that more than 5 hydrographs are used.

0	IA	G2	Record identification characters
1	IHP6	+	Number of last cross section using the sixth hydrograph if any. Otherwise leave it blank.
2	NP6	+	Number of points connected by straight segments used to define
3	IHP7	+	Number of last section using the seventh hydrograph if any. Otherwise leave it blank.
4	NP7	+	Number of points used to define the seventh hydrograph
5	IHP8	+	Number of last section using the eighth hydrograph if any. Otherwise leave it blank.
6	NP8	+	Number of points used to define the eighth hydrograph
7	IHP9	+	Number of last section using the ninth hydrograph if any. Otherwise leave it blank.
8	NP9	+	Number of points used to define the ninth hydrograph
9	IHP10	+	Number of last section using the tenth hydrograph if any. Otherwise leave it blank.
10	NP10	+	Number of points used to define the tenth hydrograph

Succeeding G2 Record(s)

1	Q11, Q21 Q31	+	Discharge coordinate of point 1 for each hydrograph, in ft^3/sec or m^3/sec
2	TM11,TM21 TM31	+	Time coordinate of point 1 for each hydrograph, in hours
3	Q12, Q22 Q32	+	Discharge coordinate of point 2 for each hydrograph, in cfs or cms
4	TM12,TM22 TM32	+	Time coordinate of point 2 for each hydrograph, in hours

Continue with additional discharge and time coordinates. Note that time coordinates must be in increasing order.

G3 Record - This record is used to define required and optional river channel features for a job as listed below. This record is placed after the G2 records.

Field	Variable	Value	Description
0	IA	G3	Record identification characters
1	S11	+	Slope of the downstream section, required for a job
2	BSP	0	One-on-one slope for rigid bank or bank protection
		+	Slope of bank protection in BSP horizontal units on 1 vertical unit. for all cross sections unless otherwise specified in Field 8 of the XF record for a section.
3	DSOP	0	Downstream slope is allowed to vary during simulation.
		1	Downstream slope is fixed at S11 given in Field 1.
4	TEMP	0	Water temperature is 15°C.
		+	Water temperature in degrees Celsius
5	ICNN	0	Manning's n defined in Field 7 of the G1 record or those in Field 4 of the XF records are used.
		1	Brownlie's formula for alluvial bed roughness is used to calculate Manning's n in the simulation.
6	TDZAMA	0	Thickness of erodible bed layer is 100 ft (30.5 m).
		+	Thickness of erodible bed layer in ft or m. This value is applied to
7	SPGV	0	Specific gravity of sediment is 2.65.
		+	Specific gravity of sediment
8	KGS	0	The number of size fractions for bed material is 5.
		+	The number of size fractions for bed material. It maximum value is 8.
9	PHI	0	The angle of repose for bed material is 36°.
		+	Angle of repose for bed material

G4 Record - This is an optional record used to select cross sections (up to 4) to be included at each summary output. Each cross section is identified by its number which is counted from the downstream section. This record also contains other options; it is placed after the G3 record.

Field	Variable	Value	Description
0	IA	G4	Record identification characters

1	IPLT1	+	Number of cross section
2	IPLT2	+	Number of cross section
3	IPLT3	+	Number of cross section
4	IPLT4	+	Number of cross section
5	IEXCAV	+	A positive integer indicates number of cross section where sand/gravel excavation occurs.
6	GIFAC	+	A non-zero constant is used to modify sediment inflow at the upstream section.
7	PZMIN	0	Minimum bed profile during simulation run is not requested.
		1	Output file entitled TZMIN for minimum bed profile is requested.
10	REXCAV	+	A non-zero value specifies rate of sand/gravel excavation at Section IEXCAV.

G5 Record - This is an optional record used to specify miscellaneous options, including unsteady-flow routing for the job based upon the dynamic wave, bend flow characteristics. If the unsteady flow option is not used, the water-surface profile for each time step is computed using the standard-step method. When the unsteady flow option is used, the downstream water-surface elevation must be specified using the GB records.

Field	Variable	Value	Description
0	IA	G5	Record identification characters
1	DT	0	The first time step is 100 seconds.
		+	Size of the first time step in seconds.
2	IROUT	0	Unsteady water routing is not used; water-surface profiles are computed using standard-step method.
		1	Unsteady water-routing based upon the dynamic wave is used to compute stages and water discharges at all cross sections for each
3	PQSS	0	No output of gradation of sediment load
		3	Gradation of sediment load is included in output in 1,000 ppm by weight.
5	TSED	0	Rate of tributary sediment inflow is 1 times the discharge ratio.
		+	Rate of tributary sediment inflow is TSED times the discharge ratio.

6	PTV	0	No output of transverse distribution of depth-averaged velocity
		1	Transverse distribution of depth-averaged velocity is printed. The velocity distribution is for bends with fully developed transverse flow.
10	DYMAX	0	No GR points are inserted for cross sections.
		+	Maximum value of spacing between adjacent points at a cross

G6 Record - This is an optional record used to select time points for summary output. Up to 30 time points may be specified. The printing frequency (KPF) in Field 10 of the G1 Record may be suppressed by using a large number such as 9999.

Field	Variable	Value	Description
First G6 Record			
0	IA	G6	Record identification characters
1	NKPS	+	Number of time points
Succeeding G6 Record(s)			
0	IA	G6	Record identification characters
1	SPTM(1)	+	First time point, in hours
2	SPTM(2)	+	Second time point, in hours

Continue with additional time points.

G7 Record - This is an optional record used to specify erosion resistant bed layer, such as a caliche layer, that has a lower rate of erosion.

Field	Variable	Value	Description
First G7 Record			
0	IA	G7	Record identification characters
1	KG7	+	Number of time points used to define the known erosion rate in relation to flow velocity
2	THICK	+	Thickness of erosion resistant layer, in feet
Succeeding G7 Record(s)			
0	IA	G7	Record identification characters
1	ERATE(1)	+	Erosion rate, in feet per hour

2	G7V(2)	+	Velocity, in feet per second

Continue with additional time points.

GS Record - At least two GS records are required for each job, used to specify initial bed-material compositions in the channel at the downstream and upstream cross sections. The first GS record is for the downstream section; it should be placed before the first X1 record and after the G4 record, if any. The second GS record is for the upstream section; it should be placed after all cross-sectional data and just before the EJ record. Additional GS records may be inserted between two cross sections within the stream reach, with the total number of GS records not to exceed 15. Each GS record specifies the sediment composition at the cross section located before the record. From upstream to downstream, exponential decay in sediment size is assumed for the initial distribution. Sediment composition at each section is represented by five size fractions.

Field	Variable	Value	Description
0	IA	GS	Record identification characters
1	DFF	+	Geometric mean diameter of the smallest size fraction in mm
2	PC	+	Fraction of bed material in this size range

Continue with other DFF's and PC's.

GB Records - These optional records are used to define time variation of stage (water-surface elevation) at a cross section. The first set of GB records is placed before all cross section records (X1); it specifies the downstream stage. When the GB option is used, it supersedes other methods for determining the downstream stage. Other sets of GB records may be placed in other parts of the data set; each specifies the time variation of stage for the cross section immediately following the GB records.

Field	Variable	Value	Description
First GB Record			
0	IA	GB	Record identification characters
1	KBL	+	Number of points used to define base-level changes
Succeeding GB Record(s)			
0	IA	GB	Record identification characters
1	BSLL(1)	+	Base level of point 1, in ft or m
2	TMBL(1)	+	Time coordinate of point 1, in hours
3	BSLL(2)	+	Base level of point 2, in ft or m

4	TMBL(2)	+	Time coordinate of point 2, in hours

Continue with additional elevations and time coordinates, in the increasing order of time.

GQ Records - These optional records are used to define stage-discharge relation at the downstream section. The GQ input data may not used together with the GB records.

Field	Variable	Value	Description
First GQ Record			
0	IA	GQ	Record identification characters
1	KQL	+	Number of points used to define base-level changes
Succeeding GQ Record(s)			
0	IA	GQ	Record identification characters
1	BSLL(1)	+	Base level of point 1, in ft or m
2	TMQ(1)	+	Discharge of point 1, in cfs or cms
3	BSLL(2)	+	Base level of point 2, in ft or m
4	TMQ(2)	+	Discharge of point 2, in cfs or cms

Continue with additional elevations and discharges, in the increasing order of discharge.

GI Records - These optional records are used to define time variation of sediment discharge entering the study reach through the upstream cross section. The GI input data, if included, will supersede other methods for determining sediment inflow. The sediment inflow is classified into the two following cases: (1) specified inflow at the upstream section, such as by a rating curve; and (2) sediment feeding, such as from a dambreach or a sediment feeder. These two cases are distinguished by DXU in Field 2 of this record. For the first case, sediment discharge at the upstream section is computed using size fractions of bed-material at the section, but for the second case, the size fractions of feeding material need to be specified using the PCU values in this record. The upstream section does not change in geometry for the first case but it may undergo scour or fill for the second case.

Field	Variable	Value	Description
First GI Record			
0	IA	GI	Record identification characters
1	KGI	+	Number of points used to define time variation of sediment inflow.

2	DXU	+ or 0	Channel distance measured from the upstream section to the and KGI signify case 2, for which PCU values are required.
3-10	PCU	+	Size fractions of inflow material. The number of size fractions is given in Field 8 of the G3 record and the sizes for the fractions are given in the second GS record.

Succeeding GI Record(s)

0	IA	GI	Record identification characters
1	QSU(1)	+	Sediment discharge of point 1, in cubic ft or m (net volume) per second
2	TMGI(1)	+	Time coordinate of point 1, in hours
3	QSO(2)	+	Sediment discharge of point 2
4	TMGI(2)	+	Time coordinate of point 2.

Continue with additional sediment discharges and time coordinates, in the increasing order of time coordinates.

X1 Record - This record is required for each cross section (175 cross sections can be used for the study reach); it is used to specify the cross-sectional geometry and program options applicable to that cross-section. Cross sections are arranged in sequential order starting from downstream.

Field	Variable	Value	Description
0	IA	X1	Record identification characters
1	SECNO	+	Original section number from the map
2	NP	+	Total number of stations or points on the next GR records for
7	DX	+	Length of reach between current cross section and the next downstream section along the thalweg, in feet or meters
8	YFAC	0	Cross-section stations are not modified by the factor YFAC.
		+	Factor by which all cross-section stations are multiplied to increase or decrease area. It also multiplies YC1, YC2 and CPC in the XF record, and applies to the CI record.
9	PXSECE	0	Vertical or Z coordinate of GR points are not modified.
		±	Constant by which all cross-section elevations are raised or lowered

10	NODA	0	Cross section is subject to change.
		1	Cross section is not subject to change.

XF Record - This is an optional record used to specify special features of a cross section.

Field	Variable	Value	Description
0	IA	XF	Record identification characters
1	YC1	0	Regular erodible left bank
		+	Station of rigid left bank in ft or m, to the left of which channel dinates in GR records but not the first Y coordinate.
2	YC2	0	Regular erodible right bank
	+		Station of rigid right bank, to the right of which channel is non-erodible. Note: This station is located at toe of rigid bank; its value must be equal to one of the Y coordinates in GR records but not the last Y coordinate.
3	RAD	0	Straight channel with zero curvature
		+	Radius of curvature at channel centerline in ft or m. Center of radius is on same side of channel where the station (Y-coordinate) starts.
		-	Radius of curvature at channel centerline in ft or m. Center of radius is on opposite side of zero station. Note: RAD is used only if concave bank is rigid and so specified using the XF record. RAD produces a transverse bed scour due to curvature.
4	CN	0	Roughness of this section is the same as that given in Field 7 of the

			G1 record.
		+	Manning's *n* value for this section
5	CPC	0	Center of thalweg coincides with channel invert at this section.
		+	Station (Y-coordinate) of the thalweg in ft or m
6	IRC	0	Regular erodible cross section
		1	Rigid or nonerodible cross section such as drop structure or road crossing. There is no limit on the total number of such cross sections.
8	BSP	0	Slope of bank protection is the same as that given in Field 2 of the G3 record.
		+	Slope of bank protection at this section in BSP horizontal units
		5	Slope of rigid bank is defined by the GR coordinates.
9	BEFX	0	Bank erodibility factor is defined in Field 5 of the G1 record.
		+	A value between 0.1 and 1.0 for BEFX specifies the bank erodibility factor at this section.
	RWD	+	RWD is the width of bank protection of a small channel in the specified by a value greater than 1 (ft or m) in this field. When RWD is used, BEFX is not specified.
10	TDZAM	0	Erodible bed layer at this section is defined by TDZAMA in Field
		+	Thickness of erodible bed layer in ft or m. Only one decimal place is allowed for this number.
	ENEB	±	Elevation of non-erodible bed, used to define the crest elevation of a grade-control structure which may be above or below the existing channel bed. In order to distinguish it from TDZAM, ENEB must have the value of 1 at the second decimal place. For example, the ENEB value of 365 should be inputted as 365.01 and the ENEB value of -5.2 should be inputted as -5.21. When ENEB is specified, it supersedes TDZAM and TDZAMA

CI Record - This is an optional record used to specify channel improvement options due to excavation or fill. The excavation option modifies the cross-sectional geometry by trapezoidal excavation. Those points lower than the excavation level are not filled. The fill option modifies the cross-sectional geometry by raising the bed elevations to a prescribed level. Those points higher than the fill level are not lowered. Excavation and fill can not be used at the same time. This record should be placed after the X1 and XF records but before the GR records. The variable ADDVOL in Field 10 of this record is used to keep track of the total volume of excavation or fill along a channel reach. ADDVOL specifies the initial volume of fill or excavation. A value greater or less than 0.1 needs to be entered in this field to keep track of the total volume of fill or excavation until another ADDVOL is defined.

Field	Variable	Value	Description
0	IA	G5	Record identification characters
1	CLSTA	+	Station of the centerline of the trapezoidal excavation, expressed according to the stations in the GR records, in feet or meter.
2	CELCH	+	Elevation of channel invert for trapezoidal channel, in feet or meters.
4	XLSS	+	Side slope of trapezoidal excavation, in XLSS horizontal units for 1 vertical unit.
5	ELFIL	+	Fill elevation on channel bed, in feet or meters.
6	BW	+	Bed width of trapezoidal channel, in feet or meters. This width is measured along the cross section line; therefore, a larger value should be used if a section is skewed.
10	ADDVOL	0	Volume of excavation or fill, if any, is added to the total volume already defined.
		+	Initial volume of fill on channel bed, in cubic feet or cubic meters.
		-	Initial volume of excavation from channel bed, in cubic feet or meters.

GR Record - This record specifies the elevation and station of each point for a digitized cross section; it is required for each X1 record.

Field	Variable	Value	Description
0	IA	GR	Record identification characters
1	Z1	"	Elevation of point 1, in ft or m. It may be positive or negative.
2	Y1	"	Station of point 1, in ft or m
3	Z2	"	Elevation of point 2, in ft or m
4	Y2	"	Station of point 2, in ft or m

Continue with additional GR records using up to 79 points to describe the cross section. Stations should be in increasing order.

SB Record - This special bridge record is used to specify data in the special bridge routine. This record is used together with the BT and GR records for bridge hydraulics. This record is placed between cross sections that are upstream and downstream of the bridge.

Field	Variable	Value	Description
0	IA	SB	Record identification characters
1	XK	+	Pier shape coefficient for pier loss
2	XKOR	+	Total loss coefficient for orifice flow through bridge opening
3	COFQ	+	Discharge coefficient for weir flow overtopping bridge roadway
4	IB	+	Bridge index, starting with 1 from downstream toward upstream
5	BWC	+	Bottom width of bridge opening including any obstruction
6	BWP	0	No obstruction (pier) in the bridge
		i	Total width of obstruction (piers)
7	BAREA	+	Net area of bridge opening below the low chord in square feet
9	ELLC	+	Elevation of horizontal low chord for the bridge
10	ELTRD	+	Elevation of horizontal top-of-roadway for the bridge

BT Record - This record is used to compute conveyance in the bridge section. The BT data defines the top-of -roadway and the low chord profiles of bridge. The program uses the BT, SB and GR data to distinguish and to compute low flow, orifice flow and weir flow.

Field	Variable	Value	Description
0	IA	BT	Record identification characters
1	NRD	+	Number of points defining the bridge roadway and bridge low chord to be read on the BT records
2	RDST(1)	+	Roadway station corresponding to RDEL(1) and XLCEL(1)
3	RDEL(1)	+	Top of roadway elevation at station RDST(1)
4	XLCEL(1)	+	Low chord elevation at station RDST(1)
5	RDST(2)	+	Roadway station corresponding to RDEL(2) and XLCEL(2)
6	RDEL(2)	+	Top of roadway elevation at station RDST(2)

7	XLCEL(2)	+	Low chord elevation at station RDST(2)

Continue with additional sets of RDST, RDEL, and XLCEL.

EJ Record - This record is required following the last cross section for each job. Each group of records beginning with the T1 record is considered as a job.

Field	Variable	Value	Description
0	IA	EJ	Record identification characters
1-10			Not used

II. OUTPUT DESCRIPTION

Output of the model include initial bed-material compositions, time and spatial variations of the water-surface profile, channel width, flow depth, water discharge, velocity, energy gradient, median sediment size, and bed-material discharge. In addition, cross-sectional profiles are printed at different time intervals.

Symbols used in the output are generally descriptive, some of them are defined below:

SECTION	Cross section
TIME	Time on the hydrograph
DT	Size of the time step or Δt in sec
W.S.ELEV	Water-surface elevation in ft or m
WIDTH	Surface width of channel flow in ft or m
DEPTH	Depth of flow measured from channel invert to water surface in ft or m
Q	Discharge of flow in cfs or cms
V	Mean velocity of a cross-section in fps or mps
SLOPE	Energy gradient
D50	Median size or d_{50} of sediment load in mm
QS	Bed-material discharge for all size fractions in cfs or cms
FR	Froude number at a cross section
N	Manning's roughness coefficient
SED.YIELD	Bulk volume or weight of sediment having passed a cross section since beginning of simulation, in cubic yards or tons.
WSEL	Water-surface elevation, in ft or m
Z	Vertical coordinate (elevation) of a point on channel boundary at a cross-section, in ft or m
Y	Horizontal coordinate (station) of a point on channel boundary at a cross-section, in ft or m
DZ	Change in elevation during the current time step, in ft or m

TDZ	Total or accumulated change in elevation, in ft or m

ATTACHMENTS. INPUT/OUTPUT LISTINGS OF FLUVIAL-12 RUNS

DRAINAGE STUDY REPORT
FOR
EL CAMINO REAL ROAD/BRIDGE WIDENING PROJECT ON THE SAN DIEGUITO RIVER (SITE DEVELOPMENT PERMIT)

Federal Project Number BHL0-5004 (068)
Job Number: 14752
August 17, 2012

RICK ENGINEERING COMPANY

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Jayne M. Janda-Timba
R.C.E. #70649
Exp. 06/13

REGISTERED PROFESSIONAL ENGINEER
JAYNE MARIE JANDA-TIMBA
NO. 70649
EXP. 6/30/13
CIVIL
STATE OF CALIFORNIA

Prepared By:

Rick Engineering Company
Water Resources Division
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707

August 17, 2012

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Map Pocket 1: Drainage Study Map for El Camino Real Road/Bridge Widening Project on the San Dieguito River [Post-Project]

1.0 INTRODUCTION

This drainage study presents post-project condition hydrologic analyses for the proposed El Camino Real Road/Bridge Widening project (herein referred to as "the project") in support of the Site Development Permit (SDP). The project is located in the City of San Diego. El Camino Real Bridge Project on San Dieguito River proposes a new bridge construction across San Dieguito River. The new bridge is parallel to the existing El Camino Real Bridge and is situated approximately 100 feet upstream. Proposed El Camino Real bridge will be constructed approximately 2.8 miles west of where the river outlets into the Pacific Ocean. See Figure 1, Vicinity Map, located at the end of Section 1.0.

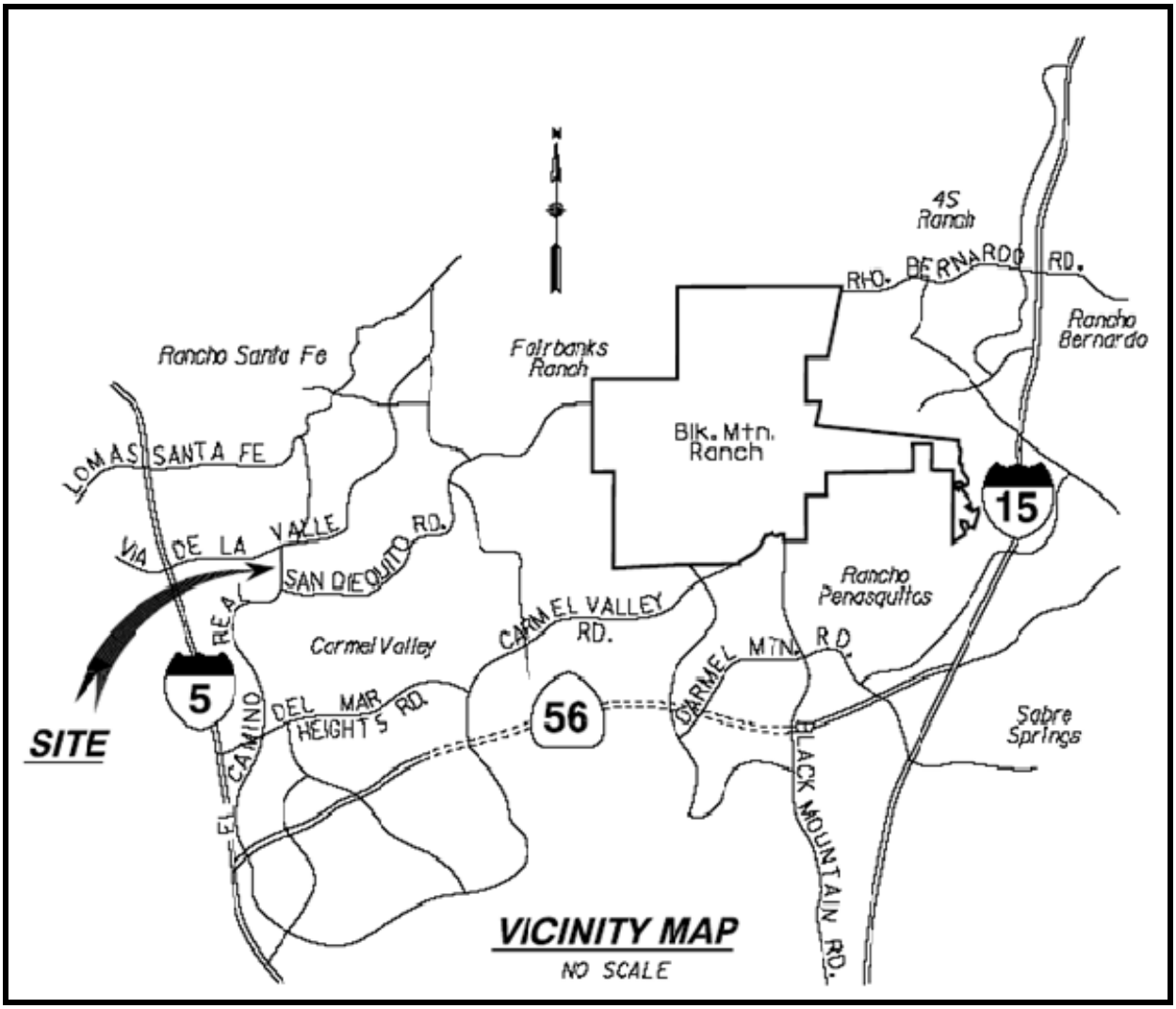
The project proposes to demolish the existing two-lane El Camino Real Bridge, and construct new four-lane bridge approximately 100 feet upstream. This will involve new road construction and improvements to San Dieguito Road, El Camino Real, and Via de la Valle. The project limits include a 0.5-mile portion of El Camino Real from San Dieguito Road to Via de la Valle, as well as 300 feet western and 800 feet eastern portions of Via de la Valle. Please see the vicinity map located in Attachment 1 for the location of the project site.

The purpose of the project is to replace the bridge across the San Dieguito River between the communities of North City and Rancho Santa Fe. The area near the existing El Camino Real bridge is severely congested, and the existing bridge has been found to include deficiencies related to structural and hydraulic issues. Therefore, the existing two-lane bridge will be replaced with a four-lane bridge. Included with this bridge replacement is the replacement of approach roadways to the north and south sides of the bridge.

Post-project storm water runoff will be treated per the Storm Water Standards Manual, and will be discussed in the report titled, "Storm Water Data Report for El Camino Real Road/Bridge Widening Project on the San Dieguito River (Site Development Permit)," dated August 17, 2012, prepared by Rick Engineering Company (Job No. 14752-C).

Hydrology is discussed in detail in Sections 2.0 of this report.
Preliminary storm drain pipe sizing are discussed in Section 3.0 of this report.

Figure 1: Vicinity Map



2.0 HYDROLOGY

2.1 Methodology

The *City of San Diego Drainage Design Manual April 1984* requires that the Modified Rational Method be used for hydrologic analysis of a watershed up to but not exceeding 1.0 square-mile (640 acres). The Rational Method computer program developed by Advanced Engineering Software (AES 2003) was used for this study because it satisfies the City of San Diego's design criteria.

2.1.1 Modified Rational Method

The AES hydrologic model is developed by creating independent node-link models of each interior drainage basin and linking these sub-models together at confluence points. The program has the capability to perform calculations for 15 hydrologic processes. These processes are assigned code numbers that appear in the results. The code numbers and their significance are as follows:

Code 1: Confluence analysis at a node
Code 2: Initial subarea analysis
Code 3: Pipe flow travel time (computer-estimated pipe sizes)
Code 4: Pipe flow travel time (user-specified pipe size)
Code 5: Trapezoidal channel travel time
Code 6: Street flow analysis through a subarea
Code 7: User-specified information at a node
Code 8: Addition of the subarea runoff to mainline
Code 9: V-Gutter flow thru subarea
Code 10: Copy main-stream data onto a memory bank
Code 11: Confluence a memory bank with the main-stream memory
Code 12: Clear a memory bank
Code 13: Clear the main-stream memory
Code 14: Copy a memory bank onto the main-stream memory
Code 15: Hydrologic data bank storage functions

In order to perform the hydrologic analysis; base information for the study area is required. This information includes the existing drainage facility locations and sizes, existing land uses, flow patterns, drainage basin boundaries, and topographic elevations. Drainage basin boundaries, flow patterns, and topographic elevations are shown on the drainage exhibits located in the map pockets.

2.2 Criteria

The hydrologic conditions were analyzed in accordance with the City of San Diego's design criteria as follows:

Design Storm:	100-year
Runoff Coefficients*:	
Industrial (Paved)	C = 0.95
Natural/ Landscaped	C = 0.45
Soil Type:	D
Rainfall Intensity:	Based on time-intensity criteria per City of San Diego

* Weighted runoff coefficients were used where appropriate based on a percentage of 0.95 and 0.45. Refer to Appendix B for calculations.

The 100-year peak flow rates for the post-project conditions can be found in Appendix A. Watershed boundaries, Rational Method areas and node numbers can be found on the workmap titled, "Drainage Study Map for El Camino Real Road/Bridge Widening Project on the San Dieguito River [Post-Project]," located in Map Pockets 1.

2.3 Results

The total drainage area in this study is approximately 22.6 acres. The drainage area is divided in two major basins (Basin 100 and 200). The results are described below for post-project conditions and Rational Method results are provided in Appendix A of this report. Watershed boundaries, Rational Method node numbers, flow patterns, and areas can be found on the workmap titled, "Drainage Study Map for El Camino Real Road/Bridge Widening Project on the San Dieguito River [Post-project]," located in Map Pockets 2.

The summary of hydrologic results is given in Table 2.1 provided below.

Table 2.1 Hydrologic Summary Table

Node	Time-of-concentration, t_c (min)	Area, A (ac)	Discharge, Q_{100} (cfs)
199	31.2	20.6	65.0
260	11.9	1.9	5.5

Basin 100:

Total area of major drainage basin is 20.6 acres. However, Basin 100 receives runoff from a proposed storm drain system west of Via de la Valle (7.7 acres). For more details, refer to report prepared by Rick Engineering Company titled, "Drainage Study for Via de la Valle, "dated April 5, 2011, Job Number 14445. Also, Basin 100 storm drain system receives low flow from a Northern Watershed tributary to the project site. Overflow will be conveyed via a triple box culvert and directed in a southerly direction towards the San Dieguito River. This watershed located north of Via de la Valle has area of 1.02 square miles (652.8 acres) and time-to-peak of 13.2 minutes (for more details please refer to report prepared by Rick Engineering Company titled, "Hydrologic Study for Watershed Tributary to Intersection of Via de la Valle and El Camino Real North," dated May 24, 2012, Job Number 14752-B). Rational Method results show Basin 100 total area to be 681.4 acres due to the above mentioned additional watersheds. Runoff from Basin 100 is collected by storm drain system and discharged directly to San Dieguito River through a network of storm drain pipes and channels.

Basin 200:

Total area of major drainage basin is 1.9 acres. Runoff from Basin 100 is collected by storm drain system and discharged directly to San Dieguito River through a storm drain system.

The post-project drainage characteristics of the project such as tributary area, flow paths, impervious area, and time of concentration to each outlet point will mimic the pre-project condition drainage characteristics. As a result, it is anticipated that this project will not adversely impact the hydrology and hydraulics of San Dieguito River.

3.0 HYDRAULICS

3.1 Hydraulic Methodology and Criteria

The 100-year post-project peak flow rates determined using the Modified Rational Method were used to preliminarily size the on-site storm drain system. Additional hydraulic analyses for sizing of earthen channels, reinforced concrete culverts, proposed inlet sizing, dry lane calculations, and energy dissipaters will be prepared during final engineering. The AES Pipe Flow Hydraulics computer program will be used during final engineering to analyze hydraulic losses that occur within the proposed storm drain system to determine the hydraulic grade lines (HGLs) within the mainline systems.

3.1.1 Storm Drain Sizing

Proposed storm drain pipes were designed using Manning's equation. The anticipated 100-year flow rate to each storm drain pipe was estimated by the Modified Rational Method. The anticipated 100-year flow rate with a 30% sizing factor was used in calculations to provide recommended storm drain sizes. The 30% sizing factor helps account for hydraulic losses within the system. A preliminary (general) storm drain sizing tables were created to size proposed storm drain pipes.

<u>Storm Drain Results</u>

The backup calculations for preliminary storm drain sizing are provided in Appendix C of this report. The summary of storm drain pipe sizes is provided in Table 3.1.

Table 3.1 Summary of Preliminary Storm Drain Pipe Sizes

RM Node Number	Preliminary Storm Drain Sizes (assumes RCPs)
120-129	36"
122-129	18"
123-129	18"
129-131	36"
130-131	18"
127-131	18"
131-160	48"
1185-160	24"
160-165	48"
146-165	30"
168-195	48"
182-185	18"
175-185	18"
185-189	18"
189-190	18"
210-260	18"

3.1.2 Inlet Design

Inlet design calculations will be completed using a computer program based on the following equations for inlets on a grade and inlets in a sump:

Type B Inlets on a Grade

$$Q = 0.7\ L\ (a + y)^{3/2}$$

Where: y = depth of flow approaching the curb inlet, in feet (ft)

a = depth of depression of curb at inlet, in feet (ft)

L = length of clear opening of inlet for total interception, in feet (ft)

Q = interception capacity of the curb inlet, in cubic feet per second (cfs)

Type B Inlets in a Sump

$$Q/L = 1.5\ \text{cfs/ft}$$

Where: Q = inlet capacity, in cubic feet per second (cfs)

L = length of clear opening of inlet for total interception, in feet (ft)

Inlet Results

Preliminary inlet locations have been identified for the project and reflect on the site plan. The inlet design calculations along with back up information will be presented during final engineering for the project and are not included in this report. Inlets will be sized for the 100-year, 6-hour storm event. Inlets will be sized to provide 100% capture of the flow.

4.0 CONCLUSION

This drainage study presents the hydrologic and hydraulic analyses for the El Camino Real Road/Bridge Widening project. The post-project condition peak discharge rates were determined using the Modified Rational Method based on the hydrologic methodology and criteria described in the City of San Diego Drainage Design Manual April 1984.

It is currently anticipated that the project will result in a slight increase to impervious surfaces. However, it is anticipated that the project will not adversely impact the hydraulics of existing drainage systems located downstream of the project, since it is discharging directly to San Dieguito River. Therefore, the project will be exempt from Hydromodification Management Plan (HMP) requirements. The project will also include LID/IMPs and Treatment Control BMPs that will further reduce/slow runoff for post-project conditions.

Preliminary storm drain sizes have been determined based on the 100-year peak flow rates. Detailed hydraulic calculations for the proposed storm drain system will take place during final engineering of this project, and are not included in this report. The 100-year, 6-hour peak flow rates will be utilized to size open channels, culverts, and the proposed inlets. Inlets will be sized, during final engineering, to provide 100% capture of the flow.

Post-project runoff will be treated per the Storm Water Standards Manual. Please refer to the report titled, "Storm Water Data Report for El Camino Real Road/Bridge Widening Project on the San Dieguito River," dated August 17, 2012, prepared by Rick Engineering Company (Job Number 14752), for more information on water quality.

APPENDIX A

Rational Method Output [Post-Project Condition]

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                        RICK ENGINEERING COMPANY
                            5620 Friars Road
                        San Diego, California 92110
                     619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* J-14752 EL CAMINO REAL BRIDGE WIDENING PROJECT                         *
* BASIN 100 POST-PROJECT (100-YR)                                        *
* 08/16/12 (AG)                                                          *
 ************************************************************************

  FILE NAME: ECR10P00.RAT
  TIME/DATE OF STUDY: 09:55 08/16/2012
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   65.0     60.0    0.020/0.020/0.020   0.50    2.00 0.0100 0.125 0.0180
  3   59.0     54.0    0.020/0.020/0.020   0.50    2.00 0.0100 0.013 0.0180
  4   40.0     33.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0160
  5   35.0     28.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0160

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
  OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE   1185.00 TO NODE   1185.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  12.60   RAIN INTENSITY(INCH/HOUR) =  3.16
  TOTAL AREA(ACRES) =     7.70   TOTAL RUNOFF(CFS) =     13.70

****************************************************************************
  FLOW PROCESS FROM NODE   1185.00 TO NODE    160.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    20.90  DOWNSTREAM(FEET) =    13.50
  FLOW LENGTH(FEET) =   129.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.86
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     13.70
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  12.76
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    160.00 =   129.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     24.20
  DOWNSTREAM ELEVATION(FEET) =     23.90
  ELEVATION DIFFERENCE(FEET) =      0.30
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.033
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   23.90  DOWNSTREAM ELEVATION(FEET) =   18.00
  STREET LENGTH(FEET) =   678.80   CURB HEIGHT(INCHES) =  8.0
```

```
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.50
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.36
  HALFSTREET FLOOD WIDTH(FEET) =   10.83
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
STREET FLOW TRAVEL TIME(MIN.) =   5.65   Tc(MIN.) =  11.65
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.269
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7900
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     1.00      SUBAREA RUNOFF(CFS) =     2.58
TOTAL AREA(ACRES) =       1.30        PEAK FLOW RATE(CFS) =       3.78

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.03
FLOW VELOCITY(FEET/SEC.) =  2.20   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    122.00 =   778.80 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    118.00 TO NODE    122.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.269
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8700
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     0.50   SUBAREA RUNOFF(CFS) =     1.42
TOTAL AREA(ACRES) =       1.80   TOTAL RUNOFF(CFS) =     5.20
TC(MIN.) =  11.65

****************************************************************************
FLOW PROCESS FROM NODE    122.00 TO NODE    129.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    15.50  DOWNSTREAM(FEET) =    14.60
FLOW LENGTH(FEET) =    52.10   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.00
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      5.20
PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  11.77
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    129.00 =   830.90 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.77
  RAINFALL INTENSITY(INCH/HR) =   3.25
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.20

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     24.20
  DOWNSTREAM ELEVATION(FEET) =     23.90
  ELEVATION DIFFERENCE(FEET) =      0.30
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.033
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    123.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   23.90  DOWNSTREAM ELEVATION(FEET) =   18.00
  STREET LENGTH(FEET) =   671.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   5.87   Tc(MIN.) =  11.87
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.244
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =     2.21
  TOTAL AREA(ACRES) =       1.00        PEAK FLOW RATE(CFS) =        3.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE    115.00 TO NODE    123.00 =   771.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.244
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.30   SUBAREA RUNOFF(CFS) =     0.80
  TOTAL AREA(ACRES) =       1.30   TOTAL RUNOFF(CFS) =     3.80
  TC(MIN.) =  11.87

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    129.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    14.80  DOWNSTREAM(FEET) =    14.60
  FLOW LENGTH(FEET) =      9.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.00
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.80
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.89
  LONGEST FLOWPATH FROM NODE    115.00 TO NODE    129.00 =   781.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.89
  RAINFALL INTENSITY(INCH/HR) =   3.24
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

+--------------------------------------------------------------------------+
| NORTHERN TRIBUTARY WATERSHED (J-14752-B HYDROLOGIC STUDY 05/24/12)       |
| PER HEC-1: A= 652.9 AC  TIME-TO-PEAK= 13.2 MIN                           |
| PER NORMAL DEPTH CALC Q=20 CFS AT VDLV LOW-FLOW CULVERT 36" RCP          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
```

```
  TC(MIN) =  13.20   RAIN INTENSITY(INCH/HOUR) =  3.10
  TOTAL AREA(ACRES) =   652.80   TOTAL RUNOFF(CFS) =     20.00

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    129.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    14.70  DOWNSTREAM(FEET) =    14.60
  FLOW LENGTH(FEET) =   132.40   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.71
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     20.00
  PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =  14.01
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    129.00 =   132.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =  14.01
  RAINFALL INTENSITY(INCH/HR) =   3.01
  TOTAL STREAM AREA(ACRES) =   652.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1         5.20    11.77        3.255         1.80
     2         3.80    11.89        3.242         1.30
     3        20.00    14.01        3.009       652.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        27.48    11.77       3.255
     2        27.55    11.89       3.242
     3        28.34    14.01       3.009

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     28.34   Tc(MIN.) =   14.01
  TOTAL AREA(ACRES) =    655.90
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    129.00 =   830.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    131.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    14.50  DOWNSTREAM(FEET) =    13.80
  FLOW LENGTH(FEET) =   797.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.93
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     28.34
  PIPE TRAVEL TIME(MIN.) =   4.54    Tc(MIN.) =  18.55
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    131.00 =  1627.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  18.55
  RAINFALL INTENSITY(INCH/HR) =   2.62
  TOTAL STREAM AREA(ACRES) =   655.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.34

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     30.00
  DOWNSTREAM ELEVATION(FEET) =     26.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.701
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    130.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   26.00  DOWNSTREAM ELEVATION(FEET) =   24.00
  STREET LENGTH(FEET) =   135.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.59
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.21
  HALFSTREET FLOOD WIDTH(FEET) =    2.90
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
STREET FLOW TRAVEL TIME(MIN.) =   1.03   Tc(MIN.) =   7.03
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.014
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.38
TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.78

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   4.54
FLOW VELOCITY(FEET/SEC.) =  2.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =   235.80 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    126.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.014
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.90   SUBAREA RUNOFF(CFS) =    1.63
TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =    2.41
TC(MIN.) =   7.03

****************************************************************************
FLOW PROCESS FROM NODE    128.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.014
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8800
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.47
TOTAL AREA(ACRES) =      1.80   TOTAL RUNOFF(CFS) =    4.88
TC(MIN.) =   7.03

****************************************************************************
FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    19.00  DOWNSTREAM(FEET) =    13.80
FLOW LENGTH(FEET) =    59.90   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  12.31
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      4.88
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   7.11
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    131.00 =   295.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   7.11
  RAINFALL INTENSITY(INCH/HR) =   4.00
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.88

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     30.00
  DOWNSTREAM ELEVATION(FEET) =     26.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.701
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    127.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   26.00  DOWNSTREAM ELEVATION(FEET) =   24.00
  STREET LENGTH(FEET) =   135.80   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  33.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    4.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
```

```
STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =   7.09
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.002
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9300
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.74
TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       1.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.18
FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
LONGEST FLOWPATH FROM NODE    105.00 TO NODE    127.00 =   235.80 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    127.00 TO NODE    131.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    19.00  DOWNSTREAM(FEET) =    13.80
FLOW LENGTH(FEET) =    32.40   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   9.95
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      1.14
PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.15
LONGEST FLOWPATH FROM NODE    105.00 TO NODE    131.00 =   268.20 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
TIME OF CONCENTRATION(MIN.) =   7.15
RAINFALL INTENSITY(INCH/HR) =   3.99
TOTAL STREAM AREA(ACRES) =     0.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.14

** CONFLUENCE DATA **
STREAM     RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       28.34    18.55       2.616        655.90
    2        4.88     7.11       3.999          1.80
    3        1.14     7.15       3.992          0.30

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  3 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       24.56     7.11       3.999
    2       24.58     7.15       3.992
    3       32.28    18.55       2.616

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     32.28   Tc(MIN.) =   18.55
```

```
  TOTAL AREA(ACRES) =     658.00
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    131.00 =  1627.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    160.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    13.70  DOWNSTREAM(FEET) =    13.50
  FLOW LENGTH(FEET) =    98.70   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     32.28
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =  18.92
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    160.00 =  1726.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       32.28    18.92       2.586      658.00
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    160.00 =  1726.60 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       13.70    12.76       3.147        7.70
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    160.00 =   129.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      40.23      12.76       3.147
     2      43.54      18.92       2.586

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     43.54   Tc(MIN.) =   18.92
  TOTAL AREA(ACRES) =    665.70

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    165.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    13.40  DOWNSTREAM(FEET) =    12.90
  FLOW LENGTH(FEET) =    53.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.43
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     43.54
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  19.02
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    165.00 =  1780.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     25.00
  DOWNSTREAM ELEVATION(FEET) =     24.90
  ELEVATION DIFFERENCE(FEET) =      0.10
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   13.572
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.057
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    147.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   24.90  DOWNSTREAM ELEVATION(FEET) =   23.40
  STREET LENGTH(FEET) =   279.50   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 35.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  28.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    6.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.35
  STREET FLOW TRAVEL TIME(MIN.) =   3.61   Tc(MIN.) =  17.19
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.725
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8100
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     0.88
TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       1.11

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.15
FLOW VELOCITY(FEET/SEC.) =  1.41   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
LONGEST FLOWPATH FROM NODE    141.00 TO NODE    147.00 =   379.50 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    146.00 TO NODE    147.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.725
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     6.10   SUBAREA RUNOFF(CFS) =     7.48
TOTAL AREA(ACRES) =       6.60   TOTAL RUNOFF(CFS) =     8.59
TC(MIN.) =  17.19

****************************************************************************
FLOW PROCESS FROM NODE    147.00 TO NODE    149.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    13.30  DOWNSTREAM(FEET) =    13.25
FLOW LENGTH(FEET) =    37.60   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   3.03
GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      8.59
PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =  17.39
LONGEST FLOWPATH FROM NODE    141.00 TO NODE    149.00 =   417.10 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    13.25  DOWNSTREAM(FEET) =    13.20
FLOW LENGTH(FEET) =    28.30   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  14.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   3.35
GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      8.59
PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =  17.53
LONGEST FLOWPATH FROM NODE    141.00 TO NODE    150.00 =   445.40 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  17.53
  RAINFALL INTENSITY(INCH/HR) =   2.70
  TOTAL STREAM AREA(ACRES) =     6.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.59

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    144.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     25.00
  DOWNSTREAM ELEVATION(FEET) =     24.90
  ELEVATION DIFFERENCE(FEET) =      0.10
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   13.572
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.057
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    150.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   24.90  DOWNSTREAM ELEVATION(FEET) =   23.40
  STREET LENGTH(FEET) =   266.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 35.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  28.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    5.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.35
  STREET FLOW TRAVEL TIME(MIN.) =   3.36   Tc(MIN.) =  16.94
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.745
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     0.89
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.15
  FLOW VELOCITY(FEET/SEC.) =  1.41   DEPTH*VELOCITY(FT*FT/SEC.) =   0.44
  LONGEST FLOWPATH FROM NODE    142.00 TO NODE    150.00 =   366.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  16.94
  RAINFALL INTENSITY(INCH/HR) =   2.75
  TOTAL STREAM AREA(ACRES) =     0.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.12

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1         8.59    17.53        2.697         6.60
     2         1.12    16.94        2.745         0.50

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1         9.56    16.94       2.745
     2         9.69    17.53       2.697

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      9.69   Tc(MIN.) =   17.53
  TOTAL AREA(ACRES) =      7.10
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    150.00 =   445.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    165.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    13.20  DOWNSTREAM(FEET) =    13.10
  FLOW LENGTH(FEET) =    38.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.69
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  17.70
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    165.00 =   484.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
```

```
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         9.69    17.70        2.684         7.10
LONGEST FLOWPATH FROM NODE    141.00 TO NODE    165.00 =   484.20 FEET.

** MEMORY BANK #  1 CONFLUENCE DATA **
STREAM     RUNOFF      Tc       INTENSITY     AREA
NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1       43.54    19.02        2.578      665.70
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    165.00 =  1780.40 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF       Tc       INTENSITY
NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1      51.51      17.70        2.684
    2      52.85      19.02        2.578

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     52.85   Tc(MIN.) =   19.02
TOTAL AREA(ACRES) =    672.80

****************************************************************************
FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE    165.00 TO NODE    168.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =     12.90  DOWNSTREAM(FEET) =     11.60
CHANNEL LENGTH THRU SUBAREA(FEET) =   606.20   CHANNEL SLOPE =  0.0021
CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   3.000
MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.235
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     54.87
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.87
AVERAGE FLOW DEPTH(FEET) =   1.04   TRAVEL TIME(MIN.) =   5.40
Tc(MIN.) =  24.42
SUBAREA AREA(ACRES) =     3.30       SUBAREA RUNOFF(CFS) =    4.06
TOTAL AREA(ACRES) =    676.10         PEAK FLOW RATE(CFS) =      56.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.07   FLOW VELOCITY(FEET/SEC.) =   1.89
LONGEST FLOWPATH FROM NODE    110.00 TO NODE    168.00 =  2386.60 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    168.00 TO NODE    190.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    11.60  DOWNSTREAM(FEET) =    11.50
FLOW LENGTH(FEET) =    58.10   MANNING'S N =  0.013
ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.09
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     56.91
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =  24.65
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    190.00 =  2444.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    190.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     34.50
  DOWNSTREAM ELEVATION(FEET) =     34.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.402
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    175.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   34.00  DOWNSTREAM ELEVATION(FEET) =   24.00
  STREET LENGTH(FEET) =   821.40   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 35.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  28.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   6.47   Tc(MIN.) =  12.47
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.178
  *USER SPECIFIED(SUBAREA):
```

```
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8100
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     1.00      SUBAREA RUNOFF(CFS) =     2.57
  TOTAL AREA(ACRES) =       1.10        PEAK FLOW RATE(CFS) =        2.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.88
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    175.00 =   921.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.178
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.50   SUBAREA RUNOFF(CFS) =     1.30
  TOTAL AREA(ACRES) =       1.60   TOTAL RUNOFF(CFS) =     4.28
  TC(MIN.) =  12.47

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    185.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    19.00  DOWNSTREAM(FEET) =    18.40
  FLOW LENGTH(FEET) =    56.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.28
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  12.64
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    185.00 =   977.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    185.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.64
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.28

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     34.50
```

```
  DOWNSTREAM ELEVATION(FEET) =      34.00
  ELEVATION DIFFERENCE(FEET) =       0.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.402
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =       0.40
  TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.40

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   34.00  DOWNSTREAM ELEVATION(FEET) =   24.00
  STREET LENGTH(FEET) =   813.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 35.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  28.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   6.34   Tc(MIN.) =  12.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.192
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.62
  TOTAL AREA(ACRES) =      1.10        PEAK FLOW RATE(CFS) =       3.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.88
  FLOW VELOCITY(FEET/SEC.) =  2.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    182.00 =   913.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    182.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.192
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.31
  TOTAL AREA(ACRES) =      1.60   TOTAL RUNOFF(CFS) =    4.33
  TC(MIN.) =  12.34

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    182.00 TO NODE    185.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    19.00  DOWNSTREAM(FEET) =    18.40
  FLOW LENGTH(FEET) =     9.40   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.66
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.33
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =  12.36
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    185.00 =   923.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    185.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.36
  RAINFALL INTENSITY(INCH/HR) =   3.19
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.33

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1         4.28    12.64        3.159         1.60
     2         4.33    12.36        3.191         1.60

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1         8.56    12.36       3.191
     2         8.56    12.64       3.159

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      8.56   Tc(MIN.) =   12.36
  TOTAL AREA(ACRES) =      3.20
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    185.00 =   977.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    189.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    18.10  DOWNSTREAM(FEET) =    17.00
  FLOW LENGTH(FEET) =   103.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.50
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      8.56
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =  12.62
```

```
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    189.00 =  1081.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    190.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    16.70  DOWNSTREAM(FEET) =    11.50
  FLOW LENGTH(FEET) =   105.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.72
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.56
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  12.77
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    190.00 =  1186.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    190.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1         8.56    12.77       3.145        3.20
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    190.00 =  1186.90 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF     Tc      INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1        56.91    24.65       2.221      676.10
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    190.00 =  2444.70 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      48.75      12.77        3.145
     2      62.95      24.65        2.221

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     62.95   Tc(MIN.) =   24.65
  TOTAL AREA(ACRES) =    679.30

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    190.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    195.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    11.50  DOWNSTREAM(FEET) =    11.40
  FLOW LENGTH(FEET) =    28.50   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.85
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     62.95
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  24.74
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    195.00 =  2473.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    199.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     11.40  DOWNSTREAM(FEET) =      9.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   775.00   CHANNEL SLOPE =  0.0021
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.964
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4900
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     63.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.00
  AVERAGE FLOW DEPTH(FEET) =   1.17   TRAVEL TIME(MIN.) =   6.46
  Tc(MIN.) =  31.20
  SUBAREA AREA(ACRES) =     2.10       SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =    681.40         PEAK FLOW RATE(CFS) =      64.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.18   FLOW VELOCITY(FEET/SEC.) =   2.01
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    199.00 =  3248.20 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =    681.40  TC(MIN.) =     31.20
  PEAK FLOW RATE(CFS)    =     64.97
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                        RICK ENGINEERING COMPANY
                            5620 Friars Road
                        San Diego, California 92110
                     619-291-0707   Fax 619-291-4165

 ************************* DESCRIPTION OF STUDY *************************
* J-14752 EL CAMINO REAL BRIDGE WIDENING PROJECT                         *
* BASIN 200 POST-PROJECT (100-YR)                                        *
* 08/16/12 (AG)                                                          *
 ************************************************************************

  FILE NAME: ECR20P00.RAT
  TIME/DATE OF STUDY: 09:38 08/16/2012
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   65.0     60.0    0.020/0.020/0.020   0.50    2.00 0.0100 0.125 0.0180
  3   59.0     54.0    0.020/0.020/0.020   0.50    2.00 0.0100 0.013 0.0180
  4   51.0     46.0    0.020/0.020/0.020   0.50    2.00 0.0100 0.125 0.0180
  5   35.0     28.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0160

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
  OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     34.50
  DOWNSTREAM ELEVATION(FEET) =     32.90
  ELEVATION DIFFERENCE(FEET) =      1.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.309
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   32.90  DOWNSTREAM ELEVATION(FEET) =   24.00
  STREET LENGTH(FEET) =   715.10   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 35.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  28.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   5.59   Tc(MIN.) =  11.59
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.275
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    2.42
  TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       2.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.55
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =   815.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    19.00  DOWNSTREAM(FEET) =    18.70
  FLOW LENGTH(FEET) =    32.60   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.71
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.82
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  11.70
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =   847.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    250.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    18.70  DOWNSTREAM(FEET) =    18.40
  FLOW LENGTH(FEET) =    31.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.77
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.82
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  11.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    250.00 =   879.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.81
  RAINFALL INTENSITY(INCH/HR) =   3.25
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.82

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     34.50
  DOWNSTREAM ELEVATION(FEET) =     32.90
  ELEVATION DIFFERENCE(FEET) =      1.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.309
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    250.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   32.90  DOWNSTREAM ELEVATION(FEET) =   24.00
  STREET LENGTH(FEET) =   692.70   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 35.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  28.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   5.42   Tc(MIN.) =  11.42
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.293
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8900
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =    2.34
  TOTAL AREA(ACRES) =       0.90        PEAK FLOW RATE(CFS) =       2.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.34
  FLOW VELOCITY(FEET/SEC.) =  2.38   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    250.00 =   792.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.42
  RAINFALL INTENSITY(INCH/HR) =   3.29
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.74

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1         2.82    11.81        3.251         1.00
     2         2.74    11.42        3.293         0.90

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
```

```
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1          5.53     11.42        3.293
     2          5.53     11.81        3.251

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.53    Tc(MIN.) =    11.81
  TOTAL AREA(ACRES) =       1.90
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    250.00 =   879.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    260.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    18.40  DOWNSTREAM(FEET) =    18.10
  FLOW LENGTH(FEET) =    29.40   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.53
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  11.90
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    260.00 =   908.60 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      1.90  TC(MIN.) =     11.90
  PEAK FLOW RATE(CFS)    =      5.53
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX B

Weighted Runoff Coefficient Backup

J-14752
ECR (Site Development Permite)
08/16/2012

Weighted Runoff Coefficient Calculations

Post-project Condition **Basin 100**

U/S Node #	D/S Node #	Soil Type	Sub Basin Area, A (acres)	Impervious Area, A_i (acres)	Pervious Area, A_p (acres)	Weighted Runoff Coefficient [1], C_w
110	112	D	0.3	0.30	0.00	0.95
112	122	D	1.0	0.67	0.33	0.79
118	122	D	0.5	0.42	0.08	0.87
115	117	D	0.2	0.20	0.00	0.95
117	123	D	0.8	0.64	0.16	0.85
119	123	D	0.3	0.22	0.08	0.82
100	102	D	0.1	0.10	0.00	0.95
102	130	D	0.1	0.10	0.00	0.95
126	130	D	0.9	0.00	0.90	0.45
128	130	D	0.7	0.60	0.10	0.88
105	109	D	0.1	0.10	0.00	0.95
109	127	D	0.2	0.19	0.01	0.93
141	143	D	0.1	0.06	0.04	0.75
143	147	D	0.4	0.29	0.11	0.81
146	147	D	6.1	0.00	6.10	0.45
142	144	D	0.1	0.06	0.04	0.75
144	150	D	0.4	0.29	0.11	0.81
165	168	D	3.3	0.64	2.66	0.55
170	171	D	0.1	0.10	0.00	0.95
171	175	D	1.0	0.71	0.29	0.81
173	175	D	0.5	0.37	0.13	0.82
176	178	D	0.1	0.10	0.00	0.95
178	182	D	1.0	0.73	0.27	0.82
180	182	D	0.5	0.37	0.13	0.82
195	199	D	2.1	0.17	1.93	0.49

% Impervious: 35.6%

Total Area (acres): 20.9

Note:
1. Based on the 1984 City of San Diego Drainage Design Manual, Ci = 0.95 for 100% impervious area & Cp = 0.45 for 0% impervious area.

J-14752
ECR (Site Development Permite)
08/16/2012

Weighted Runoff Coefficient Calculations

Post-project Condition **Basin 200**

U/S Node #	D/S Node #	Soil Type	Sub Basin Area, A (acres)	Impervious Area, A_i (acres)	Pervious Area, A_p (acres)	Weighted Runoff Coefficient [1], C_w
200	205	D	0.1	0.10	0.00	0.95
205	210	D	0.9	0.73	0.17	0.86
240	242	D	0.1	0.10	0.00	0.95
242	250	D	0.8	0.70	0.10	0.89

% Impervious: 85.8%

Total Area (acres): 1.9

Note:
1. Based on the 1984 City of San Diego Drainage Design Manual, Ci = 0.95 for 100% impervious area & Cp = 0.45 for 0% impervious area.

APPENDIX C

Preliminary Storm Drain Sizing Backup

J-14752
ECR (Site Development Permite)
08/16/2012

Preliminary Storm Drain Size

The purpose of this table is to provide an estimated pipe size to convey the 100-year flow rates with a sizing factor.

Manning's n: 0.013

Sizing Factor (%): 30

	Slope at:	0.1%		0.2%		0.3%		0.4%	
Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)
2.0	2.6	1.37	18"	1.20	18"	1.11	18"	1.05	18"
5.0	6.5	1.93	24"	1.69	24"	1.57	24"	1.49	18"
7.5	9.8	2.24	30"	1.97	24"	1.83	24"	1.73	24"
10.0	13.0	2.50	30"	2.19	30"	2.03	30"	1.93	24"
15.0	19.5	2.91	36"	2.56	36"	2.37	30"	2.24	30"
20.0	26.0	3.24	42"	2.85	36"	2.64	36"	2.50	30"
25.0	32.5	3.52	48"	3.09	42"	2.87	36"	2.72	36"
30.0	39.0	3.77	48"	3.31	42"	3.07	42"	2.91	36"
35.0	45.5	4.00	48"	3.51	48"	3.25	42"	3.08	42"
40.0	52.0	4.20	54"	3.69	48"	3.42	42"	3.24	42"
50.0	65.0	4.57	60"	4.01	54"	3.72	48"	3.52	48"
60.0	78.0	4.89	60"	4.30	54"	3.98	48"	3.77	48"
70.0	91.0	5.19	72"	4.55	60"	4.22	54"	4.00	48"
80.0	104.0	5.45	72"	4.79	60"	4.44	54"	4.20	54"
90.0	117.0	5.70	72"	5.00	60"	4.64	60"	4.39	54"
110.0	143.0	6.14	84"	5.39	72"	5.00	60"	4.74	60"
145.0	188.5	6.81	84"	5.98	72"	5.55	72"	5.25	72"
170.0	221.0	7.23	96"	6.35	84"	5.89	72"	5.58	72"
240.0	312.0	8.23	108"	7.23	96"	6.70	84"	6.35	84"
350.0	455.0	9.48	108"	8.33	96"	7.72	96"	7.31	96"

Note:

1. "cfs" = cubic feet per second.
2. Minimum pipe sizes are calculated using the Manning's equation and are based on the flow rates with 30% factor.

J-14752
ECR (Site Development Permite)
08/16/2012

Preliminary Storm Drain Size

The purpose of this table is to provide an estimated pipe size to convey the 100-year flow rates with a sizing factor.

Manning's n: 0.013

Sizing Factor (%): 30

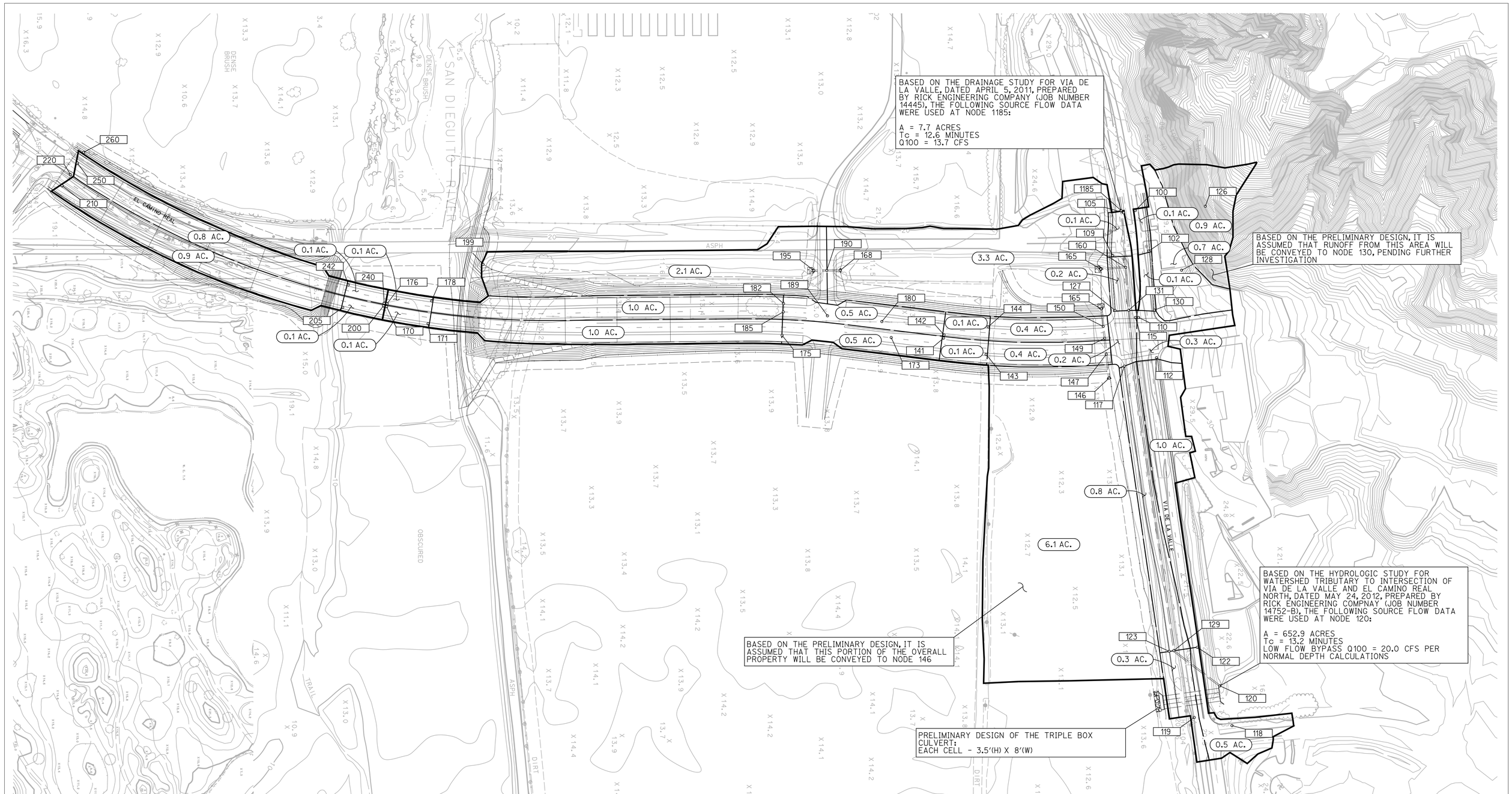
	Slope at:	0.5%		1.0%		2.0%		3.0%	
Q_{100} (cfs[1])	Q_{100} with Sizing Factor (cfs[1])	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)	Minimum Pipe Size[2] (feet)	Recommended Pipe Size (inches)
2.0	2.6	1.01	12"	0.89	12"	0.78	10"	0.72	10"
5.0	6.5	1.43	18"	1.25	18"	1.10	18"	1.02	18"
7.5	9.8	1.66	24"	1.46	18"	1.28	18"	1.19	18"
10.0	13.0	1.85	24"	1.62	24"	1.43	18"	1.32	18"
15.0	19.5	2.15	30"	1.89	24"	1.66	24"	1.54	24"
20.0	26.0	2.40	30"	2.11	30"	1.85	24"	1.71	24"
25.0	32.5	2.61	36"	2.29	30"	2.01	24"	1.86	24"
30.0	39.0	2.79	36"	2.45	30"	2.15	30"	1.99	24"
35.0	45.5	2.96	36"	2.60	36"	2.28	30"	2.11	30"
40.0	52.0	3.11	42"	2.73	36"	2.40	30"	2.22	30"
50.0	65.0	3.38	42"	2.97	36"	2.61	36"	2.42	30"
60.0	78.0	3.62	48"	3.18	42"	2.79	36"	2.59	36"
70.0	91.0	3.83	48"	3.37	42"	2.96	36"	2.74	36"
80.0	104.0	4.03	54"	3.54	48"	3.11	42"	2.88	36"
90.0	117.0	4.21	54"	3.70	48"	3.25	42"	3.01	42"
110.0	143.0	4.54	60"	3.99	48"	3.50	42"	3.25	42"
145.0	188.5	5.04	72"	4.42	54"	3.89	48"	3.60	48"
170.0	221.0	5.35	72"	4.70	60"	4.12	54"	3.82	48"
240.0	312.0	6.09	84"	5.35	72"	4.69	60"	4.35	54"
350.0	455.0	7.01	96"	6.16	84"	5.41	72"	5.01	72"

Note:

1. "cfs" = cubic feet per second.
2. Minimum pipe sizes are calculated using the Manning's equation and are based on the flow rates with 30% factor.

MAP POCKET 1

Drainage Study Map
for
El Camino Real Road/Bridge Widening Project
on the San Dieguito River
[Post-Project]



DRAINAGE STUDY MAP FOR EL CAMINO REAL ROAD/BRIDGE WIDENING PROJECT ON SAN DIEGUITO RIVER (SITE DEVELOPMENT PERMIT)

[POST-PROJECT]

LEGEND:

- MAJOR DRAINAGE BASIN BOUNDARY
- SUB BASIN BOUNDARY
- (XX.X AC) SUB BASIN AREA
- [XXX] NODE NUMBER

J-14752 Date: August 17, 2012

NOT FOR CONSTRUCTION - EXHIBIT FOR DRAINAGE STUDY REPORT ONLY

August 17, 2012

Development Services
202 "C" Street, 9th Floor
San Diego, California 92101

SUBJECT: EL CAMINO REAL ROAD/BRIDGE WIDENING PROJECT – SITE DEVELOPMENT PERMIT (SDP) - WATER QUALITY TECHNICAL REPORT (WQTR)
(RICK ENGINEERING COMPANY JOB NUMBER 14752)

To Whom It May Concern:

The El Camino Real Road/Bridge Widening project is required to submit a Water Quality Technical Report (WQTR) in support of the Site Development Permit (SDP). Since the project is also required to process a Storm Water Data Report (SWDR) through Caltrans, the City of San Diego agreed the SWDR could be provided for the SDP submittal in lieu of a separate WQTR. Additional information has been included in the SWDR to meet the requirements of the WQTR.

Please feel free to contact Brendan Hastie or myself if you have any questions and/or concerns at (619) 291-0707.

Sincerely,

RICK ENGINEERING COMPANY

Jayne Janda-Timba
RCE #70649, Exp. 06/13
Associate

JJT:NM:cf:files/text/14752.002

PRELIMINARY STORM WATER DATA REPORT
FOR
EL CAMINO REAL ROAD/BRIDGE WIDENING PROJECT
ON THE
SAN DIEGUITO RIVER

Federal Project Number BHL0-5004 (068)

Job Number 14752-C
June 22, 2012
Revised: August 17, 2012

RICK ENGINEERING COMPANY
ENGINEERING COMPANY
RICK ENGINEERING CO

RICK
ENGINEERING COMPANY

Dist-County-Route: 11 – San Diego – ECR
Post Mile Limits: N/A
Project Type: New Bridge Construction
Project ID (or EA): BHL0-5004 (068)
Program Identification: Highway Bridge Program
Phase: ☒ PID
☐ PA/ED
☐ PS&E

Regional Water Quality Control Board(s): SRWQCB Region 9

Is the Project required to consider Treatment BMPs? Yes ☒ No ☐
If yes, can Treatment BMPs be incorporated into the project? Yes ☒ No ☐
If No, a Technical Data Report must be submitted to the RWQCB at least 30 days prior to the projects RTL date. List RTL Date:

Total Disturbed Soil Area: 12.2 Acres Risk Level: 2
Estimated: Construction Start Date: 10/2014 Construction Completion Date: 1/2017
Notification of Construction (NOC) Date to be submitted: 1/2014

Erosivity Waiver	Yes ☐	Date:	No ☒
Notification of ADL reuse (if Yes, provide date)	Yes ☐	Date:	No ☒
Separate Dewatering Permit (if yes, permit number)	Yes ☐	Permit #	No ☒

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the date upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

Edgar Camerino, Registered Civil Engineer — 08/17/2010 Date

I have reviewed the stormwater quality design issues and find this report to be complete, current and accurate:

[Name), Project Manager — *Date*

[Name), Designated Maintenance Representative — *Date*

[Name), Designated Landscape Architect Representative — *Date*

[Stamp Required for PS&E only) *[Name), District/Regional Design SW Coordinator or Designee* — *Date*

List of Documents and Attachments

Revision Page	First Plan Check Revision Page – dated August 17, 2012
Document 1:	Long Form – Storm Water Data Report
Attachment 1:	Vicinity Map
Attachment 2:	Evaluation Documentation Form
Attachment 3:	Risk Level Determination Documentation
Attachment 4:	Treatment BMP Summary Spreadsheet
Attachment 5:	Storm Water Checklists (SW-1, SW-2, SW-3)
Attachment 6:	Design Pollution Prevention BMPs, Checklist DPP-1
Attachment 7:	Treatment BMPs, Checklist T-1
Attachment 8:	Additional Documents to Address *City of San Diego Storm Water Standards Manual*
Attachment 9:	BMP Maintenance Information
Attachment 10:	Site Map for El Camino Real Bridge Widening Project

PRELIMINARY STORM WATER DATA REPORT
FOR
EL CAMINO REAL ROAD/BRIDGE WIDENING PROJECT
ON THE
SAN DIEGUITO RIVER

REVISION PAGE

August 17, 2012

This Storm Water Data Report presents a revision to the June 22, 2012 report pursuant to the comments provided by RBF. The comments (redlines) found in the report were addressed. Also, additional information regarding the construction methods analysis has been included.

1. Project Description

El Camino Real Bridge Project on San Dieguito River proposes a new bridge construction across San Dieguito River. The new bridge is parallel to the existing El Camino Real Bridge and is situated approximately 100 feet upstream. Proposed El Camino Real bridge will be constructed approximately 2.8 miles west of where the river outlets into the Pacific Ocean.

The project proposes to demolish the existing two-lane El Camino Real Bridge, and construct new four-lane bridge approximately 100 feet upstream. This will involve new road construction and improvements to San Dieguito Road, El Camino Real, and Via de la Valle. The project limits include a 0.5-mile portion of El Camino Real from San Dieguito Road to Via de la Valle, as well as 300 feet western and 800 feet eastern portions of Via de la Valle. Please see the vicinity map located in Attachment 1 for the location of the project site.

The purpose of the project is to replace the bridge across the San Dieguito River between the communities of North City and Rancho Santa Fe.

The area near the existing ECR bridge is severely congested, and the existing bridge has been found to include deficiencies related to structural and hydraulic issues. Therefore, the existing two-lane bridge will be replaced with a four-lane bridge. Included with this bridge replacement is the replacement of approach roadways to the north and south sides of the bridge.

El Camino Real Bridge widening project has several alternatives. All five (5) of them are similar in nature and include one of two basic cross-section designs: a full widened roadway, or a narrow roadway. The different cross sections would provide different features in terms of number of vehicle travel lanes, bicycle lanes, center median and pedestrian walkways. The full widened roadway cross section for El Camino Real would be a total of 104 feet wide, and would include a total of four travel lanes (two in each direction), a 4-foot-wide central median, and a bike lane and a 22-foot-wide parkway with a pedestrian walkway on each side. The El Camino Real narrow roadway cross section would be 60 feet wide, and would include either

four travel lanes (two in each direction) with a 2-foot-wide striped median, or two travel lanes (one in each direction) and bike lanes on each side, with a 14-foot-wide median.

The following provides a description of the various alternatives under consideration for the project.

No Project Alternative

The No Build Alternative would maintain the current two-lane, unimproved design of El Camino Real between Via de la Valle and San Dieguito Road. No additional capacity would be provided for traffic in this road segment. No pedestrian walkways or bicycle lanes would be provided in this road segment. No signals for pedestrian/equestrian crossings at the Horsepark and Polo Club entrance driveways would be provided. This segment of El Camino Real would continue to be subject to periodic flooding. The bridge over the San Dieguito River would not be replaced with a higher structure that is above the 100-year flood level and conforms to current seismic standards. The existing congested traffic conditions, flood risk, and potential for bridge damage during a seismic event would continue. The road configuration would continue to be inconsistent with current approved planning documents for the study area. However, the existing low-level, rural appearance of the road and bridge would not be affected. Also, there would be no potential impacts to wetlands in the drainage ditch parallel to El Camino Real, in the drainage ditch parallel to Via de la Valle, or in the San Dieguito River. The existing driveways and property at Horsepark and Polo Club recreational facilities would not be affected. Other potential adverse effects of the project construction would not occur.

Alternative 1

Central Alignment Alternative: Full widened roadway cross section roughly centered on the existing alignment of El Camino Real to impact neighboring properties on the east and west sides relatively equally. For this alternative, the roadway would be raised above the 100-year flood level on embankment.

Alternative 2

Western Alignment Alternative: Full widened roadway cross section with an alignment shifted west to avoid impacts to the wetlands in the drainage ditch parallel to the eastern edge of El Camino Real. For this alternative, the roadway would be raised above the 100-year flood level on embankment.

Alternative 3

Eastern Alignment Alternative: Full widened roadway cross section with an alignment shifted east to allow independent construction of the new bridge, minimize impacts to developed properties along the western side of El Camino Real (Horsepark and Mary's Tack and Feed), and reduce impacts to wetlands in the drainage ditch parallel to the eastern edge of El Camino Real. The alignment for this alternative would be shifted eastward to where the toe of the new road western embankment would tie in along the existing Polo Club fence. For this alternative, the roadway would be raised above the 100-year flood level on embankment.

Alternative 4

Roundabout Alternative: Full widened roadway cross section with an alignment shifted east similar to the Eastern Alignment Alternative. Roundabouts instead of signalized intersections would be located where El Camino Real meets San Dieguito Road, the Polo Field/Horsepark driveways, and De la Valle Place, and where Via de la Valle meets El Camino Real North. At the intersection of Via de la Valle and El Camino Real North, the project footprint would extend approximately 275 feet northward on El Camino Real North and approximately 500 feet eastward on Via de la Valle to allow appropriate transitions to the existing roadways. At the intersection of El Camino Real and San Dieguito Road, the project footprint would extend 350 feet southward on El Camino Real and 600 feet eastward on San Dieguito Road to allow appropriate transitions to those existing roadways.

Alternative 5

Lower Elevation Alternative: Full widened roadway cross section roughly centered on the existing alignment of El Camino Real to impact neighboring properties on the east and west sides relatively equally. The elevation (profile) of this alternative would be lower than for the other alternatives. For this alternative, the roadway would be raised above the 100-year flood level on embankment.

Including the proposed improvements to the approach roadways on both the north and south sides of the bridge, the project proposes approximately 9.6 acres of new or replaced impervious surfaces. The existing impervious surface for the project is 3.6 acres, and at the completion of project the total impervious area will be 9.6 acres. Thus, a total of 6.0 acres of impervious area will be added as a result of this project.

The project proposes to disturb approximately 12.2 acres of soil. This does not include the areas of approach roadway that are not being removed and replaced, but are rather being simply repaved with the project. These areas are proposed to be ground and overlaid, so they are therefore exempt from the total disturbed area calculation.

This project is currently at a preliminary PID design level, therefore, all requirements for this Storm Water Data Report can not be fully addressed at this time; however, as the project progresses into final design, this report will be revised to address all the requirements. This project is being processed through the California Department of Transportation (CALTRANS) Division of Local Assistance. As a result, even though the bridge itself is not within a CALTRANS right of way, this Storm Water Data Report is being processed through CALTRANS. Because this project is located within the City of San Diego, this report has been prepared to also incorporate the requirements of the January 20, 2012 *City of San Diego Storm Water Standards Manual* and act as a preliminary Water Quality Technical Report for the project.

Additional information regarding the temporary construction impact to the San Dieguito River has also been included in Section 8, to address the CEQA/NEPA requirements.

The Project Site is located within the San Diego MS4 permit area.

2. Site Data and Storm Water Quality Design Issues

- On September 2, 2009, the State Water Resources Control Board (SWRCB) adopted Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) Permit for Storm Water Discharge (SWD) from the State of California Department of Transportation (CALTRANS) properties, facilities and activities. This project will be designed in conformance with the NPDES Permit requirements.

- This project is within the San Diego Regional Water Quality Control Board (Region 9) jurisdiction.

- There are no existing treatment BMPs within the project area.

- It is not anticipated for there to be additional right-of-way costs associated with the proposed BMPs.

- The proposed bridge crosses and discharges to the San Dieguito River (905.11). The San Dieguito River is listed on the 303(d) list of impaired water bodies. The San Dieguito River is listed as having the following pollutants of concern: enterococcus, fecal coliform, nitrogen, phosphorous, total dissolved solids, and toxicity.

- There are no water supply reservoirs or groundwater percolation facilities within the project limits.

- The San Dieguito River does not currently have any TMDLs.

- Based on the Storm Water Requirements Applicability Checklist from the January 20, 2012 *City of San Diego Storm Water Standards Manual*, located in Attachment 8, the project falls under the Priority Development Project Categories of "Water Quality Sensitive Areas," "Street, road, highway, or freeway," and "Significant Redevelopment".

- Based on Table 4-1 from the January 20, 2012 City of San Diego Storm Water Standards Manual (on the following page), the project falls in the general project category of Streets, Highways, and Freeways. As a result, the anticipated pollutants are Sediment, Heavy Metals, Organic Compounds, Trash and Debris, Oil and Grease, Bacteria and Viruses, and Pesticides.

Table 4-1. Anticipated and Potential Pollutants Generated by Land Use Type.

	General Pollutant Categories								
General Project Categories	**Sediments**	**Nutrients**	**Heavy Metals**	**Organic Compounds**	**Trash & Debris**	**Oxygen Demanding Substances**	**Oil & Grease**	**Bacteria & Viruses**	**Pesticides**
Detached Residential Housing Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P(1)	X
Commercial Development	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Industrial Development	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	P(1)
Steep Hillside Developments	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X	X	P(1)
Retail Gasoline Outlets (RGO)			X	X	X	X	X		

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

Source: City of San Diego "Storm Water Standards," dated January 20, 2012.

Table obtained from January 20, 2012 City of San Diego Storm Water Standards Manual to show the potential pollutants for the project per the City of San Diego.

- A 401 Water Quality certification will be required and will be processed with the San Diego Regional Water Quality Control Board during the design process.

- As of the authoring of this report, biological surveys have not been completed to determine whether or not seasonal construction restrictions due to breeding times or other issues will exist. Updates to these findings will be included in the final project Storm Water Data Report (SWDR).

- The climate is semi-arid with an average annual rainfall of approximately 10 inches. The 85th percentile water quality rainfall intensity is 0.2 inches/hour.

- Discharges from the El Camino Real Road/Bridge Widening Project on San Dieguito River will convey water to proposed storm drain systems that discharge directly into the San Dieguito River, and this portion of the San Dieguito River is exempt from Hydromodification Management Requirements. As a result, the project is not required to incorporate to Hydromodification Management into the project design.

- Stormwater runoff from the project site will flow through a post construction stormwater treatment device prior to discharge into the storm drain system or the San Dieguito River.

- As of the authoring of this report, Aerially Deposited Lead (ADL) is listed as a Recognized Environmental Condition in the Administrative Draft Phase I of the Initial Study Assessment (ISA). Future Phase II sampling is suggested.

- As required by the new General Construction Permit, the project risk level has been calculated and has been determined to be Risk Level 2 using the Combined Risk Level Matrix method.

- The project area is currently used as equestrian and recreational land, and the surrounding areas are open space in use. Slope stabilization is not considered to be an issue onsite; however, some slope stabilization will be included along the river.

- The project has been designed in a way so that the post-project drainage patterns will follow the pre-project patterns where feasible, in order to minimize any impact of the project on the downstream drainage system. Based on the proposed design of the project, no significant drainage impacts are anticipated downstream of the project. Onsite erosion is not expected to be an issue with the use of construction BMPs.

- This project is projected to take approximately three (3) years to be constructed, and construction will occur on a year round basis, therefore the project will include construction activities during the rainy season.

- During construction of the project dewatering and equipment operation will take place within the FEMA defined floodplain and floodway for the San Dieguito River in order to assist in construction of the new bridge. The proposed bridge replacement will result in a reduction in water surface elevations in the San Dieguito River compared with the existing bridge. However, during construction, there is a potential for various temporary impacts to water surface elevations. Therefore, the project will assess the potential impacts that may occur from anticipated construction methods (i.e. – berms, trestles, etc. during the course of construction within the river corridor). Refer to Section 8 of this report for more information.

3. Regional Water Quality Control Board Agreements

The preliminary design and environmental process has been ongoing for over a decade. Throughout this time, the project design team has met with several resource agencies, including the San Diego Regional Water Quality Control Board (RWQCB) on numerous occasions. At this time, there is no formal agreement in place, however, a general understanding of the project approach and mitigation areas have been discussed. The project will be required to obtain a 401 Water Quality certification from the Regional Water Quality Control Board. Meetings and

coordination with the Regional Water Quality Control Board during the design process will continue to be documented and the outcome will be reflected the final project SWDR.

4. Proposed Design Pollution Prevention BMPs to be used on the Project

Due to the grading design, the decrease in sediment source area and the implementation of BMPs, the project is not expected to increase sediment loading.

Slope/Surface Protection Systems

Typically, 2:1 (h:v) fill slopes will be associated with the construction of this project. In places where cut slopes are required, they will be no greater than 1.5:1 (h:v). Slope rounding will be utilized to minimize concentrated flows. Disturbed slopes and new slopes will be re-vegetated per the project landscape plans. The vegetated surfaces (landscaping) will consist of native plants, with the recommended seed mixture, mulch, tackifier, and fertilizer being used for the re-vegetation. The plant establishment period is expected to be within the average time for proper plant growth in San Diego. No hard surfaces for typical graded slopes are anticipated to be used within the project limits.

Concentrated Flow Systems

This project proposes to utilize existing concentrated flow systems in the form of storm drains to convey flow to the San Dieguito River. Concentrated conveyance systems will also be utilized at each corner of the proposed bridge to convey runoff from the bridge to the San Dieguito River.

Preservation of Existing Vegetation

The total project site is approximately 17.5 acres. All efforts have been made within reason in the planning process to minimize disturbances to existing slopes, drainage systems, etc. Due to the scale of the proposed project no preservation areas of existing vegetation are expected to be identified on the final project plans.

5. Proposed Permanent BMPs to be used on the Project

The project site is not located in a watershed with prescriptive TMDL treatment BMP requirements in an adopted TMDL implementation plan. In addition, the receiving water (San Dieguito River), however, is on the 303(d) list with several listed pollutants. In an effort to treat for water quality, several bioretention basins are proposed to be used to the maximum extent possible in accordance with Low Impact Design (LID) practices. Bioretention basins will be utilized for treating flow to each of the seven (7) storm drain inlets. However, within the small right of way between the El Camino Real and existing roadway on western side of Via de la Valle, there is insufficient space available on either the northern or southern sides of the street for bioretention basins that meet sizing criteria to treat the entire tributary section of roadway. Therefore, a treatment control BMP, (i.e. structural BMP such as filtration device) will be utilized. The proposed locations of these treatment control BMP are shown on the exhibit titled Site Map for El Camino Real Bridge Project on San Dieguito River located within Attachment 10.

Dry weather flows are not anticipated to be generated by the project, so a connection to the sanitary sewer is not necessary. The project area is not in an area where traction sand is applied.

Treatment BMP Strategy

Between the small footprint filtration devices, and the bioretention basin it is anticipated that 100% of the water quality flow for the project will be treated.

The following post construction treatment devices are proposed for the El Camino Real Bridge Project on San Dieguito River:

Bioretention Basin

Bioretention Basins were selected at seven (7) locations of the project based on the following considerations:

- The bioretention basin will treat for sediments, trash, metals, bacteria, oil and grease, and organics at high efficiency. The bioretention basin will treat for nutrients at medium removal efficiency.

- The bioretention basin provides a higher level of treatment for several pollutants of concern in comparison to alternative treatment control BMP's
- The site was previously mass-graded and the new areas of construction include high level of compaction necessary to support construction of the new roadway and bridge, therefore, infiltration BMPs have not been considered.

The calculations for water quality treatment flow rates are included in Attachment 4, while additional supporting literature and typical details are included in Attachment 9, and the location of each Treatment Control BMP is shown on the exhibit titled "Storm Water Data Report Exhibit for El Camino Real Bridge Project on San Dieguito River," located in Attachment 10.

Media Filters

Media Filters are projected for use in the project in the form of *small footprint filtration devices*. Due to the preliminary nature of this project, a specific device manufacturer has not yet been determined, however a specific manufacturer and device will be included in future revisions of this report associated with the final design of the project.

Because heavy sediment and litter loads are not anticipated, pre treatment is not necessary for these *small footprint filtration devices*. Three devices are proposed at curb inlet locations where adequate footprint is not available for bioretention to be utilized. See the below table for tributary areas and water quality flow rates for each of the inlet locations. Water Quality flow rates are calculated based on an 85th percentile intensity of 0.2 inches per hour and a 95% imperviousness factor for the project area. The calculations for these inlets are located in Attachment 4. Located in Attachment 10 is the Site Map for El Camino Real Bridge Project on the San Dieguito River, which shows the location of each of the proposed and existing inlets.

The following treatment devices are not proposed for the project:

Dry Weather Diversion

Dry Weather Diversion is not incorporated into the project, because dry weather flows are not anticipated to be persistent.

Infiltration Devices

Due to the nature of the soils on the project site and the close proximity to groundwater, the use of infiltration devices is not appropriate within the project limits.

Detention Basins

Due to the location of the project relative to the San Diego watershed, as well as due to the fact that the project replaces an existing roadway, detention basins are not anticipated within the project limits.

Gross Solids Removal Devices (GSRDs)

GSRDs are not incorporated into the project because the receiving waters are not impaired for trash/litter and because trash and debris will be collected within the proposed TC-BMPs.

Traction Sand Traps

Traction sand traps are not incorporated into the project because the project site is not in an area where sand is applied more than twice a year.

Multi-Chambered Treatment Trains (MCTTs)

MCTTs have not been incorporated into the project because the rock-lined bioswale and *small footprint filtration devices* combined have been sized for 100% of the water quality flowrates.

Wet Basins

Wet Basins have not been incorporated into the project because the rock-lined bioswale and *small footprint filtration devices* combined have been sized for 100% of the water quality flowrate.

Hydromodification Management Requirements

Since the project discharges directly to an exempt river (i.e. San Dieguito River), the project is exempt from the Hydromodification Management Plan (HMP) requirements.

6. Proposed Temporary Construction Site BMPs to be used on Project

The EPA has delegated authority to the State of California State Water Resources Control Board (SWRCB) to administer and enforce the Phase II NPDES permit process within the State of California. Therefore, this project is subject to the requirements of the (SWRCB) Order 2009-0009-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity.

A Storm Water Pollution Prevention Plan (SWPPP) will be prepared for the project in accordance with the Permit. The SWPPP will be implemented concurrently with the commencement of soil-disturbing activities associated with construction. The requirements of the General Permit are intended to be implemented on a year-round basis. A Notice of Intent (NOI) will be filed with the State Water Resources Control Board (SWRCB) and the Waste Discharge Identification (WDID) Number will be obtained.

BMPs implemented during the construction of the project will include erosion control, sediment control, tracking control, wind erosion control, non-storm water management pollution control, waste management, and materials pollution control BMPs. BMPs utilized for construction work occurring within the river will likely include temporary construction berms, in-stream silt curtains, and cofferdams and pumps to dewater soils. The BMPs utilized for upland construction zones will most likely include debris-catching basins, silt fencing, straw wattles, gravel bags, storm drain inlet protection, stabilized construction entrances, and similar other measures. These BMPs will be documented in the SWPPP, identified on the SWPPP Wall Map, and implemented at the job site.

Below is a list of proposed construction BMPs:

- BMPs for physical and vegetation stabilization such as: geotextiles, mats, fiber blankets, hydraulic mulch, Bonded Fiber Matrix, and sprayed-on binders.
- BMPs for sediment control such as: silt fencing, gravel bag barriers, and fiber rolls.
- BMPs for prevention of off-site sediment tracking such as: stabilized construction entrances/exits, corrugated steel panels, and dust control.
- BMPs for materials management such as: protecting stockpiles from wind and rain, covering and/or providing secondary containment of storage areas, and specifying precautions for material handling.

The selection of specific construction BMPs will occur at Project Approval (PA/ED) and Plan Specifications & Estimate (PS&E) phases of the project, along with the identification of separate bid line and lump sum items. Concurrence from the District Construction Storm Water Coordinators will be handled in the future phases as well.

7. Maintenance BMPs (Drain Inlet Stenciling)

Drain Inlet Stenciling will be provided at the proposed drainage inlets within the project limits.

8. San Dieguito River Impacts

In the post project condition, the El Camino Real Bridge has been designed to keep hydraulic impacts to the San Dieguito River to a minimum. The bridge has been designed so there will be no rise in water surface elevation during major storm events upstream of the bridge when compared to the existing bridge structure. The report titled "Hydraulic Study for El Camino Real Bridge Project on the San Dieguito River" (Rick Engineering Company Job Number 14752-B) presents the hydraulic analyses for the San Dieguito River. The report shows no rise in water surface elevations in the San Dieguito River.

A separate analysis will be prepared to assess temporary impacts to the water surface elevations resulting from construction access and equipment during the construction phase of the project. For details specific to the construction methods analysis, refer to the report titled "El Camino

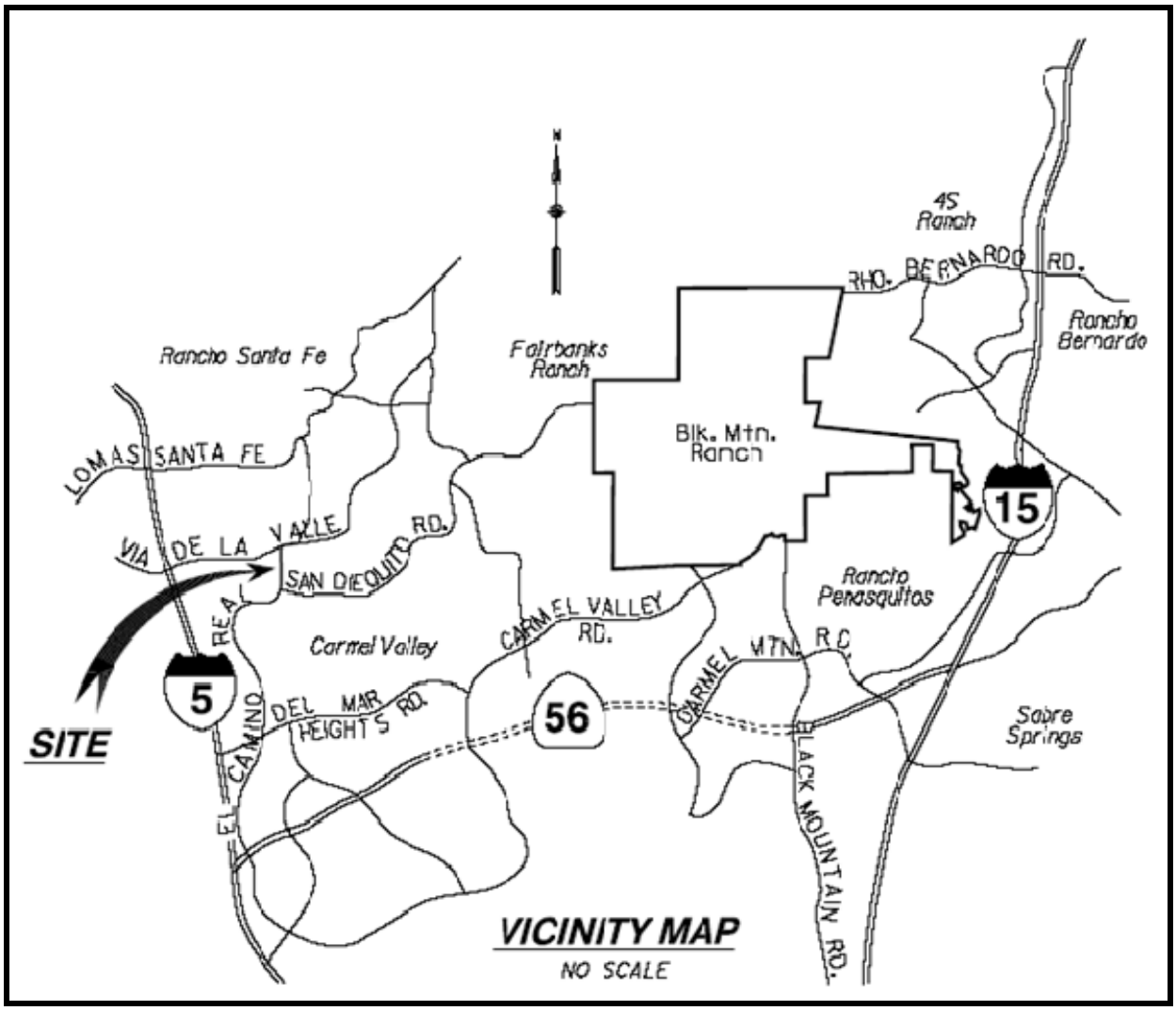
Real Road/Bridge Widening Bridge Construction Methodology & Associated Noise Reduction Measures, and Biological & Hydraulic Impacts," prepared by Rick Engineering Company, TY LIN International, and Nordby Biological Consulting, dated July 18, 2012 (and revisions thereafter).

In summary, key hydraulic considerations during construction are summarized below:

- Elevation of temporary berm or trestle in order to provide access for construction personnel and equipment
- Low-flow opening(s) sized for daily flows and up to a specific storm event (i.e. – 1-inch storm or 2-year storm event)
- Minimize increase to water surface elevations for larger storm events (i.e. – 10-year, 50-year, 100-year)
- Removal of equipment from the channel with the prediction of storm events larger than those capable of bypassing through the low flow opening(s), including a factor of safety.

Attachment 1:

Vicinity Map


4S Ranch
RHO. BERNARDO RD.
Rancho Bernardo
Rancho Santa Fe
Fairbanks Ranch
Blk. Mtn. Ranch
LOMAS SANTA FE
15
VIA DE LA VALLE
SAN DIEQUITO RD.
REA
Rancho Penasquitos
CARMEL VALLEY RD.
Carmel Valley
CARMEL MTN. RD.
5
DEL MAR HEIGHTS RD.
56
Sabre Springs
SITE
EL CAMINO
BLACK MOUNTAIN RD.
VICINITY MAP
NO SCALE

Attachment 2:

Evaluation Documentation Form

DATE: 06/22/2012

Project ID (or EA): BHL0-5004 (068)

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION FOR EVALUATION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	✓		See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs. Go to 2
2.	Is this an emergency project?		✓	If **Yes**, go to 10. If **No**, continue to 3.
3.	Have TMDLs or other Pollution Control Requirements been established for surface waters within the project limits? Information provided in the water quality assessment or equivalent document.		✓	If **Yes**, contact the District/Regional NPDES Coordinator to discuss the Department's obligations under the TMDL (if Applicable) or Pollution Control Requirements, go to 9 or 4. _____ *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project located within an area of a local MS4 Permittee?	✓		If Yes. *San Diego*, go to 5. If No, document in SWDR go to 5.
5.	Is the project directly or indirectly discharging to surface waters?	✓		If **Yes**, continue to 6. If **No**, go to 10.
6.	Is it a new facility or major reconstruction?	✓		If **Yes**, continue to 8. If **No**, go to 7.
7.	Will there be a change in line/grade or hydraulic capacity?	✓		If **Yes**, continue to 8. If **No**, go to 10.
8.	Does the project result in a net increase of one acre or more of new impervious surface?	✓		If **Yes**, continue to 9. If **No**, go to 10. _____ *(Net Increase New Impervious Surface)*
9.	Project is required to consider approved Treatment BMPs.	✓	See Sections 2.4 and either Section 5.5or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
10.	Project is not required to consider Treatment BMPs. _____*(Dist./Reg. Design SW Coord. Initials)* _____*(Project Engineer Initials)* _____ *(Date)*		Document for Project Files by completing this form, and attaching it to the SWDR.	

1 ***See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs***

DATE: 06/22/2012

Project ID (or EA): BHL0-5004 (068)

Project Evaluation Process for the Consideration of Construction Site BMPs

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION
1.	Will construction of the project result in areas of disturbed soil as defined by the Project Planning and Design Guide (PPDG)?	✓		If Yes, Construction Site BMPs for Soil Stabilization (SS) will be required. Complete CS-1, Part 1. Continue to 2. If No, Continue to 3.
2.	Is there a potential for disturbed soil areas within the project to discharge to storm drain inlets, drainage ditches, areas outside the right-of-way, etc?	✓		If Yes, Construction Site BMPs for Sediment Control (SC) will be required. Complete CS-1, Part 2. Continue to 3.
3.	Is there a potential for sediment or construction related materials and wastes to be tracked offsite and deposited on private or public paved roads by construction vehicles and equipment?	✓		If Yes, Construction Site BMPs for Tracking Control (TC) will be required. Complete CS-1, Part 3. Continue to 4.
4.	Is there a potential for wind to transport soil and dust offsite during the period of construction?	✓		If Yes, Construction Site BMPs for Wind Erosion Control (WE) will be required. Complete CS-1, Part 4. Continue to 5.
5.	Is dewatering anticipated or will construction activities occur within or adjacent to a live channel or stream?	✓		If Yes, Construction Site BMPs for Non-Storm Water Management (NS) will be required. Complete CS-1, Part 5. Continue to 6.
6.	Will construction include saw-cutting, grinding, drilling, concrete or mortar mixing, hydro-demolition, blasting, sandblasting, painting, paving, or other activities that produce residues?	✓		If Yes, Construction Site BMPs for Non-Storm Water Management (NS) will be required. Complete CS-1, Parts 5 & 6. Continue to 7.
7.	Are stockpiles of soil, construction related materials, and/or wastes anticipated?	✓		If Yes, Construction Site BMPs for Waste Management and Materials Pollution Control (WM) will be required. Complete CS-1, Part 6. Continue to 8.
8.	Is there a potential for construction related materials and wastes to have direct contact with precipitation; stormwater run-on, or stormwater runoff; be dispersed by wind; be dumped and/or spilled into storm drain systems?	✓		If Yes, Construction Site BMPs for Waste Management and Materials Pollution Control (WM) will be required. Complete CS-1, Part 6. Continue to 9.
9.	End of checklist.	✓	Document for Project Files by completing this form, and attaching it to the SWDR.	

PE to initialize after concurrence with Construction (PS&E only) *Date*

Attachment 3:

Risk Level Determination Documentation

RISK DETERMINATION ANALYSIS FOR EL CAMINO REAL BETWEEN SAN DIEGUITO ROAD AND VIA DE LA VALLE
RICK ENGINEERING COMPANY JOB NUMBER 14752-C
June 22, 2012

A Risk Determination Analysis is a process to assess the risk level of a project based on both sediment risk and receiving water risk during periods of land disturbance and exposure. The Risk Determination Analysis was conducted to determine the project's Risk Level (1, 2 or 3). A Risk Level is established by determining two factors: first, calculating the project's sediment risk; and second, receiving water risk during periods of soil exposure (i.e. grading and site stabilization). Both factors are used to determine the project's specific Risk Level.

The Risk Determination Analysis was conducted in accordance with the procedures outlined in Appendix 1 Risk Determination Worksheet of the 2009-0009-DWQ Construction General Permit (CGP). It should be noted that the State Water Resources Control Board (SWRCB) has not yet made the GIS data used to obtain the LS factor available to the public. Therefore, the LS factor is obtained from the Storm Water Multiple Applications and Report Tracking System (SMARTS) populate method.

The latitude and longitude for the project is 32.97807° and -117.23043°.

I. The following was performed to obtain the <u>SEDIMENT RISK</u>:

1. Determine the R Factor:

   The construction commencement and completion dates were provided by the Legally Responsible Person (LRP) to Rick Engineering Company. These dates include the following:

   Construction Commencement Date: October 1, 2014
   Construction Completion Date: January 31, 2017

   The R-factor was determined to be **66.39.** Please refer to Attachment 1 for supporting documentation.

2. Determine the K Factor:

   Obtain the K Factor from the GIS Map on the State Water Resources Control Board's website on April 3, 2012:

   ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/

   Based on the GIS Map, the project's K factor is estimated to be **0.43**. Please refer to Attachment 2 for supporting documentation.

3. Determine the LS Factor:

   Obtain the LS factor from the same GIS Map on the State Water Resources Control Board's website:

   Based on the alternate manual method calculations, the project's LS factor is **2.9**.
   Please refer to Attachment 2 for supporting documentation.

4. Calculate the Watershed Erosion Estimate:

   The Watershed Erosion Estimate (R*K*LS) was determined to be **82.79 tons/acre**. Please refer to Attachment 2 for supporting documentation.

5. Obtain the Site Sediment Risk Factor:

	Watershed Erosion Estimate
Low Sediment Risk:	< 15 tons/acre
Medium Sediment Risk:	>= 15 and <75 tons/acre
High Sediment Risk:	>= 75 tons/acre

   The Site Sediment Risk Factor is estimated to be **"Low"**.

II. The following was performed to obtain the <u>RECEIVING WATER RISK</u>:

The proposed project is located in the following hydrologic basin planning area:
Hydrologic Unit: San Dieguito (905)
Hydrologic Area: Solana Beach (.1)
Hydrologic Subarea: Rancho Santa Fe (.11)

In this specific subarea, the receiving water that is currently listed as impaired based on California's List of Polluted Waters [California's 2008-2010 Section 303(d) List], a component of the California's 2010 Integrated Report [Clean Water Act Section 303(d) List and 305(b) Report], approved by the USEPA on October 11, 2011, is the San Dieguito River. The pollutants/stressors causing impairment do not include sedimentation/siltation.

The Receiving Water Risk Factor Worksheet requires the following information to determine if the project is a "Low" or "High" risk to the receiving water:

1. Does the disturbed area discharge (either directly or indirectly) to a 303(d)-listed waterbody impaired by sediment? or Is the disturbed area located within a sub-watershed draining to a 303(d) listed waterbody impaired by sediment?

Based on a review of the 2010 Clean Water Act Section 303(d) List, the project **does not** discharge directly or indirectly into a waterbody impaired by sediment and the project **is not** located within a sub-watershed draining to a 303(d) listed waterbody impaired by sediment.

2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY?

Based on a review of the "California Regional Water Quality Control Board San Diego Region, Water Quality Control Plan for the San Diego Basin (9)" (Basin Plan), the project **does not** discharge to a receiving water with designated beneficial uses of SPAWN & COLD & MIGRATORY.

The Receiving Water Risk Factor is estimated to be **"Low"**. Please refer to Attachment 3 for supporting documentation.

III. Conclusion

Project Sediment Risk:	**High**
Project Receiving Water Risk:	**Low**
Project Combined Risk:	**Level 2**

The project's Sediment Risk is "High" and the project's Receiving Water Risk is "Low".

The project's combined risk is a **RISK LEVEL 2**.

Rick Engineering Company certifies (as the term is defined by California Business and Professions Code Section 6735.5) that the information and any design within this Risk Determination meet the requirements of the California Construction General Permit (CGP) 2009-0009-DWQ.

Kelly Doyle
QSD #33 CPESC #4120
Environmental Project Manager

Attachments:
Attachment 1: Latitude/Longitude Map and R-value Calculations
Attachment 2: Sediment Risk Supporting Documentation
Attachment 3: Receiving Water Risk Supporting Documentation

KD:cf:k/files/text.001

Attachment 1
Latitude/Longitude Map and R-value Calculations

Figure 1. Erosivity Index Zone Map

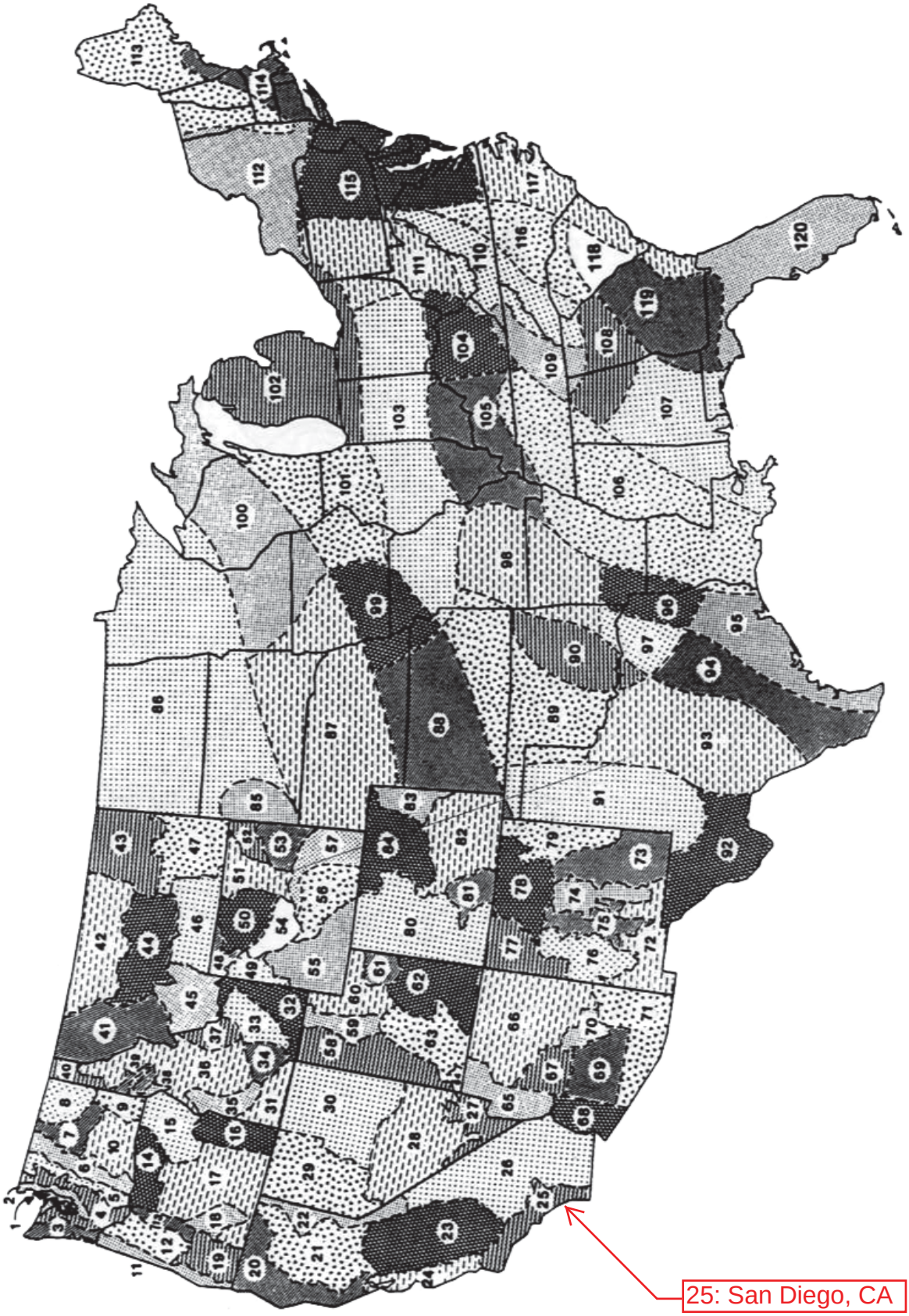
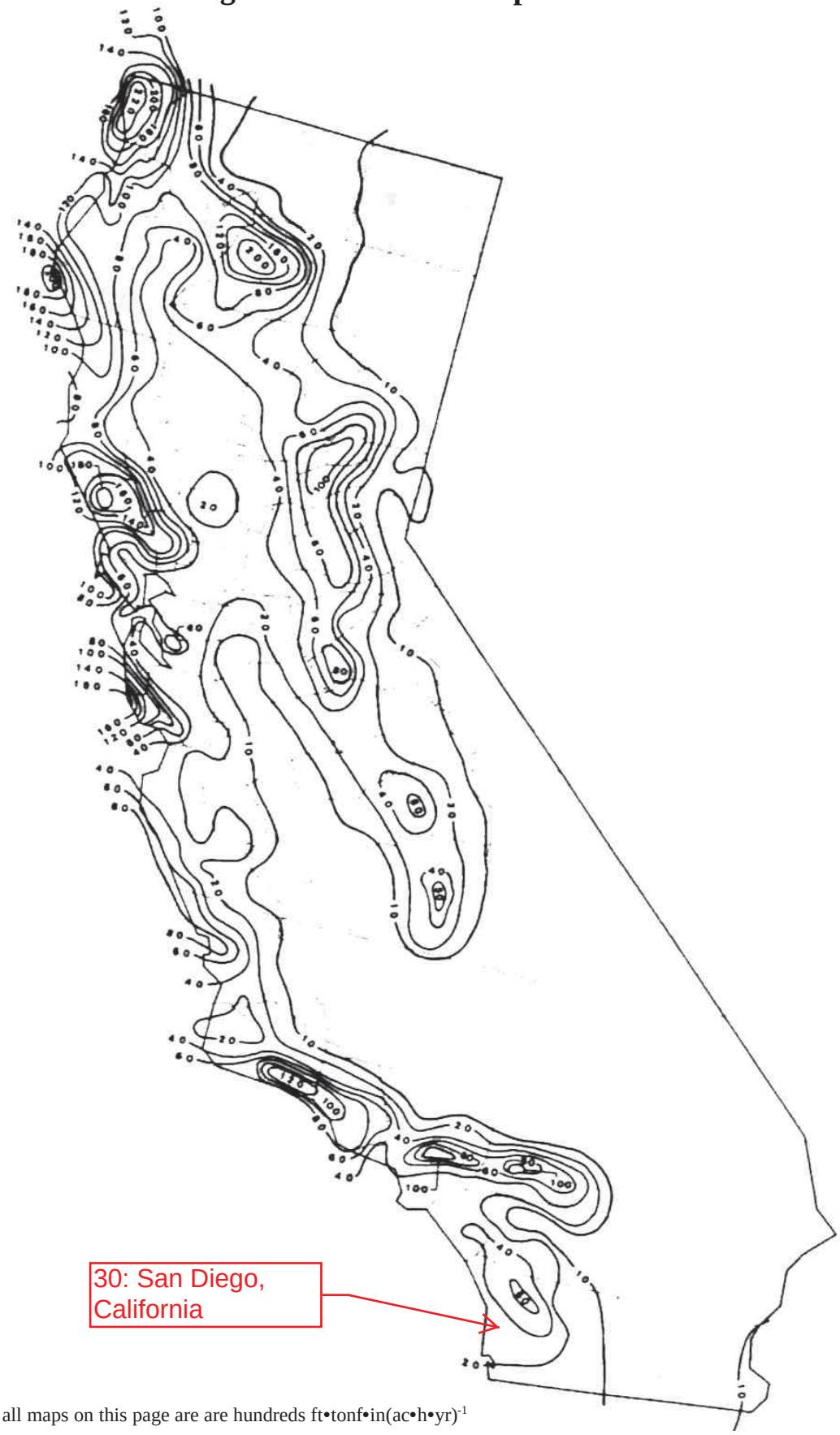


Figure 4. Isoerodent Map of California



Note: Units for all maps on this page are are hundreds ft•tonf•in(ac•h•yr)$^{-1}$

Table 1. Erosivity Index Table

EI as a percentage of Average Annual R Value Computed for Geographic Areas Shown in Figure 1

	Jan	Jan	Feb	Feb	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sep	Sep	Oct	Oct	Nov	Nov	Dec	Dec
EI#	1-15	16-31	1-15	16-29	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31	1-15	16-31
1	0.0	4.3	8.3	12.8	17.3	21.6	25.1	28.0	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53.0	56.0	60.8	66.8	71.0	75.7	82.0	89.1	95.2
2	0.0	4.3	8.3	12.8	17.3	21.6	25.1	28.0	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53.0	56.0	60.8	66.8	71.0	75.7	82.0	89.1	95.2
3	0.0	7.4	13.8	20.9	26.5	31.8	35.3	38.5	40.2	41.6	42.5	43.6	44.5	45.1	45.7	46.4	47.7	49.4	52.8	57.0	64.5	73.1	83.3	92.3
4	0.0	3.9	7.9	12.6	17.4	21.6	25.2	28.7	31.9	35.1	38.2	42.0	44.9	46.7	48.2	50.1	53.1	56.6	62.2	67.9	75.2	83.5	90.5	96.0
5	0.0	2.3	3.6	4.7	6.0	7.7	10.7	13.9	17.8	21.2	24.5	28.1	31.1	33.1	35.3	38.2	43.2	48.7	57.3	67.8	77.9	86.0	91.3	96.9
6	0.0	0.0	0.0	0.5	2.0	4.1	8.1	12.6	17.6	21.6	25.5	29.6	34.5	40.0	45.7	50.7	55.6	60.2	66.5	75.5	85.6	95.9	99.5	99.9
7	0.0	0.0	0.0	0.0	0.0	1.2	4.9	8.5	13.9	19.0	26.1	35.4	43.9	48.8	53.9	64.5	73.4	77.5	80.4	84.8	89.9	96.6	99.2	99.7
8	0.0	0.0	0.0	0.0	0.0	0.9	3.6	7.8	15.0	20.2	27.4	38.1	49.8	57.9	65.0	75.6	82.7	86.8	89.4	93.4	96.3	99.1	100.0	100.0
9	0.0	0.8	3.1	4.7	7.4	11.7	17.8	22.5	27.0	31.4	36.0	41.6	46.4	50.1	53.4	57.4	61.7	64.9	69.7	79.0	89.6	97.4	100.0	100.0
10	0.0	0.3	0.5	0.9	2.0	4.3	9.2	13.1	18.0	22.7	29.2	39.5	46.3	48.8	51.1	57.2	64.4	67.7	71.1	77.2	85.1	92.5	96.5	99.0
11	0.0	5.4	11.3	18.8	26.3	33.2	37.4	40.7	42.5	44.3	45.4	46.5	47.1	47.4	47.8	48.3	49.4	50.7	53.6	57.5	65.5	76.2	87.4	94.8
12	0.0	3.5	7.8	14.0	21.1	27.4	31.5	35.0	37.3	39.8	41.9	44.3	45.6	46.3	46.8	47.9	50.0	52.9	57.9	62.3	69.3	81.3	91.5	96.7
13	0.0	0.0	0.0	1.8	7.2	11.9	16.7	19.7	24.0	31.2	42.4	55.0	60.0	60.8	61.2	62.6	65.3	67.6	71.6	76.1	83.1	93.3	98.2	99.6
14	0.0	0.7	1.8	3.3	6.9	16.5	26.6	29.9	32.0	35.4	40.2	45.1	51.9	61.1	67.5	70.7	72.8	75.4	78.6	81.9	86.4	93.6	97.7	99.3
15	0.0	0.0	0.0	0.5	2.0	4.4	8.7	12.0	16.6	21.4	29.7	44.5	56.0	60.8	63.9	69.1	74.5	79.1	83.1	87.0	90.9	96.6	99.1	99.8
16	0.0	0.0	0.0	0.5	2.0	5.5	12.3	16.2	20.9	26.4	35.2	48.1	58.1	63.1	66.5	71.9	77.0	81.6	85.1	88.4	91.5	96.3	98.7	99.6
17	0.0	0.0	0.0	0.7	2.8	6.1	10.7	12.9	16.1	21.9	32.8	45.9	55.5	60.3	64.0	71.2	77.2	80.3	83.1	87.7	92.6	97.2	99.1	99.8
18	0.0	0.0	0.0	0.6	2.5	6.2	12.4	16.4	20.2	23.9	29.3	37.7	45.6	49.8	53.3	58.4	64.3	69.0	75.0	86.6	93.9	96.6	98.0	100.0
19	0.0	1.0	2.6	7.4	16.4	23.5	28.0	31.0	33.5	37.0	41.7	48.1	51.1	52.0	52.5	53.6	55.7	57.6	61.1	65.8	74.7	88.0	95.8	98.7
20	0.0	9.8	18.5	25.4	30.2	35.6	38.9	41.5	42.9	44.0	45.2	48.2	50.8	51.7	52.5	54.6	57.4	58.5	60.1	63.2	69.6	76.7	85.4	92.4
21	0.0	7.5	13.6	18.1	21.1	24.4	27.0	29.4	31.7	34.6	37.3	39.6	41.6	43.4	45.4	48.1	51.3	53.3	56.6	62.4	72.4	81.3	88.9	94.7
22	0.0	1.2	1.6	1.6	1.6	1.6	1.6	2.2	3.9	4.6	6.4	14.2	32.8	47.2	58.8	69.1	76.0	82.0	87.1	96.7	99.9	99.9	99.9	99.9
23	0.0	7.9	15.0	20.9	25.7	31.1	35.7	40.2	43.2	46.2	47.7	48.8	49.4	49.9	50.7	51.8	54.1	57.7	62.8	65.9	70.1	77.3	86.8	93.5
24	0.0	12.2	23.6	33.0	39.7	47.1	51.7	55.9	57.7	58.6	58.9	59.1	59.1	59.2	59.2	59.3	59.5	60.0	[illegible]	63.0	66.5	71.8	81.3	[illegible]
25	0.0	9.8	20.8	30.2	37.6	45.8	50.6	54.4	56.0	56.8	57.1	57.1	57.2	57.6	58.5	59.8	62.2	65.3	67.5	68.2	69.4	74.8	86.6	93.0
26	0.0	2.0	5.4	9.8	15.6	21.5	24.7	26.6	27.4	28.0	28.7	29.8	32.5	36.6	44.9	55.4	65.7	72.6	77.8	84.4	89.5	93.9	96.5	98.4
27	0.0	0.0	0.0	1.0	4.0	5.9	8.0	11.1	13.0	14.0	14.6	15.3	17.0	23.2	39.1	60.0	76.3	86.1	89.7	90.4	90.9	93.1	96.6	99.1
28	0.0	0.0	0.0	0.0	0.2	0.5	1.5	3.3	7.2	11.9	17.7	21.4	27.0	37.1	51.4	62.3	70.6	78.8	84.6	90.6	94.4	97.9	99.3	100.0
29	0.0	0.6	0.7	0.7	0.7	1.5	3.9	6.0	10.5	17.9	28.8	36.6	43.8	51.5	59.3	68.0	74.8	80.3	84.3	88.8	92.7	98.0	99.8	99.9
30	0.0	0.0	0.0	0.0	0.0	0.2	0.8	2.8	7.9	14.2	24.7	35.6	45.4	52.2	58.7	68.5	77.6	84.5	88.9	93.7	96.2	97.6	98.3	99.6

Risk Determination R-factor Analysis for El Camino Real Bridge
Rick Engineering Company Job Number 14752-C

El Camino Real between San Dieguito Road and Via De La Valle
San Diego, California 92014

Manual R factor Calculation due to continued maintenance on the Environmental Protection Agency's (EPA) Rainfall Erosivity Factor Calculator.

Construction Start Date: October 1, 2014
Construction End Date: January 31, 2017

Figure 1- Erosivity Index Zone Map:
The EI distribution zone for San Diego, California is 25.

Table 1- Erosivity Index Table:
The EI percentage from October 1 through December 31 is 25.5%. The EI percentage from January 1 through December 31 is 93.0%. The EI percentage from January 1 through January 31 is 9.8%.

Figure 4-Isoerodent Map of California:
Interpolated annual erosion index for San Diego, California is 30.

R factor for the first year of construction (October 1, 2014 – December 31, 2014): 30 x (25.5%)= 7.65
R factor for the second year (2015) of construction: 30 x (93.0%)= 27.9
R factor for the third year (2016) of construction: 30 x (93.0%)= 27.9
R factor for the fourth year (January 1, 2017 – January 31, 2017)) of construction: 30 x (9.8%)= 2.94

R factor for complete project duration (28 months): 7.65+27.9+27.9+2.94= 66.39

Office of Governor
Jerry Brown
Visit his Website

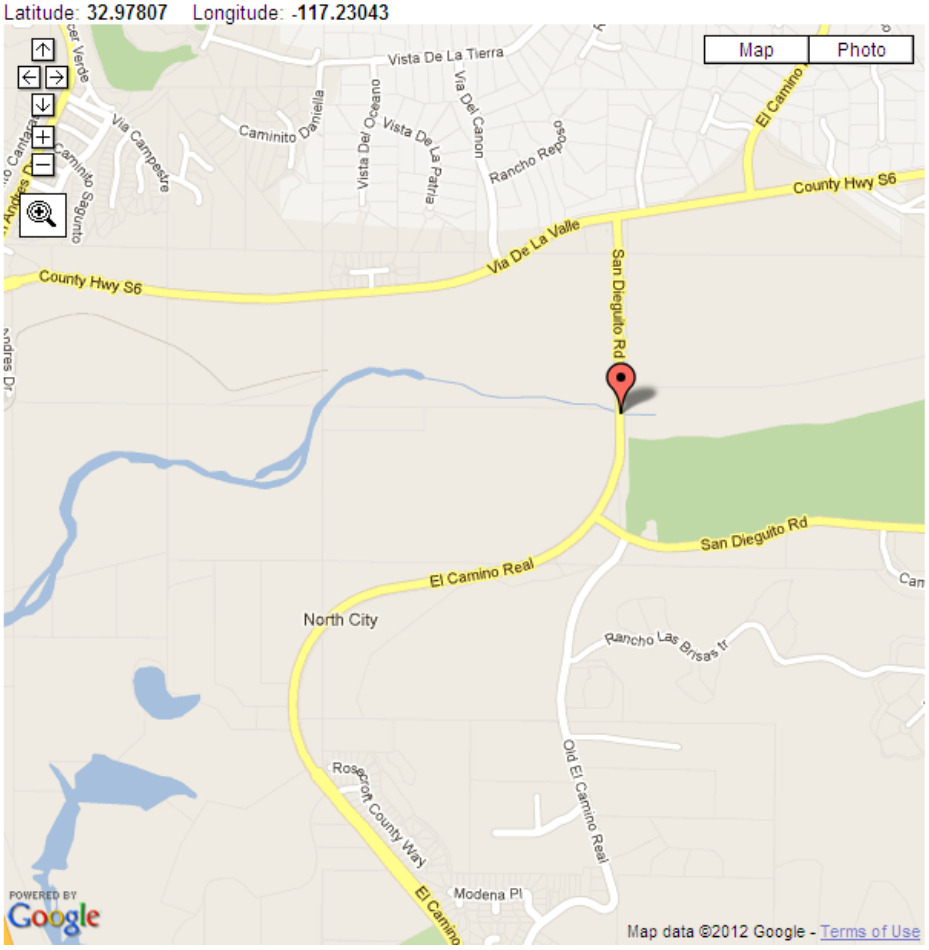
Latitude/Longitude Tool

All coordinates are referenced to the North American Datum of 1983.

Zoom the map or enter a street address (*Example: 123 Main St., Sacramento, CA*):

san dieguito road, san diego, CA [Go!]

You clicked on:
Latitude: **32.97807** Longitude: **-117.23043**



Attachment 2
Sediment Risk Supporting Documentation

Water Boards Storm Water Multiple Application & Report Tracking System 2

Help Logout

You are logged-in as: **Kelly Doyle - Doyle** .
If this account does not belong to you, please log out.

Navigate To:

NOTICE OF INTENT - Risk

The Notice of Intent (NOI) is organized into different sections. Please complete all applicable sections before submitting the form. If you want to complete the NOI at a later time, please click on "Save & Exit".

WDID:		**Owner:**	Doyle	**Status of document:**	Not Submitted	**Processed Date:**	
			5620 Friars Road San Diego CA 92109	**Certified Date:**		**NOT Effective Date:**	
Business Type:	Construction	**Site:**	El Camino Real Bridge El Camino Real San Diego CA 92014				

Owner Info | Developer Info | Site Info | Addtnl Site Info | Risk | Billing Info | Attachments | Certification | Print | Status History | NOTs | COIs

SEDIMENT RISK FACTOR WORKSHEET **Instructions: Enter R,K and LS factor values.System will calculate watershed erosion estimates and site sediment risk factor** **A. Sediment Risk**	
A) R Factor Value: (What's this?)	66.39 * Instructions to Calculate the R-factor
B) K Factor Value (weighted average, by area, for all site soils) (What's this?) ***If not using the SWRCB map(Populate K Factor) upload your analysis on the Attachment Tab prior to submitting to the SWRCB.	0.43 * Populate K Factor
C) LS Factor (weighted average, by area, for all slopes) (What's this?) ***If not using the SWRCB map(Populate LS Factor) upload your analysis on the Attachment Tab prior to submitting to the SWRCB.	2.9 * Populate LS Factor
Watershed Erosion Estimate (=R*K*LS) in tons/acre	82.79
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >/= 15 and <75 tons/acre High Sediment Risk: >/= 75 tons/acre	High

RECEIVING WATER (RW) RISK FACTOR WORKSHEET

A. Watershed Characteristics

A.1.(a) Does the disturbed area discharge directly or indirectly to a 303(d) listed waterbody impaired by sediment? OR A.1.(b) Is the disturbed area located within a sub-watershed draining to a 303(d) listed waterbody impaired by sediment? OR A.2. Is the disturbed area located within a planning watershed draining to a waterbody with designated beneficial uses of COLD, SPAWN AND MIGRATORY?	Populate Receiving Water Risk No * Yes = High, No = Low Statewide Map of High Receiving Water Risk Watersheds	Low

C. Combined Risk Level Matrix

		Sediment Risk		
		Low	Medium	High
Receiving Water Risk	Low	Level1	Level2	
	High		Level2	Level3

Project Sediment Risk: High

Project Receiving Water Risk: Low

Project Combined Risk: Level2

Save & Exit | Save & Continue

Fields marked with * are mandatory fields.

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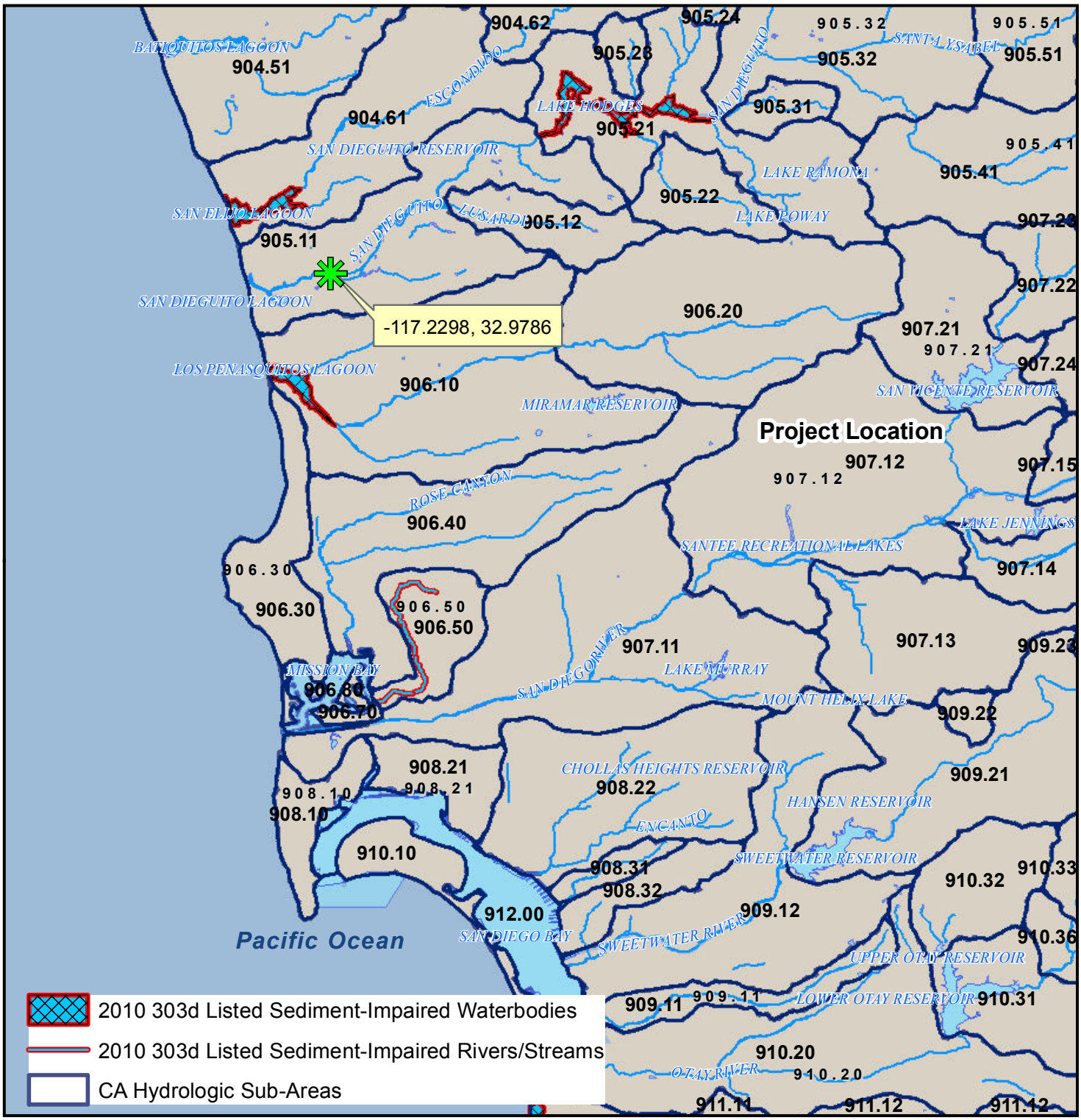
Attachment 3
Receiving Water Risk Supporting Documentation



N
W E
S

1 Inch = 25,000 feet

Receiving Water Risk

El Camino Real Road Widening

RICK ENGINEERING COMPANY

J-14752 C
June 22, 2012

J:\15237C\Hydro\SWPPP\AppendixIV\RiskDetermination\AppendixIII

Data Sources:
California Interagency Watershed Mapping Committee - 2004
State Water Resources Control Board - November 2011

Table 2-2. BENEFICIAL USES OF INLAND SURFACE WATERS

Inland Surface Waters [1, 2]	Hydrologic Unit Basin Number	BENEFICIAL USE														
		MUN	AGR	IND	PROC	GWR	FRSH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
San Dieguito River Watershed - continued																
San Dieguito Reservoir	5.21	See Reservoirs & Lakes – Table 2-4														
Warren Canyon	5.21	●	●	●	●				●	●	●	●	●	●		
San Bernardo Valley	5.21	●	●	●	●				●	●		●		●	●	
unnamed intermittent streams	5.24	●	●	●	●				●	●		●		●		
unnamed intermittent streams	5.23	●	●	●	●				●	●		●		●		
unnamed intermittent streams	5.22	●	●	●	●				●	●		●		●		
San Dieguito River	5.11	+	○	○					●	●		●	●	●		●
Lusardi Creek	5.12	+	○	○					●	●		●		●		
Lusardi Creek	5.11	+	○	○					●	●		●		●		
La Zanja Canyon	5.11	+	○	○					●	●		●		●		
Gonzales Canyon	5.11	+	○	○					●	●		●		●		
San Dieguito Lagoon	5.11	See Coastal Waters – Table 2-3														
Los Penasquitos Creek Watershed																
Los Penasquitos Lagoon	6.10	See Coastal Waters – Table 2-3														
Soledad Canyon	6.10	+	●	●					○	●		●	●	●		
Carol Canyon	6.10	+	●	●					○	●		●	●	●	●	

● Existing Beneficial Use

○ Potential Beneficial Use

+ Excepted from MUN (See Text)

[1] Waterbodies are listed multiple times if they cross hydrologic area or sub area boundaries.

[2] Beneficial use designations apply to all tributaries to the indicated waterbody, if not listed separately.

Attachment 4:

Treatment BMP Summary Spreadsheet

Street 4 % LID Sizing Calculations for ECR Bridge Widening NEPA

DMA Name	DMA (ft^2)	Surface Type	Runoff Factor	Area x Runoff Factor (ft^2)	Sum (ft^2)	Sizing Factor	Minimum Size (ft^2)	Size Planned (ft^2)
BMP-1	31866	Paved	1.0	31866	32988	0.04	1320	1320
	11221	Landscaped	0.1	1122				
BMP-2	30751	Paved	1.0	30751	31807	0.04	1272	1272
	10558	Landscaped	0.1	1056				
BMP-3	51332	Paved	1.0	51332	52964	0.04	2119	2119
	16321	Landscaped	0.1	1632				
BMP-4	51367	Paved	1.0	51367	52997	0.04	2120	2120
	16297	Landscaped	0.1	1630				
BMP-5	15787	Paved	1.0	15787	16430	0.04	657	657
	6428	Landscaped	0.1	643				
BMP-6	15402	Paved	1.0	15402	16010	0.04	640	640
	6079	Landscaped	0.1	608				
BMP-7	10319	Paved	1.0	10319	10319	0.04	413	N/A[1]
	0	Landscaped	0.1	0				
BMP-8	13902	Paved	1.0	13902	13995	0.04	560	N/A[1]
	932	Landscaped	0.1	93				
BMP-9	47174	Paved	1.0	47174	47174	0.04	1887	N/A[1]
	0	Landscaped	0.1	0				
BMP-10	45286	Paved	1.0	45286	46278	0.04	1851	1851
	9915	Landscaped	0.1	992				

1- Locations of BMP-7, 8, and 9 are too restrictive to utilize bioretention; therefore, filtration BMPs are proposed. Refer to separate calculations.

Water Quality Flow Rate Calculations for ECR Bridge Widening NEPA

Inlet	Area (sft)	Area (acres)	C	Water Quality Intensity(in/hr)	Water Quality Flow Rate (cfs)	100-Year Intensity (in/hr)	100-Year Flow Rate (cfs)
BMP-7	10319	0.2	0.95	0.2	0.05	4.4	1.0
BMP-8	13902	0.3	0.95	0.2	0.06	4.4	1.3
BMP-9	47174	1.1	0.95	0.2	0.21	4.4	4.5

Attachment 5:

Strom Water Checklist (SW-1, SW-2, SW-3)

Checklist SW-1, Site Data Sources

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

Information for the following data categories should be obtained, reviewed and referenced as necessary throughout the project planning phase. Collect any available documents pertaining to the category and list them and reference your data source. For specific examples of documents within these categories, refer to Section 5.5 of this document. Example categories have been listed below; add additional categories, as needed. Summarize pertinent information in Section 2 of the SWDR.

DATA CATEGORY/SOURCES	Date
Topographic	
• 2' Contour Topo, Vertical Datum NGVD29	04/08/2002
•	
•	
Hydraulic	
• Hydraulic Study for El Camino Real Bridge Project on the San Dieguito River; Rick Engineering	04/12/2012
•	
•	
Soils	
• Final Geotechnical Report El Camino Real Roadway Widening; Ninyo & Moore	01/2006
•	
•	
Climatic	
• Local Area Climate Data in San Diego County (RWQCB)	
•	
•	
Water Quality	
• City of San Diego Storm Water Standards Manual	1/14/2011
• Caltrans Storm Water Quality Handbook, Project Planning and Design Guide (PPDG)	07/2010
•	
Other Data Categories	
•	
•	
•	

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

The following questions provide a guide to collecting critical information relevant to project stormwater quality issues. Complete responses to applicable questions, consulting other Caltrans functional units (Environmental, Landscape Architecture, Maintenance, etc.) and the District/Regional Storm Water Coordinator as necessary. Summarize pertinent responses in Section 2 of the SWDR.

1.	Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	☒Complete	☐NA
2.	For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	☒Complete	☐NA
3.	Determine if there are any municipal or domestic water supply reservoirs or groundwater percolation facilities within the project limits. Consider appropriate spill contamination and spill prevention control measures for these new areas.	☒Complete	☐NA
4.	Determine the RWQCB special requirements, including TMDLs, effluent limits, etc.	☒Complete	☐NA
5.	Determine regulatory agencies seasonal construction and construction exclusion dates or restrictions required by federal, state, or local agencies.	☒Complete	☐NA
6.	Determine if a 401 certification will be required.	☒Complete	☐NA
7.	List rainy season dates.	☒Complete	☐NA
8.	Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	☒Complete	☐NA
9.	If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	☒Complete	☐NA
10.	Determine contaminated soils within the project area.	☒Complete	☐NA
11.	Determine the total disturbed soil area of the project.	☒Complete	☐NA
12.	Describe the topography of the project site.	☒Complete	☐NA
13.	List any areas outside of the Caltrans right-of-way that will be included in the project (e.g. contractor's staging yard, work from barges, easements for staging, etc.).	☐Complete	☒NA
14.	Determine if additional right-of-way acquisition or easements and right-of-entry will be required for design, construction and maintenance of BMPs. If so, how much?	☐Complete	☒NA
15.	Determine if a right-of-way certification is required.	☐Complete	☒NA
16.	Determine the estimated unit costs for right-of-way should it be needed for Treatment BMPs, stabilized conveyance systems, lay-back slopes, or interception ditches.	☐Complete	☒NA
17.	Determine if project area has any slope stabilization concerns.	☒Complete	☐NA
18.	Describe the local land use within the project area and adjacent areas.	☒Complete	☐NA
19.	Evaluate the presence of dry weather flow.	☒Complete	☐NA

Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water Impacts

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

The PE must confer with other functional units, such as Landscape Architecture, Hydraulics, Environmental, Materials, Construction and Maintenance, as needed to assess these issues. Summarize pertinent responses in Section 2 of the SWDR.

Options for avoiding or reducing potential impacts during project planning include the following:

1. Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?	☐Yes	☒No	☐NA
2. Can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?	☐Yes	☒No	☐NA
3. Can any of the following methods be utilized to minimize erosion from slopes:			
a. Disturbing existing slopes only when necessary?	☒Yes	☐No	☐NA
b. Minimizing cut and fill areas to reduce slope lengths?	☒Yes	☐No	☐NA
c. Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?	☐Yes	☐No	☒NA
d. Acquiring right-of-way easements (such as grading easements) to reduce steepness of slopes?	☐Yes	☐No	☒NA
e. Avoiding soils or formations that will be particularly difficult to re-stabilize?	☐Yes	☐No	☒NA
f. Providing cut and fill slopes flat enough to allow re-vegetation and limit erosion to pre-construction rates?	☒Yes	☐No	☐NA
g. Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?	☐Yes	☐No	☒NA
h. Rounding and shaping slopes to reduce concentrated flow?	☒Yes	☐No	☐NA
i. Collecting concentrated flows in stabilized drains and channels?	☒Yes	☐No	☐NA
4. Does the project design allow for the ease of maintaining all BMPs?	☒Yes	☐No	
5. Can the project be scheduled or phased to minimize soil-disturbing work during the rainy season?	☐Yes	☒No	
6. Can permanent storm water pollution controls such as paved slopes, vegetated slopes, basins, and conveyance systems be installed early in the construction process to provide additional protection and to possibly utilize them in addressing construction storm water impacts?	☒Yes	☐No	☐NA

Attachment 6:

Design Pollution Prevention BMPs, Checklist DPP-1

Design Pollution Prevention BMPs
Checklist DPP-1, Part 1

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

Consideration of Design Pollution Prevention BMPs

Consideration of Downstream Effects Related to Potentially Increased Flow [to streams or channels]

Will project increase velocity or volume of downstream flow?	☐Yes	☒No	☐NA
Will the project discharge to unlined channels?	☒Yes	☐No	☐NA
Will project increase potential sediment load of downstream flow?	☐Yes	☒No	☐NA
Will project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?	☒Yes	☐No	☐NA

If Yes was answered to any of the above questions, consider ***Downstream Effects Related to Potentially Increased Flow***, complete the DPP-1, Part 2 checklist.

Slope/Surface Protection Systems

Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA

If Yes was answered to the above question, consider ***Slope/Surface Protection Systems***, complete the DPP-1, Part 3 checklist.

Concentrated Flow Conveyance Systems

Will the project create or modify ditches, dikes, berms, or swales?	☒Yes	☐No	☐NA
Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA
Will it be necessary to direct or intercept surface runoff?	☒Yes	☐No	☐NA
Will cross drains be modified?	☒Yes	☐No	☐NA

If Yes was answered to any of the above questions, consider ***Concentrated Flow Conveyance Systems***; complete the DPP-1, Part 4 checklist.

Preservation of Existing Vegetation

It is the goal of the Storm Water Program to maximize the protection of desirable existing vegetation to provide erosion and sediment control benefits on all projects. ☒Complete

Consider ***Preservation of Existing Vegetation***, complete the DPP-1, Part 5 checklist.

Design Pollution Prevention BMPs
Checklist DPP-1, Part 2

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

Downstream Effects Related to Potentially Increased Flow

1. Review total paved area and reduce to the maximum extent practicable. ☒Complete
2. Review channel lining materials and design for stream bank erosion control. ☒Complete
   (a) See Chapters 860 and 870 of the HDM. ☒Complete
   (b) Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity. ☒Complete
3. Include, where appropriate, energy dissipation devices at culvert outlets. ☒Complete
4. Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour. ☒Complete
5. Include, if appropriate, peak flow attenuation basins or devices to reduce peak discharges. ☒Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 3

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

Slope / Surface Protection Systems

1. What are the proposed areas of cut and fill? (attach plan or map) ☐Complete
2. Were benches or terraces provided on high cut and fill slopes to reduce concentration of flows? ☐Yes ☐No
3. Were slopes rounded and/or shaped to reduce concentrated flow? ☐Yes ☐No
4. Were concentrated flows collected in stabilized drains or channels? ☐Yes ☐No
5. Are new or disturbed slopes > 4:1 horizontal:vertical (h:v)? ☐Yes ☐No

   If Yes, District Landscape Architect must prepare or approve an erosion control plan, at the District's discretion.
6. Are new or disturbed slopes > 2:1 (h:v)? ☐Yes ☐No

   If Yes, Geotechnical Services must prepare a Geotechnical Design Report, and the District Landscape Architect should prepare or approve an erosion control plan. Concurrence must be obtained from the District Maintenance Storm Water Coordinator for slopes steeper than 2:1 (h:v).
7. Estimate the net new impervious area that will result from this project. 6.0 acres ☒Complete

VEGETATED SURFACES

1. Identify existing vegetation. ☒Complete
2. Evaluate site to determine soil types, appropriate vegetation and planting strategies. ☒Complete
3. How long will it take for permanent vegetation to establish? ☐Complete
4. Minimize overland and concentrated flow depths and velocities. ☐Complete

HARD SURFACES

1. Are hard surfaces required? ☐Yes ☐No

   If Yes, document purpose (safety, maintenance, soil stabilization, etc.), types, and general locations of the installations. ☐Complete

Review appropriate SSPs for Vegetated Surface and Hard Surface Protection Systems. ☐Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 4

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

Concentrated Flow Conveyance Systems

Ditches, Berms, Dikes and Swales

1. Consider Ditches, Berms, Dikes, and Swales as per Topics 813, 834.3, and 835, and Chapter 860 of the HDM. ☒Complete
2. Evaluate risks due to erosion, overtopping, flow backups or washout. ☒Complete
3. Consider outlet protection where localized scour is anticipated. ☒Complete
4. Examine the site for run-on from off-site sources. ☒Complete
5. Consider channel lining when velocities exceed scour velocity for soil. ☒Complete

Overside Drains

1. Consider downdrains, as per Index 834.4 of the HDM. ☐Complete
2. Consider paved spillways for side slopes flatter than 4:1 h:v. ☐Complete

Flared Culvert End Sections

1. Consider flared end sections on culvert inlets and outlets as per Chapter 827 of the HDM. ☐Complete

Outlet Protection/Velocity Dissipation Devices

1. Consider outlet protection/velocity dissipation devices at outlets, including cross drains, as per Chapters 827 and 870 of the HDM. ☒Complete

Review appropriate SSPs for Concentrated Flow Conveyance Systems. ☐Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 5

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

Preservation of Existing Vegetation

1. Review Preservation of Property, Standard Specifications 16.1.01 and 16-1.02 (Clearing and Grubbing) to reduce clearing and grubbing and maximize preservation of existing vegetation. ☒Complete
2. Has all vegetation to be retained been coordinated with Environmental, and identified and defined in the contract plans? ☒Yes ☐No
3. Have steps been taken to minimize disturbed areas, such as locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling? ☒Complete
4. Have impacts to preserved vegetation been considered while work is occurring in disturbed areas? ☒Yes ☐No
5. Are all areas to be preserved delineated on the plans? ☒Yes ☐No

Attachment 7:

Treatment BMPs, Checklist T-1

Treatment BMPs
Checklist T-1, Part 1

Prepared by: Rick Engineering Co Date: 06/22/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

Consideration of Treatment BMPs

This checklist is used for projects that require the consideration of Approved Treatment BMPs, as determined from the process described in Section 4 (Project Treatment Consideration) and the Evaluation Documentation Form (EDF). This checklist will be used to determine which Treatment BMPs should be considered for each watershed and sub-watershed within the project. Supplemental data will be needed to verify siting and design applicability for final incorporation into a project.

Complete this checklist for each phase of the project, when considering Treatment BMPs. Use the responses to the questions as the basis when developing the narrative in Section 5 of the Storm Water Data Report to document that Treatment BMPs have been appropriately considered.

Answer all questions, unless otherwise directed. Questions 14 through 16 should be answered after all subwatershed (drainages) are considered using this checklist.

1. Is the project in a watershed with prescriptive TMDL treatment BMP requirements in an adopted TMDL implementation plan? ☐Yes ☒No

   If Yes, consult the District/Regional Storm Water Coordinator to determine whether the T-1 checklist should be used to propose alternative BMPs because the prescribed BMPs may not be feasible or other BMPs may be more cost-effective. Special documentation and regulatory response may be necessary.

2. Dry Weather Flow Diversion

   (a) Are dry weather flows generated by Caltrans anticipated to be persistent? ☐Yes ☒No

   (b) Is a sanitary sewer located on or near the site? ☒Yes ☐No

   If Yes to both 2 (a) and (b), continue to (c). If No to either, skip to question 3.

   (c) Is connection to the sanitary sewer possible without extraordinary plumbing, features or construction practices? ☐Yes ☐No

   (d) Is the domestic wastewater treatment authority willing to accept flow? ☐Yes ☐No

   If Yes was answered to all of these questions consider ***Dry Weather Flow Diversion***, complete and attach **Part 3** of this checklist

3. Is the receiving water on the 303(d) list for litter/trash or has a TMDL been issued for litter/trash? ☐Yes ☒No

If Yes, consider ***Gross Solids Removal Devices (GSRDs)***, complete and attach **Part 6** of this checklist. Note: Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins also can capture litter. Before considering GSRDs for stand-alone installation or in sequence with other BMPs, consult with District/Regional NPDES Storm Water Coordinator to determine whether Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins should be considered instead of GSRDs to meet litter/trash TMDL.

4. Is project located in an area (e.g., mountain regions) where traction sand is applied more than twice a year? ☐Yes ☒No

   If Yes, consider ***Traction Sand Traps***, complete and attach **Part 7** of this checklist.

5. Maximizing Biofiltration Strips and Swales

   Objectives:

   1) Quantify infiltration from biofiltration alone

   2) Identify highly infiltrating biofiltration (i.e. > 90%) and skip further BMP consideration.

   3) Identify whether amendments can substantially improve infiltration.

   (a) Have biofiltration strips and swales been designed for runoff from all project areas, including sheet flow and concentrated flow conveyance? If no, document justification in Section 5 of the SWDR. ☒Yes ☐No

   (b) Based on site conditions, estimate what percentage of the WQV[1] can be infiltrated. When calculating the WQV, use a 12-hour drawdown for Type A and B soils, a 24-hour drawdown for Type C soils, and a 48-hour drawdown for Type D soils.

   _X_ < 20% ☒Complete
   ___ 20 % - 50%
   ___ 50% - 90%
   ___ > 90%

   (c) Is infiltration greater than 90 percent? If Yes, skip to question 13. ☐Yes ☒No

[1] **A complete methodology for determining WQV infiltration is available at:** http://www.dot.ca.gov/hq/oppd/stormwtr/index.htm

(d) Can the infiltration ranking in question 5(b) above be increased by using soil amendments? Use the 'drain time' associated with the amended soil (the 12-hour WQV for Type A and B soils, the 24-hour WQV for Type C soils[2]). ☐Yes ☒No

If Yes, consider including soil amendments; increasing the infiltration ranking allows more flexibility in the selection of BMPs (strips and swales will show performance comparable to other BMPs). Record the new infiltration estimate below:

___ < 20% (skip to 6)
___ 20 % - 50% (skip to 6)
___ 50% - 90% (skip to 6)
___ >90%

☐Complete

(e) Is infiltration greater than 90 percent? If Yes, skip to question 13. ☐Yes ☒No

6. Biofiltration in Rural Areas

Is the project in a rural area (outside of urban areas that is covered under an NDPES Municipal Stormwater Permit[3]). If Yes proceed to question 13. ☐Yes ☒No

7. Estimating Infiltration for BMP Combinations

Objectives:

1) Identify high-infiltration biofiltration or biofiltration and infiltration BMP combinations and skip further BMP consideration.

2) If high infiltration is infeasible, then identify the infiltration level of all feasible BMP combinations for use in the subsequent BMP selection matrices

(a) Has concentrated infiltration (i.e., via earthen basins or earthen filters) been prohibited? Consult your District/Regional Storm Water Coordinator and/or environmental documents. ☒Yes ☐No

If No proceed to 7 (b); if Yes skip to question 8 and do not consider earthen basin-type BMPs

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[2] Type D soils are not expected where amendments are incorporated

[3] See pages 39 and 40 of the Fact Sheets for the CGP.
http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_factsheet.pdf

(b) Assess infiltration of an infiltration BMP that is used in conjunction with biofiltration. Include infiltration losses from biofiltration, if biofiltration is feasible. ☐Complete

(use 24 hr WQV)
___ < 20% (do not consider this BMP combination)
___ 20% - 50%
___ 50% - 90%
___ >90%

Is at least 90 percent infiltration estimated? If Yes proceed to 13. If No proceed to 7(c). ☐**Yes** ☐**No**

(c) Assess infiltration of biofiltration with combinations with remaining approved earthen BMPs using water quality volumes based on the drain time of those BMPs. This assessment will be used in subsequent BMP selection matrices.

Earthen Detention Basin (use 48 hr WQV)	Earthen Austin SF (use 48 hr WQV)
___ < 20%	___ < 20%
___ 20% - 50%	___ 20% - 50%
___ > 50%	___ > 50%

☐Complete

Continue to Question 8

8. Identifying BMPs based on the Target Design Constituents

(a) Does the project discharge to a water body that has been placed on the 303-d list or has had a TMDL adopted? If "No," use Matrix A to select BMPs, consider designing to treat 100% of the WQV, then skip to question 12. ☒**Yes** ☐**No**

If Yes, is the identified pollutant(s) considered a Targeted Design Constituent (TDC) (check all that apply below)?

☐ sediments	☐ copper (dissolved or total)
☒ phosphorus	☐ lead (dissolved or total)
☒ nitrogen	☐ zinc (dissolved or total)
	☐ general metals (dissolved or total)[1]

(b) Treating Sediment. Is sediment a TDC? If Yes, use Matrix A to select BMPs, then skip to question 12. Otherwise, proceed to question 9. ☐**Yes** ☒**No**

[1] General metals include cadmium, nickel, chromium, and other trace metals. Note that selenium and arsenic are not metals. Mercury is a metal, but is considered later during BMP selection, under Question 12 below.

BMP Selection Matrix A: General Purpose Pollutant Removal			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Strip: HRT > 5 Austin filter (concrete) Austin filter (earthen) Delaware filter MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Swale MCTT Wet basin	Austin filter (concrete) Delaware filter MCTT Wet basin
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

9. Treating both Metals and Nutrients.
   Is copper, lead, zinc, or general metals *AND* nitrogen or phosphorous a TDC? If Yes use Matrix D to select BMPs, then skip to question 12. Otherwise, proceed to question 10. ☐Yes ☒No

10. Treating Only Metals.
    Are copper, lead, zinc, or general metals listed TDCs? If Yes use Matrix B below to select BMPs, and skip to question 12. Otherwise, proceed to question 11. ☐Yes ☒No

BMP Selection Matrix B: Any metal is the TDC, but not nitrogen or phosphorous			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	MCTT Wet basin Austin filter (earthen) Austin filter (concrete) Delaware filter	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Biofiltration Strip Biofiltration Swale Wet basin
Tier 2	Strip: HRT > 5 Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

11. Treating Only Nutrients.
    Are nitrogen and/or phosphorus listed TDCs? If "Yes," use Matrix C to select BMPs. If "No", please check your answer to 8(a). At this point one of the matrices should have been used for BMP selection for the TDC in question, unless no BMPs are feasible. ☒Yes ☐No

BMP Selection Matrix C: Phosphorous and / or nitrogen is the TDC, but no metals are the TDC			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Austin filter (earthen) Austin filter (concrete) Delaware filter**	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches*	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Wet basin Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale Wet basin	Austin filter (concrete) Delaware filter Wet basin
* Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			
** Delaware filters would be ranked in Tier 2 if the TDC is nitrogen only, as opposed to phosphorous only or both nitrogen and phosphorous.			

BMP Selection Matrix D: Any metal, plus phosphorous and / or nitrogen are the TDCs			
Consider approaches to treat the remaining WQV with combinations of the BMPs in this table. The PE should select at least one BMP for the project; preference is for Tier 1 BMPs, followed by Tier 2 BMPs when Tier 1 BMPs are not feasible. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs are chosen based on the infiltration category determined in question 7. BMPs in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Wet basin* Austin filter (earthen) Austin filter (concrete) Delaware filter**	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches***	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches*** Biofiltration Strip Biofiltration Swale
Tier 2	Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
* The wet basin should only be considered for phosphorus			
** In cases where earthen BMPs can infiltrate, Delaware filters are ranked in Tier 2 if the TDC is nitrogen only, but they are Tier 1 for phosphorous only or both nitrogen and phosphorous.			
*** Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

12. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for mercury or low dissolved oxygen? ☒Yes ☐No

    If Yes contact the District/Regional NPDES Storm Water Coordinator to determine if standing water in a Delaware filter, wet basin, or MCTT would be a risk to downstream water quality.

13. After completing the above, identify and attach the checklists shown below for every Treatment BMP under consideration. (use one checklist every time the BMP is considered for a different drainage within the project) ☒Complete

    __X__ Biofiltration Strips and Biofiltration Swales: Checklist T-1, Part 2
    ____ Dry Weather Diversion: Checklist T-1, Part 3
    ____ Infiltration Devices: Checklist T-1, Part 4
    ____ Detention Devices: Checklist T-1, Part 5
    ____ GSRDs: Checklist T-1, Part 6
    ____ Traction Sand Traps: Checklist T-1, Part 7
    __X__ Media Filter [Austin Sand Filter and Delaware Filter]: Checklist T-1, Part 8
    ____ Multi-Chambered Treatment Train: Checklist T-1, Part 9
    ____ Wet Basins: Checklist T-1, Part 10

14. Estimate what percentage of WQV (or WQF, depending upon the Treatment BMP selected) will be treated by the preferred Treatment BMP(s): _____100__% ☒Complete

    (a) Have Treatment BMPs been considered for use in parallel or series to increase this percentage? ☐Yes ☒No

15. Estimate what percentage of the net WQV (for all new impervious surfaces within the project) that will be treated by the preferred treatment BMP(s): _____% ☒Complete

16. Prepare cost estimate, including right-of-way, and site specific determination of feasibility (Section 2.4.2.1) for selected Treatment BMPs and include as supplemental information for SWDR approval. ☐Complete

Treatment BMPs
Checklist T-1, Part 2

Prepared by: Rick Engineering Co Date: 06/21/2012 District-Co-Route: 11-San Diego-ECR

PM : Edgar Camerino Project ID (or EA): BHL0-5004 (068) RWQCB: San Diego (Region 9)

Biofiltration Swales / Biofiltration Strips

Feasibility

1. Do the climate and site conditions allow vegetation to be established? ☒Yes ☐No
2. Are flow velocities from a peak drainage facility design event < 4 fps (i.e. low enough to prevent scour of the vegetated biofiltration swale as per HDM Table 873.3E)? ☒Yes ☐No

   If "No" to either question above, Biofiltration Swales and Biofiltration Strips are not feasible.

   3. Are Biofiltration Swales proposed at sites where known contaminated soils or groundwater plumes exist? ☐Yes ☒No
   If "Yes", consult with District/Regional NPDES Coordinator about how to proceed.
4. Does adequate area exist within the right-of-way to place Biofiltration device(s)? ☒Yes ☐No
   If "Yes", continue to Design Elements section. If "No", continue to Question 5.
5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Biofiltration devices and how much right-of-way would be needed to treat WQF? _____ acres ☐Yes ☐No
   If "Yes", continue to Design Elements section. If "No", continue to Question 6.
6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of these Treatment BMPs into the project. ☐Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Has the District Landscape Architect provided vegetation mixes appropriate for climate and location? * ☐Yes ☒No

2.	Can the biofiltration swale be designed as a conveyance system under any expected flows > the WQF event, as per HDM Chapter 800? * (e.g. freeboard, minimum slope, etc.)	☒Yes	☐No
3.	Can the biofiltration swale be designed as a water quality treatment device under the WQF while meeting the required HRT, depth, and velocity criteria? (Reference Appendix B, Section B.2.3.1)*	☒Yes	☐No
4.	Is the maximum length of a biofiltration strip ≤ 300 ft? *	☒Yes	☐No
5.	Has the minimum width (in the direction of flow) of the invert of the biofiltration swale received the concurrence of Maintenance? *	☒Yes	☐No
6.	Can biofiltration swales be located in natural or low cut sections to reduce maintenance problems caused by animals burrowing through the berm of the swale? **	☒Yes	☐No
7.	Is the biofiltration strip sized as long as possible in the direction of flow? **	☒Yes	☐No
8.	Have Biofiltration Systems been considered for locations upstream of other Treatment BMPs, as part of a treatment train? **	☐Yes	☒No

Attachment 8:

Additional Documents to Address

City of San Diego Storm Water Standards Manual

City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

THE CITY OF SAN DIEGO

Storm Water Requirements Applicability Checklist

FORM
DS-560
JANUARY 2011

Project Address: Portion of El Camino Real between San Dieguito Road and Via de la Valle	Project Number *(for City Use Only):*

SECTION 1. Permanent Storm Water BMP Requirements:

Additional information for determining the requirements is found in the Storm Water Standards Manual.

Part A: Determine if Exempt from Permanent Storm Water BMP Requirements.
Projects that are considered maintenance, or are otherwise not categorized as "development projects" or "redevelopment projects" according to the Storm Water Standards manual are not required to install permanent storm water BMPs. **If "Yes" is checked for any line in Part A, proceed to Part C and check the box labeled "Exempt Project." If "No" is checked for all of the lines, continue to Part B.**

1.	The project is not a Development Project as defined in the Storm Water Standards Manual: for example habitat restoration projects, and construction inside an existing building.	☐ Yes	☑ No
2.	The project is only the construction of underground or overhead linear utilities.	☐ Yes	☑ No
3.	The project qualifies as routine maintenance (replaces or renews existing surface materials because of failed or deteriorating condition). This includes roof replacement, pavement spot repairs and resurfacing treatments such as asphalt overlay or slurry seal, and replacement of damaged pavement.	☐ Yes	☑ No
4.	The project only installs sidewalks, bike lanes, or pedestrian ramps on an existing road, and does not change sheet flow condition to a concentrated flow condition.	☐ Yes	☑ No

Part B: Determine if Subject to Priority Development Project Requirements.
Projects that match one of the definitions below are subject to additional requirements including preparation of a Water Quality Technical Report.
If "Yes" is checked for any line in Part B, proceed to Part C and check the box labeled "Priority Development Project." If "No" is checked for all of the lines, continue to Part C and check the box labeled "Standard Development Project."

1.	**Residential development of 10 or more units.**	☐ Yes	☑ No
2.	**Commercial development and similar non-residential development greater than one acre.** Hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; and other light industrial facilities.	☐ Yes	☑ No
3.	**Heavy industrial development greater than one acre.** Manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas.	☐ Yes	☑ No
4.	**Automotive repair shop.** Facilities categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	☐ Yes	☑ No
5.	**Restaurant.** Facilities that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), and where the land area for development is greater than 5,000 square feet.	☐ Yes	☑ No
6.	**Hillside development greater than 5,000 square feet.** Development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions and where the development will grade on any natural slope that is twenty-five percent or greater.	☐ Yes	☑ No
7.	**Water Quality Sensitive Area.** Development located within, directly adjacent to, or discharging directly to a Water Quality Sensitive Area (as depicted in Appendix C) in which the project either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" is defined as being situated within 200 feet of the Water Quality Sensitive Area. "Discharging directly to" is defined as outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.	☑ Yes	☐ No
8.	**Parking lot with a minimum area of 5,000 square feet or a minimum of 15 parking spaces** and potential exposure to urban runoff (unless it meets the exclusion for parking lot reconfiguration on line 11).	☐ Yes	☑ No

9.	**Street, road, highway, or freeway.** New paved surface in excess of 5,000 square feet used for the transportation of automobiles, trucks, motorcycles, and other vehicles (unless it meets the exclusion for road reconfiguration on line 11).	☑ Yes ☐ No
10.	**Retail Gasoline Outlet (RGO)** that is: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.	☐ Yes ☑ No
11.	**Significant Redevelopment**; project installs and/or replaces 5,000 square feet or more of impervious surface and the existing site meets at least one of the categories above. The project is not considered Significant Redevelopment if reconfiguring an existing road or parking lot without a change to the footprint of an existing developed road or parking lot. The existing footprint is defined as the outside curb or the outside edge of pavement when there is no curb.	☑ Yes ☐ No
12.	**Other Pollutant Generating Project.** Any other project not covered in the categories above, that disturbs one acre or more and is not excluded by the criteria below.	☐ Yes ☑ No

Projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces.

Part C: Select the appropriate category based on the outcome of Parts A & B.

1.	If "Yes" is checked for any line in Part A, then check this box. Continue to Section 2.	☐ Exempt Project
2.	If "No" is checked for all lines in Part A, and Part B, then check this box. Continue to Section 2.	☐ Standard Development Project
3.	If "No" is checked for all lines in Part A, and "Yes" is checked for at least one of the lines in Part B, then check this box. Continue to Section 2. See the Storm Water Standards Manual for guidance on determining if Hydromodification Management Plan requirements apply.	☑ Priority Development Project

SECTION 2. Construction Storm Water BMP Requirements:
For all projects, complete Part D. If "Yes" is checked for any line in Part D, then continue to Part E.

Part D: Determine Construction Phase Storm Water Requirements.

1.	Is the project subject to California's statewide General NPDES Permit for Storm Water Discharges Associated with Construction Activities? (See State Water Resources Control Board Order No. 2009-0009-DWQ for rules on enrollment)	☑ Yes ☐ No
2.	Does the project propose grading or soil disturbance?	☑ Yes ☐ No
3.	Would storm water or urban runoff have the potential to contact any portion of the construction area, including washing and staging areas?	☑ Yes ☐ No
4.	Would the project use any construction materials that could negatively affect water quality if discharged from the site (such as, paints, solvents, concrete, and stucco)?	☑ Yes ☐ No
5.	Check this box if "Yes" is checked for line 1. Continue to Part E.	☑ SWPPP Required
6.	Check this box if "No" is checked for line 1, and "Yes is checked for any line 2-4. Continue to Part E.	☐ WPCP Required
7.	Check this box if "No" is checked for all lines 1-4. Part E does not apply.	☐ No Document Required

Part E: Determine Construction Site Priority
This prioritization must be completed with this form, noted on the plans, and included in the SWPPP or WPCP. The City reserves the right to adjust the priority of the projects both before and during construction. [Note: The construction priority does NOT change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by City staff.]

☑ 1. **High Priority**
- a) Projects where the site is 50 acres or more and grading will occur during the wet season
- b) Projects 1 acre or more and tributary to an impaired water body for sediment (e.g., Peñasquitos watershed)
- c) Projects 1 acre or more within or directly adjacent to or discharging directly to a coastal lagoon or other receiving water within a Water Quality Sensitive Area.
- d) Projects subject to phased grading or advanced treatment requirements.

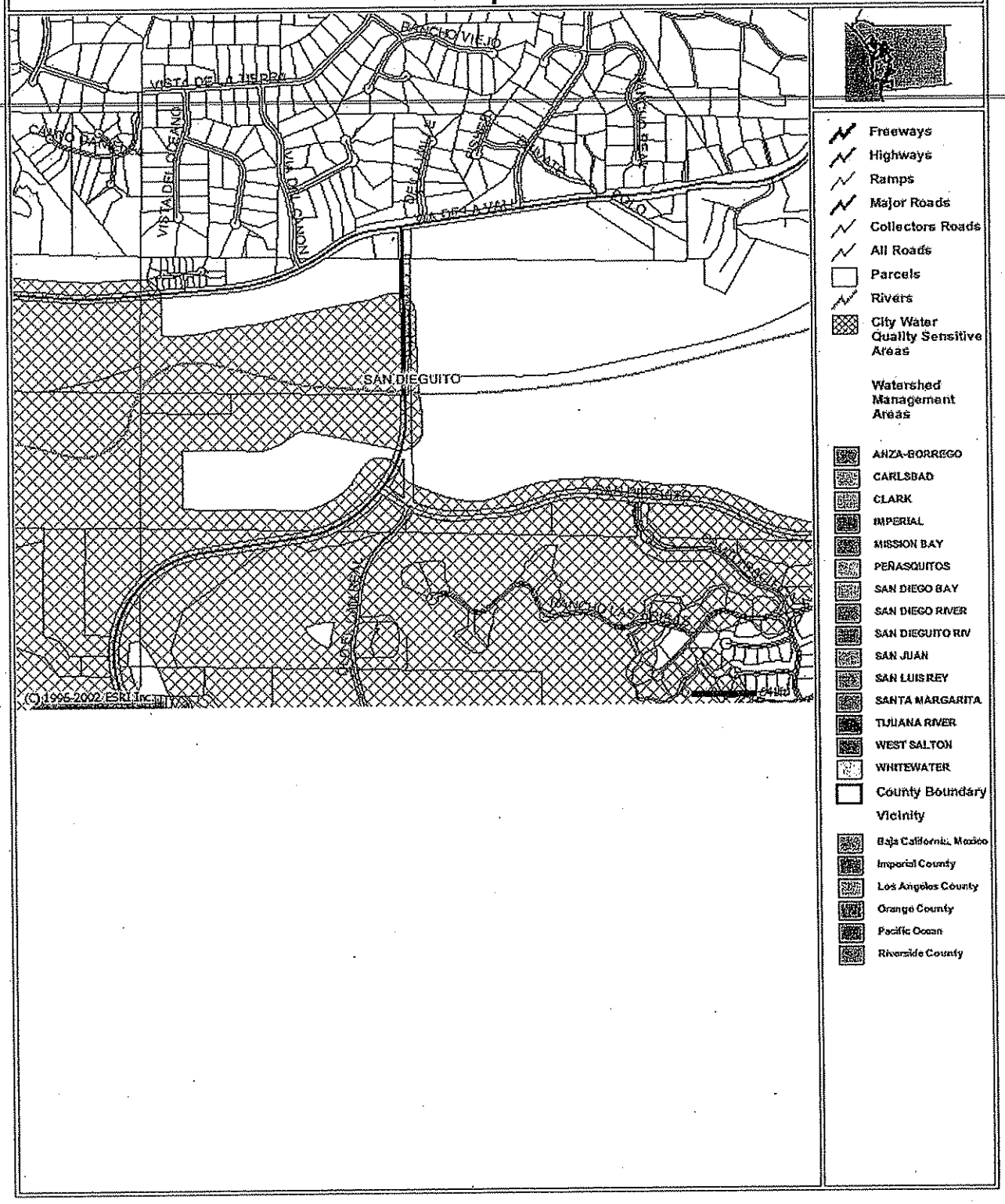
☐ **2 Medium Priority**. Projects 1 acre or more but not subject to a high priority designation.

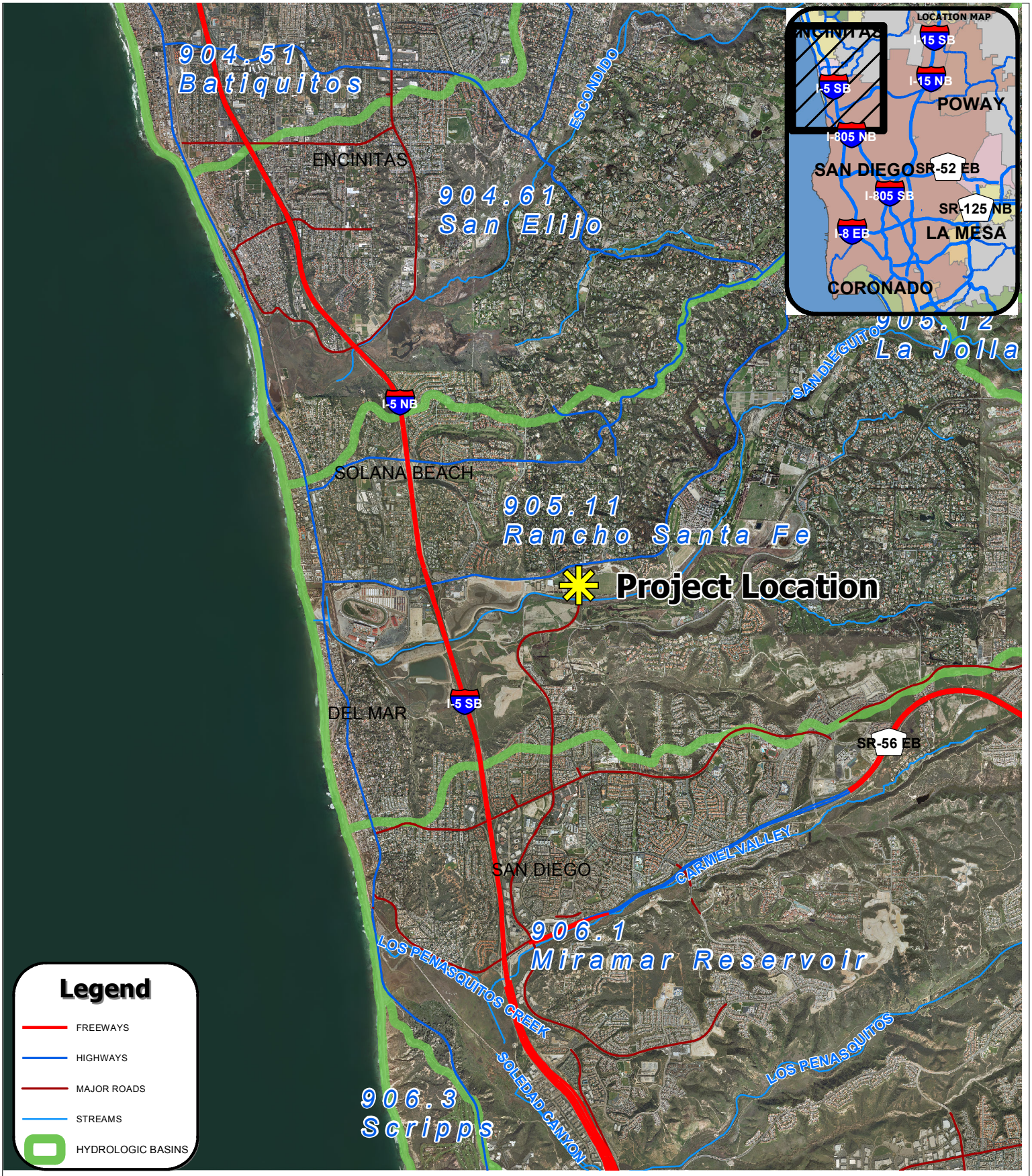
☐ **3 Low Priority.** Projects requiring a Water Pollution Control Plan but not subject to a medium or high priority designation.

Name of Owner or Agent *(Please Print):* City of San Diego	Title:
Signature:	Date:

Reset Button Page 2

Parcel Map and Data





RICK ENGINEERING COMPANY

PREPARED BY GIS SERVICES DIVISION

1 inch = 6,000 feet

Feet 0 3,000 6,000 12,000

HYDROLOGIC UNIT FOR El CAMINO REAL BRIDGE PROJECT

THIS PROJECT LOCATED WITHIN THE CITY OF SAN DIEGO

EXHIBIT DATE: 6/22/2012 REC JN: 14752-C

W:\14752-C\Hydro\WaterQuality\WQAR\14752C_HydrologicUnitBaseMap.mxd

2010 California 303(d) List of Water Quality Limited Segments*

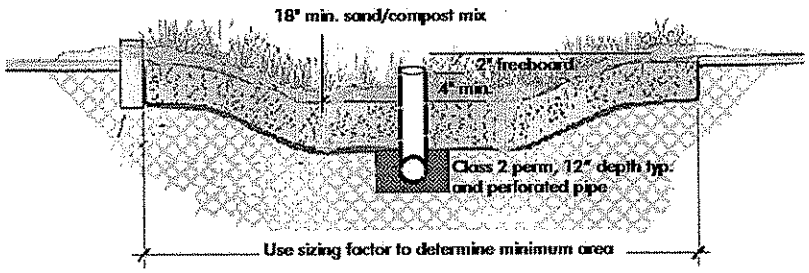
Water quality limited segments requiring a TMDL(5A), being addressed by TMDL(5B), and/or being addressed by an action other than TMDL(5C).

REGION	REGION NAME	WATER BODY NAME	WBID	WATER BODY TYPE	WBTYPE CODE	INTEGRATED REPORT CATEGORY	USGS CATALOGING UNIT*	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT	POLLUTANT	POLLUTANT CATEGORY	FINAL LISTING DECISION	TMDL REQUIREMENT STATUS**	EXPECTED TMDL COMPLETION DATE***
9	Regional Board 9 - San Diego Region	San Dieguito River	CAR9051100020080825090830	River & Stream	R	5	18070304	90511000	19	Miles	Enterococcus	Pathogens	List on 303(d) list (TMDL required list)	5A	2021
9	Regional Board 9 - San Diego Region	San Dieguito River	CAR9051100020080825090830	River & Stream	R	5	18070304	90511000	19	Miles	Fecal Coliform	Pathogens	List on 303(d) list (TMDL required list)	5A	2021
9	Regional Board 9 - San Diego Region	San Dieguito River	CAR9051100020080825090830	River & Stream	R	5	18070304	90511000	19	Miles	Nitrogen	Nutrients	List on 303(d) list (TMDL required list)	5A	2021
9	Regional Board 9 - San Diego Region	San Dieguito River	CAR9051100020080825090830	River & Stream	R	5	18070304	90511000	19	Miles	Phosphorus	Nutrients	List on 303(d) list (TMDL required list)	5A	2021
9	Regional Board 9 - San Diego Region	San Dieguito River	CAR9051100020080825090830	River & Stream	R	5	18070304	90511000	19	Miles	Total Dissolved Solids	Salinity	List on 303(d) list (TMDL required list)	5A	2021
9	Regional Board 9 - San Diego Region	San Dieguito River	CAR9051100020080825090830	River & Stream	R	5	18070304	90511000	19	Miles	Toxicity	Toxicity	List on 303(d) list (TMDL required list)	5A	2021

Attachment 9:

BMP Maintenance Information

4.7 Bioretention Facilities



Bioretention facility configured for treatment-only requirements. Bioretention facilities can rectangular, linear, or nearly any shape.

Best Uses

- Commercial areas
- Residential subdivisions
- Industrial developments
- Roadways
- Parking lots
- Fit in setbacks, medians, and other landscaped areas

Advantages

- Can be any shape
- Low maintenance
- Can be landscaped

Limitations

- Require 4% of tributary impervious square footage
- Typically requires 3-4 feet of head
- Irrigation typically required

Bioretention detains runoff in a surface reservoir, filters it through plant roots and a biologically active soil mix, and then infiltrates it into the ground. Where native soils are less permeable, an underdrain conveys treated runoff to storm drain or surface drainage.

Bioretention facilities can be configured in nearly any shape. When configured as linear **swales**, they can convey high flows while percolating and treating lower flows.

Bioretention facilities can be configured as in-ground or above-ground planter boxes, with the bottom open to allow infiltration to native soils underneath. If infiltration cannot be allowed, use the sizing factors and criteria for the Flow-Through Planter.

4.7.1 Criteria

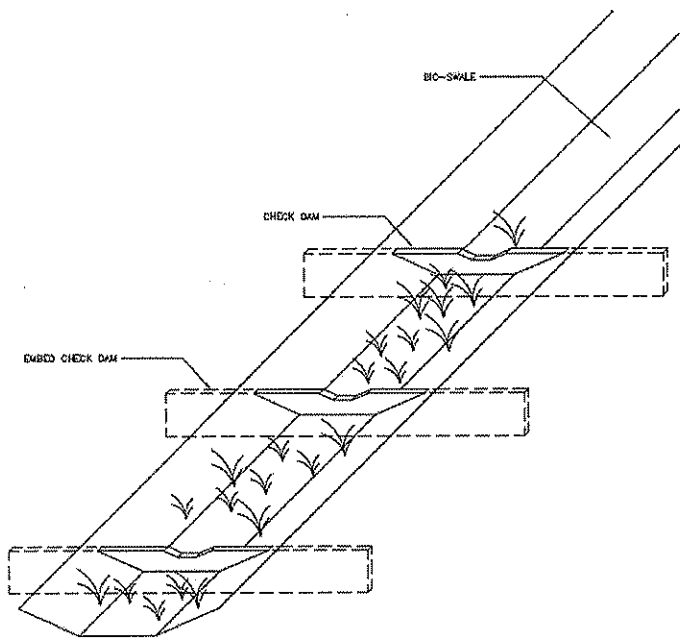
For development projects subject only to runoff treatment requirements, the following criteria apply:

Parameter	Criterion
Soil mix depth	18 inches minimum
Soil mix minimum percolation rate	5 inches per hour minimum sustained (10 inches per hour initial rate recommended)
Soil mix surface area	0.04 times tributary impervious area (or equivalent)
Surface reservoir depth	6 inches minimum; may be sloped to 4 inches where adjoining walkways.

Parameter	Criterion
Underdrain	Required in Group "C" and "D" soils. Perforated pipe embedded in gravel ("Class 2 permeable" recommended), connected to storm drain or other accepted discharge point.

4.7.2 Details

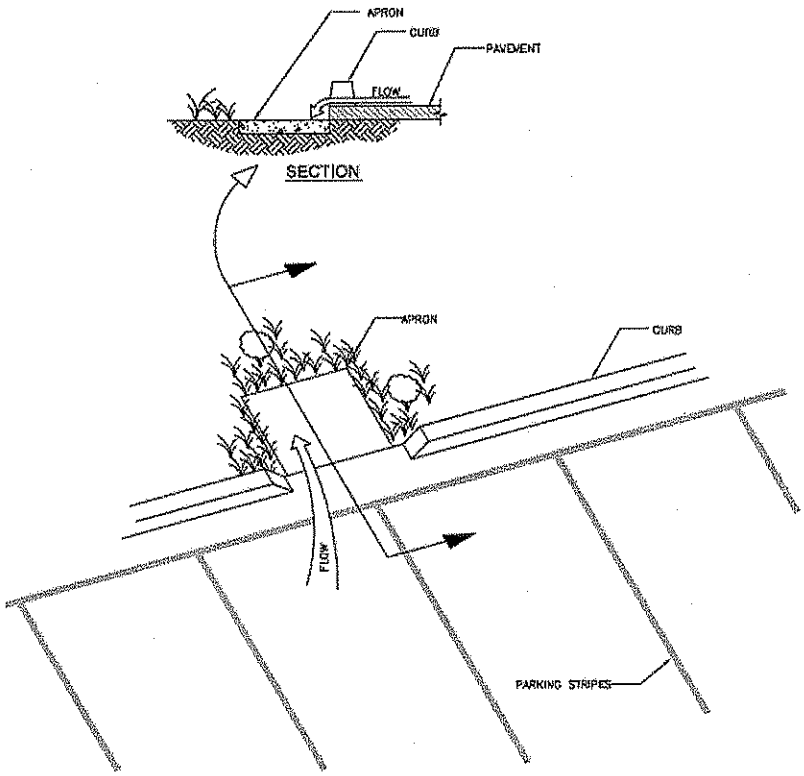
Plan. On the surface, a bioretention facility should be one level, shallow basin—or a series of basins. As runoff enters each basin, it should flood and fill throughout before runoff overflows to the outlet or to the next downstream basin. This will help prevent movement of surface mulch and soil mix.



Use check dams for linear bioretention facilities (swales) on a slope.

In a linear swale, check dams should be placed so that the lip of each dam is at least as high as the toe of the next upstream dam. A similar principle applies to bioretention facilities built as terraced roadway shoulders.

Inlets. Paved areas draining to the facility should be graded, and inlets should be placed, so that runoff remains as sheet flow or as dispersed as possible. Curb cuts should be wide (12" is recommended) to avoid clogging with leaves or debris. Allow for a minimum reveal of 4"-6" between the inlet and soil mix elevations to ensure turf or mulch buildup does not block the inlet. In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet.



Recommended design details for bioretention facility inlets (see text).

Where runoff is collected in pipes or gutters and conveyed to the facility, protect the landscaping from high-velocity flows with energy-dissipating rocks. In larger installations, provide cobble-lined channels to better distribute flows throughout the facility.

Upturned pipe outlets can be used to dissipate energy when runoff is piped from roofs and upgradient paved areas.

Soil mix. The required soil mix is similar to a loamy sand. It must maintain a minimum percolation rate of 5" per hour throughout the life of the facility, and it must be suitable for maintaining plant life. Typically, on-site soils will not be suitable due to clay content.

Storage and drainage layer. "Class 2 permeable," Caltrans specification 68-1.025, is recommended. Open-graded crushed rock, washed, may be used, but requires 4"-6" washed pea gravel be substituted at the top of the crushed rock gravel layers. Do not use filter fabric to separate the soil mix from the gravel drainage layer or the gravel drainage layer from the native soil.

Underdrains. No underdrain is required where native soils beneath the facility are Hydrologic Soil Group A or B. For treatment-only facilities where native soils are Group C or D, a perforated pipe must be bedded in the gravel layer and must terminate at a storm drain or other approved discharge point.

Outlets. In treatment-only facilities, outlets must be set high enough to ensure the surface reservoir fills and the entire surface area of soil mix is flooded before the outlet elevation is reached. In swales, this can be achieved with appropriately placed check dams.

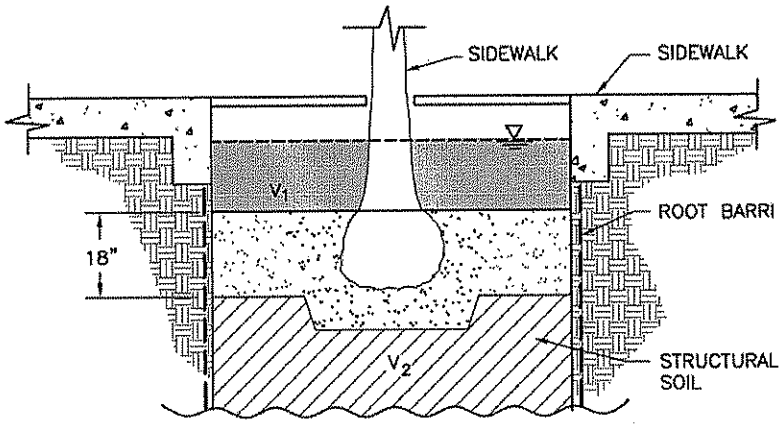
The outlet should be designed to exclude floating mulch and debris.

Vaults, utility boxes and light standards. It is best to locate utilities outside the bioretention facility—in adjacent walkways or in a separate area set aside for this purpose. If utility structures are to be placed within the facility, the locations should be anticipated and adjustments made to ensure the minimum bioretention surface area and volumes are achieved. Leaving the final locations to each individual utility can produce a haphazard, unaesthetic appearance and make the bioretention facility more difficult to maintain.

Emergency overflow. The site grading plan should anticipate extreme events and potential clogging of the overflow and route emergency overflows safely.

Trees. Bioretention areas can accommodate small or large trees. There is no need to subtract the area taken up by roots from the effective area of the facility. Extensive tree roots maintain soil permeability and help retain runoff. Normal maintenance of a bioretention facility should not affect tree lifespan.

The bioretention facility can be integrated with a tree pit of the required depth and filled with structural soil. If a root barrier is used, it can be located to allow tree roots to spread throughout the bioretention facility while protecting adjacent pavement. Locations and planting elevations should be selected to avoid blocking the facility's inlets and outlets.



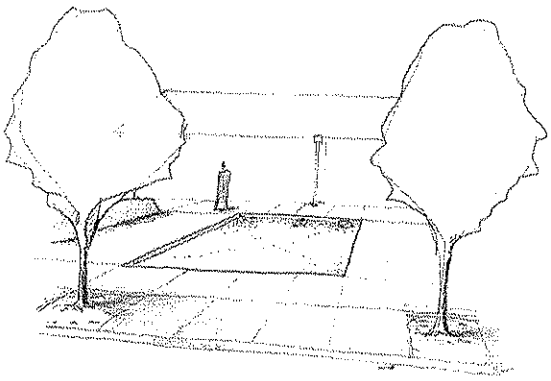
Bioretention facility configured as a tree well. The root barrier is optional.

4.7.3 Applications

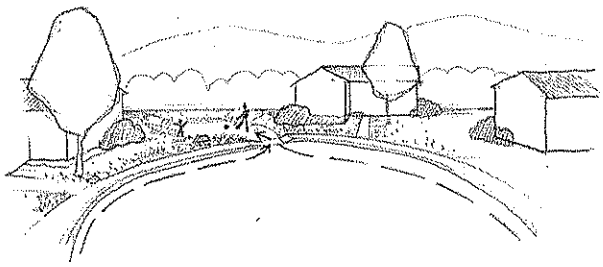
Multi-purpose landscaped areas. Bioretention facilities are easily adapted to serve multiple purposes. The loamy sand soil mix will support turf or a plant palette suitable to the location and a well-drained soil.

Example landscape treatments:

- Lawn with sloped transition to adjacent landscaping.
- Swale in setback area
- Swale in parking median
- Lawn with hardscaped edge treatment
- Decorative garden with formal or informal plantings
- Traffic island with low-maintenance landscaping
- Raised planter with seating
- Bioretention on a terraced slope



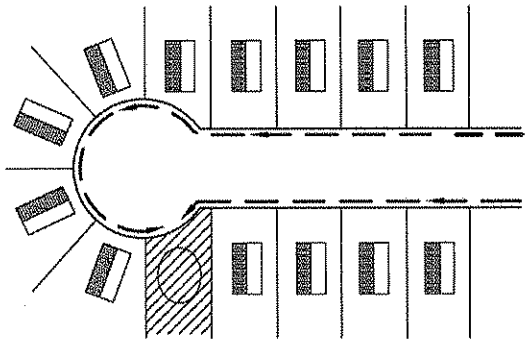
Bioretention facility configured as a recessed decorative lawn with hardscaped edge.



Bioretention facility configured and planted as a lawn/ play area.

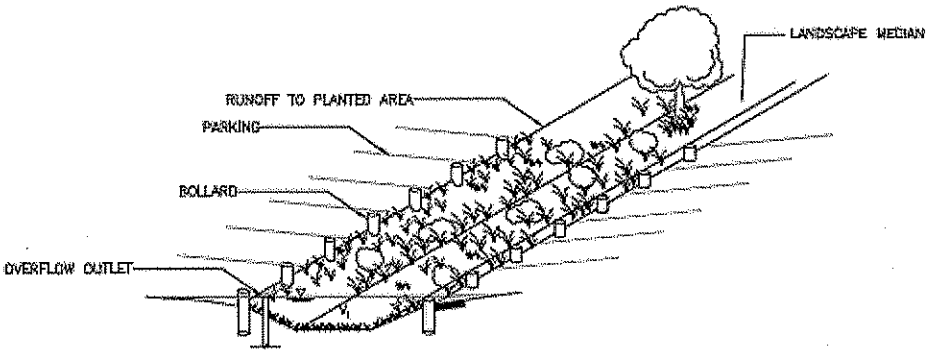
Residential subdivisions. Some subdivisions are designed to drain roofs and driveways to the streets (in the conventional manner) and then drain the streets to bioretention areas, with one bioretention area for each 1 to 6 lots, depending on subdivision layout and topography.

If allowed by the local jurisdiction, bioretention areas can be placed on a separate, dedicated parcel with joint ownership.



Bioretention facility receiving drainage from
individual lots and the street in a residential subdivision.

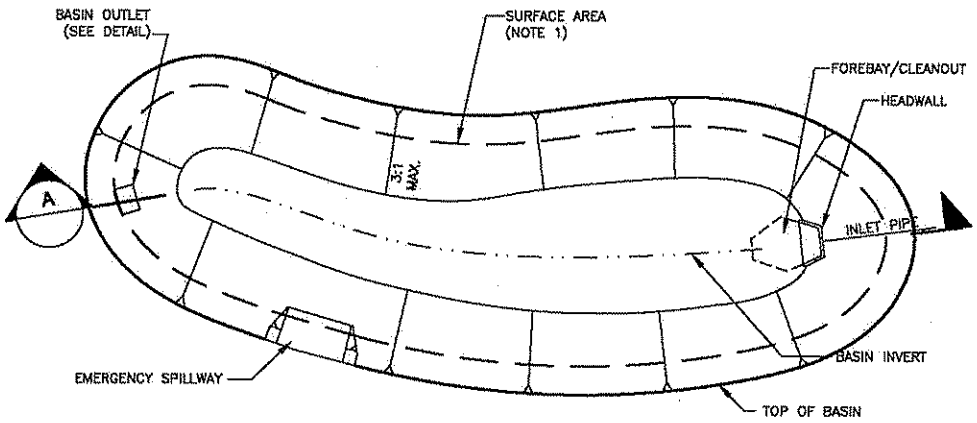
Sloped sites. Bioretention facilities must be constructed as a basin, or series of basins, with the circumference of each basin set level. It may be necessary to add curbs or low retaining walls.



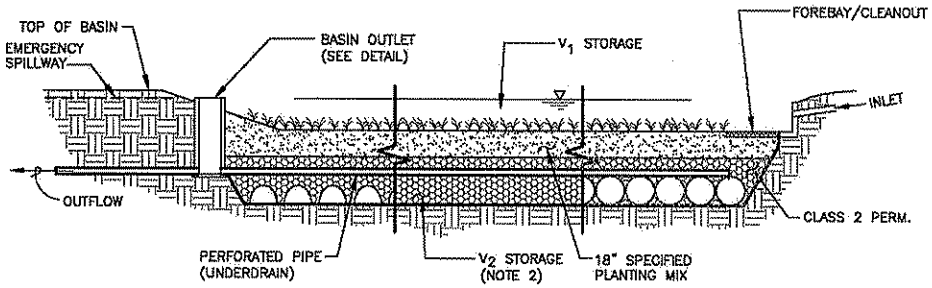
Bioretention facility configured as a parking median.
Note use of bollards in place of curbs, eliminating the need for curb cuts.

4.7.4 Design Checklist for Bioretention

- ❒ Volume or depth of surface reservoir meets or exceeds minimum.
- ❒ 18" depth "loamy sand" soil mix with minimum long-term percolation rate of 5"/hour.
- ❒ Area of soil mix meets or exceeds minimum.
- ❒ Perforated pipe underdrain bedded in "Class 2 perm" with connection and sufficient head to storm drain or discharge point (except in "A" or "B" soils).
- ❒ No filter fabric.
- ❒ Underdrain has a clean-out port consisting of a vertical, rigid, non-perforated PVC pipe, with a minimum diameter of 6 inches and a watertight cap.
- ❒ Location and footprint of facility are shown on site plan and landscaping plan.
- ❒ Bioretention area is designed as a basin (level edges) or a series of basins, and grading plan is consistent with these elevations. If facility is designed as a swale, check dams are set so the lip of each dam is at least as high as the toe of the next upstream dam.
- ❒ Inlets are 12" wide, have 4"-6" reveal and an apron or other provision to prevent blockage when vegetation grows in, and energy dissipation as needed.
- ❒ Overflow connected to a downstream storm drain or approved discharge point.
- ❒ Emergency spillage will be safely conveyed overland.
- ❒ Plantings are suitable to the climate and a well-drained soil.
- ❒ Irrigation system with connection to water supply.
- ❒ Vaults, utility boxes, and light standards are located outside the minimum soil mix surface area.
- ❒ When excavating, avoid smearing of the soils on bottom and side slopes. Minimize compaction of native soils and "rip" soils if clayey and/or compacted. Protect the area from construction site runoff.



PLAN VIEW
NOT TO SCALE

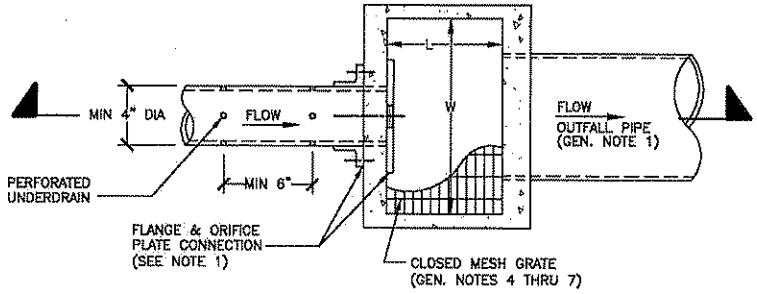


A SECTION
NOT TO SCALE

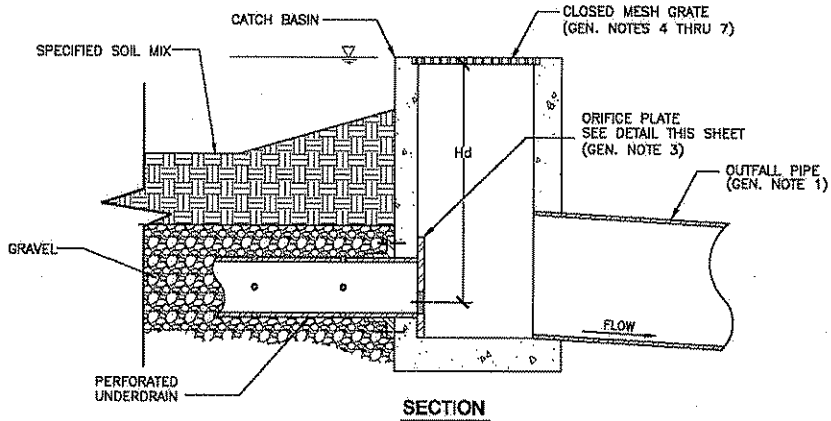
NOTE

1. SURFACE AREA LIMIT DETERMINED BY EXTENT OF SPECIFIED PLANTING MIX, WHICH IS GOVERNED BY THE OUTLET SPILL ELEVATION. FOR REQUIRED SURFACE AREA REFER TO THE FACTORS AND EQUATIONS IN THE STORMWATER C.3 GUIDEBOOK.
2. V_2 STORAGE ACCOMPLISHED WITH INFILTRATION ARCHES, PERFORATED PIPES, CLASS 2 PERM OR OTHER AT THE DESIGNERS DISCRETION.

Bioretention Facility

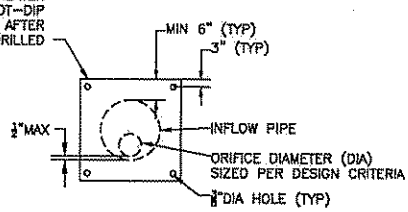


PLAN
N.T.S.



SECTION
N.T.S.

ORIFICE PLATE: MIN SQUARE DIMENSIONS 1.0 FT GREATER THAN PIPE DIA. HOT-DIP GALVANIZED PLATE AFTER HOLES HAVE BEEN DRILLED



FLOW CONTROL ORIFICE PLATE

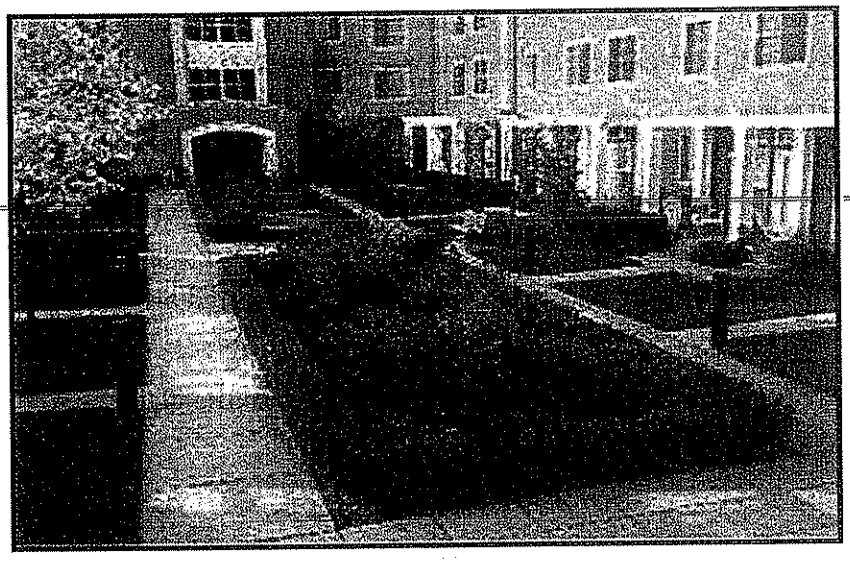
NOTE

1. ORIFICE PLATE & FLANGE CONNECTION TO CONCRETE SHALL BE FITTED WITH 30 DUROMETER NEOPRENE RING.

Bioretention Facility Outlet Detail - A

Bioretention

TC-32



Design Considerations

- Soil for Infiltration
- Tributary Area
- Slope
- Aesthetics
- Environmental Side-effects

Description

The bioretention best management practice (BMP) functions as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. These facilities normally consist of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The runoff's velocity is reduced by passing over or through buffer strip and subsequently distributed evenly along a ponding area. Exfiltration of the stored water in the bioretention area planting soil into the underlying soils occurs over a period of days.

Targeted Constituents

✓	Sediment	■
✓	Nutrients	▲
✓	Trash	■
✓	Metals	■
✓	Bacteria	■
✓	Oil and Grease	■
✓	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

California Experience

None documented. Bioretention has been used as a stormwater BMP since 1992. In addition to Prince George's County, MD and Alexandria, VA, bioretention has been used successfully at urban and suburban areas in Montgomery County, MD; Baltimore County, MD; Chesterfield County, VA; Prince William County, VA; Smith Mountain Lake State Park, VA; and Cary, NC.

Advantages

- Bioretention provides stormwater treatment that enhances the quality of downstream water bodies by temporarily storing runoff in the BMP and releasing it over a period of four days to the receiving water (EPA, 1999).
- The vegetation provides shade and wind breaks, absorbs noise, and improves an area's landscape.

Limitations

- The bioretention BMP is not recommended for areas with slopes greater than 20% or where mature tree removal would

CASQA
California Stormwater Quality Association

be required since clogging may result, particularly if the BMP receives runoff with high sediment loads (EPA, 1999).

- Bioretention is not a suitable BMP at locations where the water table is within 6 feet of the ground surface and where the surrounding soil stratum is unstable.
- By design, bioretention BMPs have the potential to create very attractive habitats for mosquitoes and other vectors because of highly organic, often heavily vegetated areas mixed with shallow water.
- In cold climates the soil may freeze, preventing runoff from infiltrating into the planting soil.

Design and Sizing Guidelines

- The bioretention area should be sized to capture the design storm runoff.
- In areas where the native soil permeability is less than 0.5 in/hr an underdrain should be provided.
- Recommended minimum dimensions are 15 feet by 40 feet, although the preferred width is 25 feet. Excavated depth should be 4 feet.
- Area should drain completely within 72 hours.
- Approximately 1 tree or shrub per 50 ft^2 of bioretention area should be included.
- Cover area with about 3 inches of mulch.

Construction/Inspection Considerations

Bioretention area should not be established until contributing watershed is stabilized.

Performance

Bioretention removes stormwater pollutants through physical and biological processes, including adsorption, filtration, plant uptake, microbial activity, decomposition, sedimentation and volatilization (EPA, 1999). Adsorption is the process whereby particulate pollutants attach to soil (e.g., clay) or vegetation surfaces. Adequate contact time between the surface and pollutant must be provided for in the design of the system for this removal process to occur. Thus, the infiltration rate of the soils must not exceed those specified in the design criteria or pollutant removal may decrease. Pollutants removed by adsorption include metals, phosphorus, and hydrocarbons. Filtration occurs as runoff passes through the bioretention area media, such as the sand bed, ground cover, and planting soil.

Common particulates removed from stormwater include particulate organic matter, phosphorus, and suspended solids. Biological processes that occur in wetlands result in pollutant uptake by plants and microorganisms in the soil. Plant growth is sustained by the uptake of nutrients from the soils, with woody plants locking up these nutrients through the seasons. Microbial activity within the soil also contributes to the removal of nitrogen and organic matter. Nitrogen is removed by nitrifying and denitrifying bacteria, while aerobic bacteria are responsible for the decomposition of the organic matter. Microbial processes require oxygen and can result in depleted oxygen levels if the bioretention area is not adequately

aerated. Sedimentation occurs in the swale or ponding area as the velocity slows and solids fall out of suspension.

The removal effectiveness of bioretention has been studied during field and laboratory studies conducted by the University of Maryland (Davis et al, 1998). During these experiments, synthetic stormwater runoff was pumped through several laboratory and field bioretention areas to simulate typical storm events in Prince George's County, MD. Removal rates for heavy metals and nutrients are shown in Table 1.

Table 1 Laboratory and Estimated Bioretention Davis et al. (1998); PGDER (1993)

Pollutant	Removal Rate
Total Phosphorus	70-83%
Metals (Cu, Zn, Pb)	93-98%
TKN	68-80%
Total Suspended Solids	90%
Organics	90%
Bacteria	90%

Results for both the laboratory and field experiments were similar for each of the pollutants analyzed. Doubling or halving the influent pollutant levels had little effect on the effluent pollutants concentrations (Davis et al, 1998).

The microbial activity and plant uptake occurring in the bioretention area will likely result in higher removal rates than those determined for infiltration BMPs.

Siting Criteria

Bioretention BMPs are generally used to treat stormwater from impervious surfaces at commercial, residential, and industrial areas (EPA, 1999). Implementation of bioretention for stormwater management is ideal for median strips, parking lot islands, and swales. Moreover, the runoff in these areas can be designed to either divert directly into the bioretention area or convey into the bioretention area by a curb and gutter collection system.

The best location for bioretention areas is upland from inlets that receive sheet flow from graded areas and at areas that will be excavated (EPA, 1999). In order to maximize treatment effectiveness, the site must be graded in such a way that minimizes erosive conditions as sheet flow is conveyed to the treatment area. Locations where a bioretention area can be readily incorporated into the site plan without further environmental damage are preferred. Furthermore, to effectively minimize sediment loading in the treatment area, bioretention only should be used in stabilized drainage areas.

Additional Design Guidelines

The layout of the bioretention area is determined after site constraints such as location of utilities, underlying soils, existing vegetation, and drainage are considered (EPA, 1999). Sites with loamy sand soils are especially appropriate for bioretention because the excavated soil can be backfilled and used as the planting soil, thus eliminating the cost of importing planting soil.

The use of bioretention may not be feasible given an unstable surrounding soil stratum, soils with clay content greater than 25 percent, a site with slopes greater than 20 percent, and/or a site with mature trees that would be removed during construction of the BMP.

Bioretention can be designed to be off-line or on-line of the existing drainage system (EPA, 1999). The drainage area for a bioretention area should be between 0.1 and 0.4 hectares (0.25 and 1.0 acres). Larger drainage areas may require multiple bioretention areas. Furthermore, the maximum drainage area for a bioretention area is determined by the expected rainfall intensity and runoff rate. Stabilized areas may erode when velocities are greater than 5 feet per second (1.5 meter per second). The designer should determine the potential for erosive conditions at the site.

The size of the bioretention area, which is a function of the drainage area and the runoff generated from the area is sized to capture the water quality volume.

The recommended minimum dimensions of the bioretention area are 15 feet (4.6 meters) wide by 40 feet (12.2 meters) long, where the minimum width allows enough space for a dense, randomly-distributed area of trees and shrubs to become established. Thus replicating a natural forest and creating a microclimate, thereby enabling the bioretention area to tolerate the effects of heat stress, acid rain, runoff pollutants, and insect and disease infestations which landscaped areas in urban settings typically are unable to tolerate. The preferred width is 25 feet (7.6 meters), with a length of twice the width. Essentially, any facilities wider than 20 feet (6.1 meters) should be twice as long as they are wide, which promotes the distribution of flow and decreases the chances of concentrated flow.

In order to provide adequate storage and prevent water from standing for excessive periods of time the ponding depth of the bioretention area should not exceed 6 inches (15 centimeters). Water should not be left to stand for more than 72 hours. A restriction on the type of plants that can be used may be necessary due to some plants' water intolerance. Furthermore, if water is left standing for longer than 72 hours mosquitoes and other insects may start to breed.

The appropriate planting soil should be backfilled into the excavated bioretention area. Planting soils should be sandy loam, loamy sand, or loam texture with a clay content ranging from 10 to 25 percent.

Generally the soil should have infiltration rates greater than 0.5 inches (1.25 centimeters) per hour, which is typical of sandy loams, loamy sands, or loams. The pH of the soil should range between 5.5 and 6.5, where pollutants such as organic nitrogen and phosphorus can be adsorbed by the soil and microbial activity can flourish. Additional requirements for the planting soil include a 1.5 to 3 percent organic content and a maximum 500 ppm concentration of soluble salts.

Soil tests should be performed for every 500 cubic yards (382 cubic meters) of planting soil, with the exception of pH and organic content tests, which are required only once per bioretention area (EPA, 1999). Planting soil should be 4 inches (10.1 centimeters) deeper than the bottom of the largest root ball and 4 feet (1.2 meters) altogether. This depth will provide adequate soil for the plants' root systems to become established, prevent plant damage due to severe wind, and provide adequate moisture capacity. Most sites will require excavation in order to obtain the recommended depth.

Planting soil depths of greater than 4 feet (1.2 meters) may require additional construction practices such as shoring measures (EPA, 1999). Planting soil should be placed in 18 inches or greater lifts and lightly compacted until the desired depth is reached. Since high canopy trees may be destroyed during maintenance the bioretention area should be vegetated to resemble a terrestrial forest community ecosystem that is dominated by understory trees. Three species each of both trees and shrubs are recommended to be planted at a rate of 2500 trees and shrubs per hectare (1000 per acre). For instance, a 15 foot (4.6 meter) by 40 foot (12.2 meter) bioretention area (600 square feet or 55.75 square meters) would require 14 trees and shrubs. The shrub-to-tree ratio should be 2:1 to 3:1.

Trees and shrubs should be planted when conditions are favorable. Vegetation should be watered at the end of each day for fourteen days following its planting. Plant species tolerant of pollutant loads and varying wet and dry conditions should be used in the bioretention area.

The designer should assess aesthetics, site layout, and maintenance requirements when selecting plant species. Adjacent non-native invasive species should be identified and the designer should take measures, such as providing a soil breach to eliminate the threat of these species invading the bioretention area. Regional landscaping manuals should be consulted to ensure that the planting of the bioretention area meets the landscaping requirements established by the local authorities. The designers should evaluate the best placement of vegetation within the bioretention area. Plants should be placed at irregular intervals to replicate a natural forest. Trees should be placed on the perimeter of the area to provide shade and shelter from the wind. Trees and shrubs can be sheltered from damaging flows if they are placed away from the path of the incoming runoff. In cold climates, species that are more tolerant to cold winds, such as evergreens, should be placed in windier areas of the site.

Following placement of the trees and shrubs, the ground cover and/or mulch should be established. Ground cover such as grasses or legumes can be planted at the beginning of the growing season. Mulch should be placed immediately after trees and shrubs are planted. Two to 3 inches (5 to 7.6 cm) of commercially-available fine shredded hardwood mulch or shredded hardwood chips should be applied to the bioretention area to protect from erosion.

Maintenance

The primary maintenance requirement for bioretention areas is that of inspection and repair or replacement of the treatment area's components. Generally, this involves nothing more than the routine periodic maintenance that is required of any landscaped area. Plants that are appropriate for the site, climatic, and watering conditions should be selected for use in the bioretention cell. Appropriately selected plants will aide in reducing fertilizer, pesticide, water, and overall maintenance requirements. Bioretention system components should blend over time through plant and root growth, organic decomposition, and the development of a natural

soil horizon. These biologic and physical processes over time will lengthen the facility's life span and reduce the need for extensive maintenance.

Routine maintenance should include a biannual health evaluation of the trees and shrubs and subsequent removal of any dead or diseased vegetation (EPA, 1999). Diseased vegetation should be treated as needed using preventative and low-toxic measures to the extent possible. BMPs have the potential to create very attractive habitats for mosquitoes and other vectors because of highly organic, often heavily vegetated areas mixed with shallow water. Routine inspections for areas of standing water within the BMP and corrective measures to restore proper infiltration rates are necessary to prevent creating mosquito and other vector habitat. In addition, bioretention BMPs are susceptible to invasion by aggressive plant species such as cattails, which increase the chances of water standing and subsequent vector production if not routinely maintained.

In order to maintain the treatment area's appearance it may be necessary to prune and weed. Furthermore, mulch replacement is suggested when erosion is evident or when the site begins to look unattractive. Specifically, the entire area may require mulch replacement every two to three years, although spot mulching may be sufficient when there are random void areas. Mulch replacement should be done prior to the start of the wet season.

New Jersey's Department of Environmental Protection states in their bioretention systems standards that accumulated sediment and debris removal (especially at the inflow point) will normally be the primary maintenance function. Other potential tasks include replacement of dead vegetation, soil pH regulation, erosion repair at inflow points, mulch replenishment, unclogging the underdrain, and repairing overflow structures. There is also the possibility that the cation exchange capacity of the soils in the cell will be significantly reduced over time. Depending on pollutant loads, soils may need to be replaced within 5-10 years of construction (LID, 2000).

Cost

Construction Cost

Construction cost estimates for a bioretention area are slightly greater than those for the required landscaping for a new development (EPA, 1999). A general rule of thumb (Coffman, 1999) is that residential bioretention areas average about $3 to $4 per square foot, depending on soil conditions and the density and types of plants used. Commercial, industrial and institutional site costs can range between $10 to $40 per square foot, based on the need for control structures, curbing, storm drains and underdrains.

Retrofitting a site typically costs more, averaging $6,500 per bioretention area. The higher costs are attributed to the demolition of existing concrete, asphalt, and existing structures and the replacement of fill material with planting soil. The costs of retrofitting a commercial site in Maryland, Kettering Development, with 15 bioretention areas were estimated at $111,600.

In any bioretention area design, the cost of plants varies substantially and can account for a significant portion of the expenditures. While these cost estimates are slightly greater than those of typical landscaping treatment (due to the increased number of plantings, additional soil excavation, backfill material, use of underdrains etc.), those landscaping expenses that would be required regardless of the bioretention installation should be subtracted when determining the net cost.

Perhaps of most importance, however, the cost savings compared to the use of traditional structural stormwater conveyance systems makes bioretention areas quite attractive financially. For example, the use of bioretention can decrease the cost required for constructing stormwater conveyance systems at a site. A medical office building in Maryland was able to reduce the amount of storm drain pipe that was needed from 800 to 230 feet - a cost savings of $24,000 (PGDER, 1993). And a new residential development spent a total of approximately $100,000 using bioretention cells on each lot instead of nearly $400,000 for the traditional stormwater ponds that were originally planned (Rappahanock,). Also, in residential areas, stormwater management controls become a part of each property owner's landscape, reducing the public burden to maintain large centralized facilities.

Maintenance Cost

The operation and maintenance costs for a bioretention facility will be comparable to those of typical landscaping required for a site. Costs beyond the normal landscaping fees will include the cost for testing the soils and may include costs for a sand bed and planting soil.

References and Sources of Additional Information

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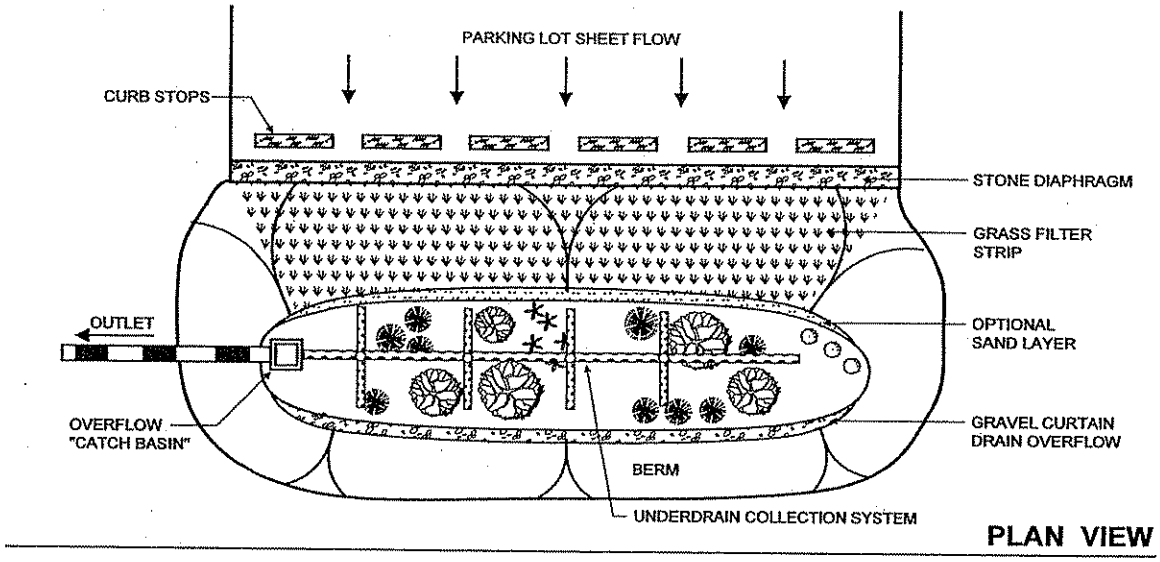
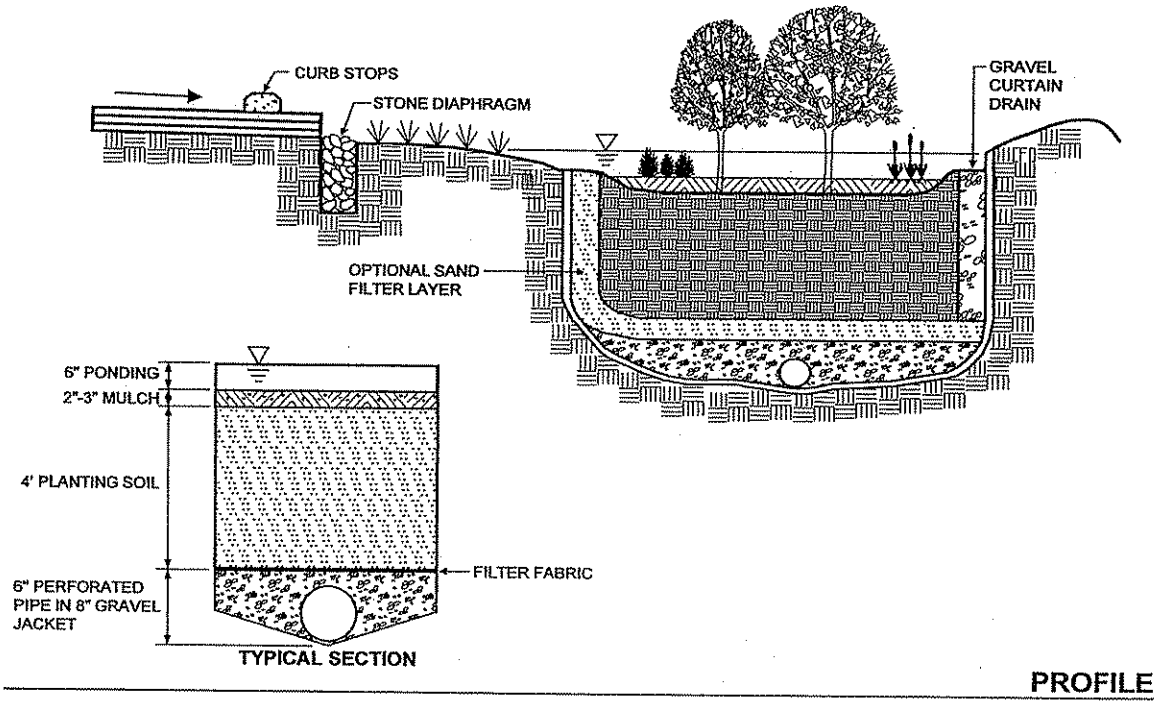
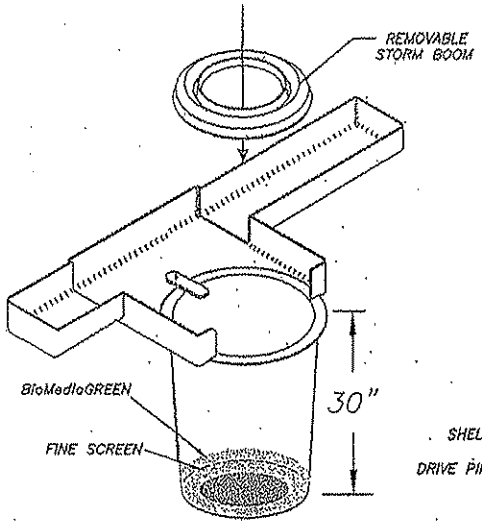




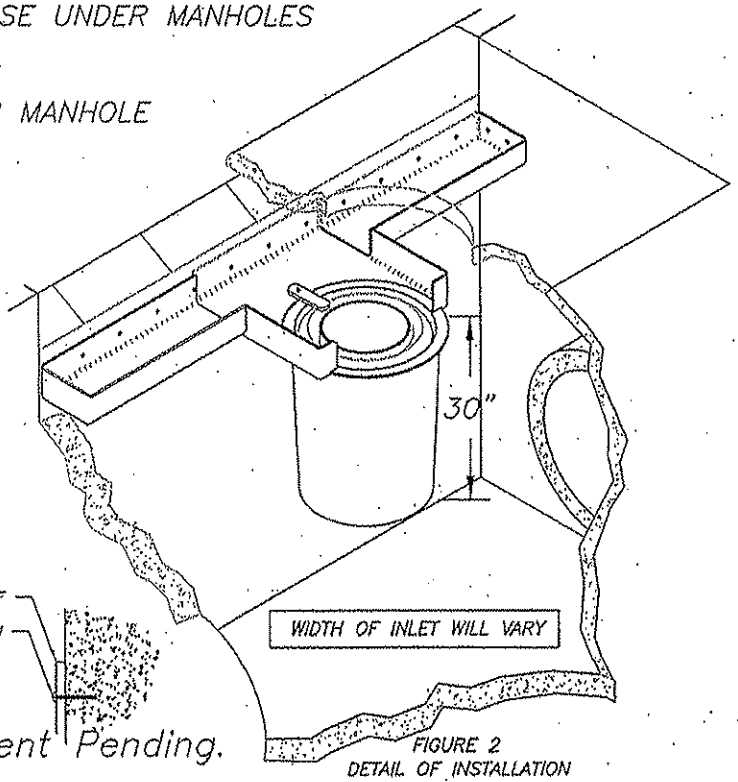
Schematic of a Bioretention Facility (MDE, 2000)

ENVIRO-SAFE HIGH CAPACITY MEDIA FILTER ROUND CURB INLET BASKET SYSTEM FOR USE UNDER MANHOLES

ROUND GISB FOR MOUNTING UNDER MANHOLE



DETAIL OF PARTS
FIGURE 1



Patent Pending.

FIGURE 2
DETAIL OF INSTALLATION

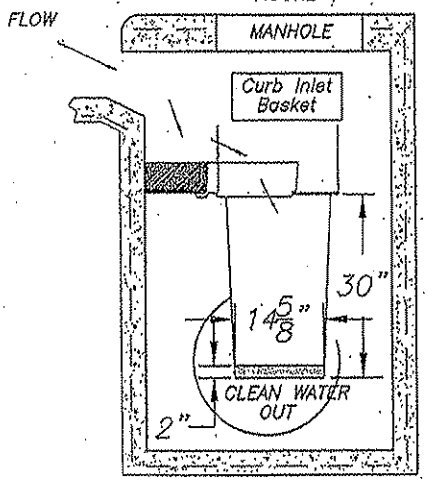


FIGURE 3
DETAIL OF PROCESS

FLOW RATES per Basket				
$Q=SO*c_d*A\sqrt{2*g*h}$		c_d = .67		
	SO	$A(ft^2)$	h (in)	Q (gpm)
BioMediaGREEN		1.06	2.0	0.212

BioMediaGREEN THIRD PARTY TESTED REMOVAL EFFICIENCIES

TPH (HYDROCARBONS) – 95% – Wave Environmental
FINE TSS – 85.4% – Wave Environmental (SA=Qo=SB 100)
DISSOLVED METALS – 52% to 92% – Wave Environmental
DISSOLVED PHOSPHORUS – 60% – Wave Environmental
BACTERIA/FECAL COLIFORM – 52% – Wave Environmental

REMOVABLE BASKET CATCHES EVERYTHING AND MAY BE REMOVED THROUGH MANHOLE WITHOUT ENTRY.

5 YEAR MANUFACTURERS WARRANTY

PATENTED

ALL FILTER SCREENS ARE STAINLESS STEEL

NOTES:

1. SHELF SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO BASKET.
2. SHELF SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS,GEL COATED FOR UV PROTECTION.
3. SHELF SYSTEM ATTACHED TO THE CATCH BASIN WITH NON-CORROSIVE HARDWARE.
4. FILTRATION BASKET STRUCTURE MANUFACTURED OF MARINE GRADE FIBERGLASS,GEL COATED FOR UV PROTECTION.
5. FILTRATION BASKET FINE SCREEN AND COARSE CONTAINMENT SCREEN MANUFACTURED FROM STAINLESS STEEL.
6. FILTRATION BASKET HOLDS BOOM OF ABSORBENT MEDIA TO CAPTURE HYDROCARBONS. BOOM IS EASILY REPLACED WITHOUT REMOVING MOUNTING HARDWARE.
7. FILTRATION BASKET LOCATION IS DIRECTLY UNDER MANHOLE FOR EASY MAINTENANCE.

SUNTREE QUALITY PRODUCTS ARE BUILT FOR EASY CLEANING AND ARE DESIGNED TO BE PERMANENT INFRASTRUCTURE AND SHOULD LAST FOR DECADES.

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P.O. BOX 869, OCEANSIDE, CA. 92049
760-433-7640 FAX: 760-433-3176
Email: info@bioclecanenvironmental.net

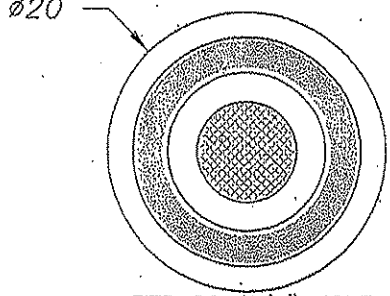
CURB INLET BASKET SYSTEM

DATE: 04/12/04 | SCALE: SF = .15
DRAFTER: N.R.B. | UNITS = INCHES

PROJECT:
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:
REVISIONS: DATE:

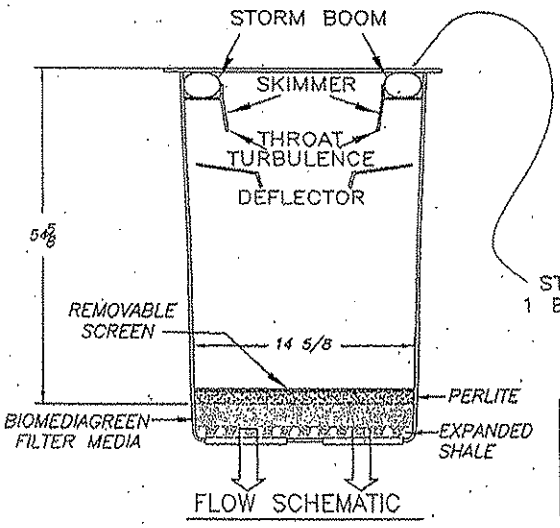
ENVIRO-SAFE HIGH CAPACITY MEDIA FILTER ROUND CURB INLET BASKET SYSTEM FOR USE UNDER MANHOLES

TOP VIEW

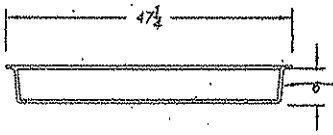


FITS 20-3/8" HOLE

FLOW RATES per Basket				
$Q = SO * c_d * A\sqrt{2*g*h}$ c_d = Coefficient of Discharge = .67				
	SO	A(ft^2)	h (in)	Q ($\frac{ft^3}{s}$)
FILTER PACK		1.06	2	.212



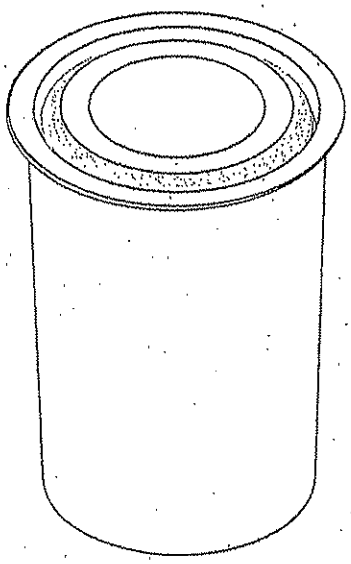
STORM BOOM
1 EA 57" LONG

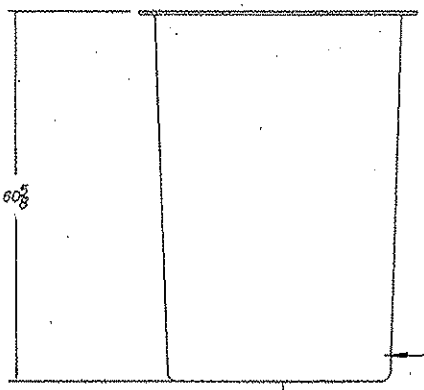


extension for tapered manhole lid with center drop

FIGURE 2
DETAIL OF INSTALLATION

REMOVE MANHOLE
INSERT GISB
REINSTALL MANHOLE





MEDIA PACK

FINE SCREEN

SIDE VIEW

5 YEAR MANUFACTURERS WARRANTY

ALL FILTER SCREENS ARE STAINLESS STEEL

BOX MANUFACTURED FROM MARINE GRADE FIBERGLASS & GEL COATED FOR UV PROTECTION

PATENTED

SUNTREE QUALITY PRODUCTS ARE BUILT FOR EASY CLEANING AND ARE DESIGNED TO BE PERMANENT INFRASTRUCTURE AND SHOULD LAST FOR DECADES.

BioMediaGREEN THIRD PARTY TESTED REMOVAL EFFICIENCIES

- TPH (HYDROCARBONS) – 99% – Waves Environmental
- FINE TSS – 85.4% – Waves Environmental (Sil-Co-Sil 106)
- DISSOLVED METALS – 52% to 98% – Waves Environmental
- DISSOLVED PHOSPHORUS – 69% – Waves Environmental
- BACTERIA/FECAL COLIFORM – 68% – Waves Enviornmental

BIO CLEAN ENVIRONMENTAL SERVICE
P.O. BOX 869, OCEANSIDE, CA. 92049
760-433-7640 FAX: 760-433-3176
Email: info@bioceanenvironmental.net

DATE: 01/11/05 | SCALE: SF = 15

DRAFTER: N.R.B. | UNITS = INCHES

PROJECT:

REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
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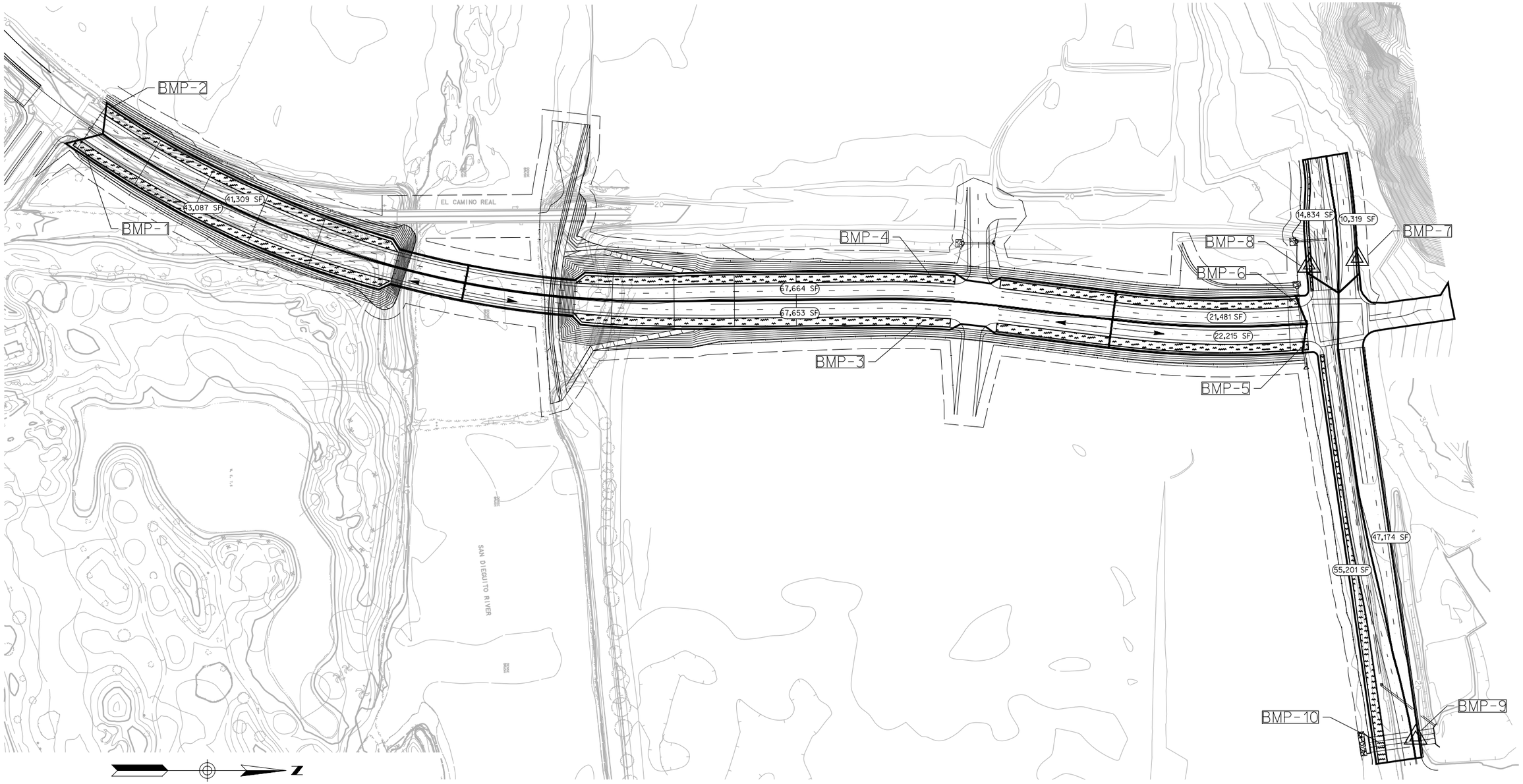
Attachment 10:

Site Map for El Camino Real Bridge Project on the San Dieguito River



200 100 0 200 400 600

GRAPHIC SCALE 1" = 200'

TREATMENT CONTROL BMP LEGEND

- LOCATION OF PROPOSED FILTRATION BMP
- LOCATION OF PROPOSED LANDSCAPE AREAS TO INCLUDE BIORETENTION BMPs

GENERAL LEGEND

- DRAINAGE BOUNDARY TO BMP
- X,XXX SF — TRIBUTARY AREA TO BMP
- BMP-X — BMP ID
- DIRECTION OF FLOW

NOTES

THESE POST-CONSTRUCTION BMPs ARE DISCUSSED IN MORE DETAIL WITHIN THIS STORM WATER DATA REPORT.

STORM WATER DATA REPORT EXHIBIT FOR EL CAMINO REAL ROAD/BRIDGE WIDENING PROJECT ON SAN DIEGUITO RIVER

Date: June 22, 2012

J-14752-C Revised: August 17, 2012

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165
rickengineering.com
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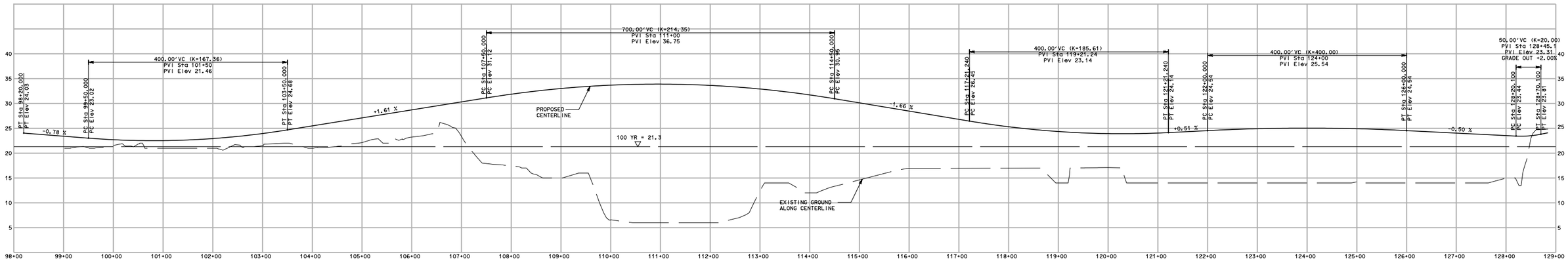
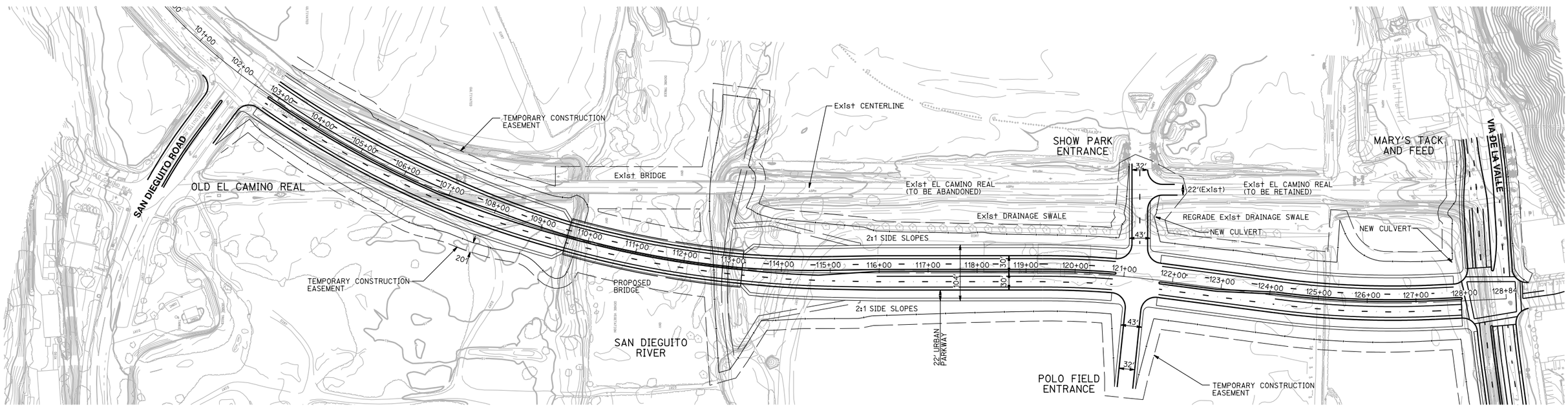
NOT FOR CONSTRUCTION - EXHIBIT FOR STORM WATER DATA REPORT ONLY



PROFILE

SCALE: 1" = 200' (Horiz)
1" = 20' (Vert)



PLAN

SCALE: 1" = 200'

FOR VIA DE LA VALLE PORTION, SEE FIGURE 2-11

EL CAMINO REAL ROAD/BRIDGE WIDENING

EASTERN ALIGNMENT PLAN AND PROFILE

JOB NO. 14752
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DATE: MARCH, 2012

FIGURE
2-9

HYDROLOGIC AND HYDRAULIC REPORT FOR EL CAMINO REAL ROAD/BRIDGE WIDENING PROJECT ON THE SAN DIEGUITO RIVER (CONSTRUCTION PHASE)

Federal Project Number BHL0-5004 (068)
Job Number 14752-C

May 13, 2013

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HYDROLOGIC AND HYDRAULIC REPORT
FOR
EL CAMINO REAL ROAD/BRIDGE WIDENING PROJECT ON THE SAN DIEGUITO RIVER (CONSTRUCTION PHASE)

Federal Project Number BHL0-5004 (068)
Job Number 14752-C

Jayne M. Janda-Timba, P.E.
R.C.E. #70649
Exp. 06/13

REGISTERED PROFESSIONAL ENGINEER
JAYNE MARIE JANDA-TIMBA
NO. 70649
EXP. 6/30/13
CIVIL
STATE OF CALIFORNIA

Prepared By:

Rick Engineering Company
Water Resources Division
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707

May 13, 2013

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Attachment 1: Hydrologic Backup Information

Attachment 2: Hec-1 Output
2-Year Storm Event (6 – hour Precipitation)
2-Year Storm Event (24 – hour Precipitation)
1.3-Year Storm Event (1.5” Precipitation)
1.0-Year Storm Event (1.0” Precipitation)

Attachment 3: 1.0-, 1.3-, 2-, 10-, 50- And 100-Year Construction Phase Condition HEC-RAS Analysis: Option 4 - Temporary Construction Berm

Attachment 4: 1.0-, 1.3-, 2-, 10-, 50- And 100-Year Construction Phase Condition HEC-RAS Analysis: Option 5 - Temporary Construction Berm

Attachment 5: 1.0-, 1.3-, 2-, 10-, 50- And 100-Year Construction Phase Condition HEC-RAS Analysis: Option 1 - Temporary Trestle Construction

Attachment 6: 1.0-, 1.3-, 2-, 10-, 50- And 100-Year Construction Phase Condition HEC-RAS Analysis: Option 2 - Temporary Trestle Construction

Attachment 7: Preliminary Eastern Alignment Plan for Proposed El Camino Real Bridge

MAP POCKET

Map Pocket 1: CD of HEC-1, HEC-RAS Models and PDF Version of the Report

1.0 INTRODUCTION

Project Location

The proposed El Camino Real Road/Bridge replacement project proposes bridge construction across the San Dieguito River in the vicinity of the existing bridge crossing. The bridge is approximately 2.8 miles west of where the river outlets into the Pacific Ocean.

This report presents hydrologic and hydraulic analyses specific to the temporary construction phase of the proposed El Camino Real Road Bridge (herein referred to as "the project"). The Vicinity Map, located in Section 2, details the location of the proposed El Camino Real Bridge.

Previously hydraulic analyses were performed for the Central Alignment, Western Alignment, Eastern Alignment, Roundabout Alternative, and Lower Elevation Alternative for El Camino Real Bridge Replacement project, and since the results were very similar, it was decided for the purpose of this report, the Eastern Alignment Alternative will be presented as a preferred alternative.

Project purpose

The purpose of this hydraulic study is to prepare detailed assessment of the hydraulic impacts of proposed temporary construction alternatives anticipated for the proposed El Camino Real Road Bridge replacement. Assessments have been made regarding the hydraulic impacts during various return frequency storm events, as well as during daily flows.

Construction Phase

Two construction alternatives were modeled to analyze the temporary impacts of each to the San Dieguito River water surface elevation and the velocities within the area of study of this project.

Temporary berm construction alternative

The temporary berm models incorporate a temporary construction berm with the following characteristics:

a. Construction of a temporary berm extending approximately 166 feet along the San Dieguito River, that will extend 30' upstream and downstream of the edge of the proposed bridge deck and will tie in with the existing ground of the San Dieguito River within 15 feet length upstream and downstream of the berm ends.
b. The width of the berm will vary based on the height of the fill placed and the left and right bank of San Dieguito River.
c. Three berm height options were utilized with a 5, 6, and 8 foot fill from the lowest elevation of the river bottom with top elevations of 11, 12, and 14 feet respectively. Each berm height alternative was modeled with two different options/openings for the low flow to determine the hydraulic impact of the berm to the San Dieguito River. The two different berm opening options considered are three trapezoidal openings with a 40-foot top width and 3:1 side slopes with opening depths of 2, 3 and 5 feet, or a combination of two trapezoidal openings with opening depths of 3 and 5 feet, and culvert pipe openings of three (3) 24" and (3) 48" plastic or Reinforced Concrete Pipes (RCPs), respectively.
d. It is assumed that each of these berm openings will be constructed by placing a short trestle of 3 feet total height section across the span and that no obstructions below each span are placed.

For each of the above temporary berm construction alternative at least one of the openings shall be located over the existing low flow channel within the San Dieguito River and all of them shall be at the lowest elevation of the river.

Trestle Construction alternative

The temporary construction trestle models incorporate a temporary construction trestle with the following characteristics:

a. Construction of a temporary trestle extending approximately 136 feet along the San Dieguito River that will extend 30' upstream and downstream of the edge of the proposed bridge deck.
b. Trestle piles are grouped in bents constructed using groupings of 18 inch diameter piers spaced at 4' on center (within each bent). Approximately 6 to 7 piles will be needed at each bent. The bents are anticipated to be spaced approximately at 25'on center, with trestle spans between each bent. Trestle is extended full length across the San Dieguito River. The orientation of the bents would be parallel to the bridge piers, and therefore parallel to the river flow.
c. Side trestles needed at each bridge pier location with assumed three bents at 25' spacing with an overall dimension of the width of the structure multiplied by 50'. The trestle height assumed 2 feet.
d. Two trestle height options were utilized with a 3 and 5 foot elevation from the lowest elevation of the river bottom with a trestle bottom elevations of 9 and 11 feet respectively.

Hydrologic analyses

The hydrologic analyses of the tributary watersheds to the San Dieguito River from Lake Hodges upstream and to the location downstream of the existing El Camino Real Road Bridge were performed using the methodology outlined in the April 1984, City of San Diego Drainage Design Manual for the 2-year and smaller storm events. The analyzed watershed encompasses approximately 22,336 acres of land (34.9 square-miles), therefore the SCS Method was utilized.

The FEMA flow rates of 5,900, 32,500 and 42,800 cfs respectively were used for the 10-, 50-, and 100-year storm events.

For the hydrologic analyses performed for the project in this report, the U.S. Army Corps of Engineers' - HEC-1 computer program was used for the 1-, 1.3-, and 2-year storm events.

The results of the hydrologic analyses in this report along with the FEMA flow rates will be used in the hydraulic analyses performed in this report to assess the construction alternatives subject to this report.

Refer to Section 3.0 and 4.0 for more detailed information on the Hydrologic Analysis.

Hydraulic analyses

As a base for the hydraulic models created for the different temporary construction alternatives presented in this report, the following hydraulic studies were used:

> "Hydraulic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Rick Engineering Company, dated April 12, 2012.

The above mentioned hydraulic study includes two earlier hydraulic studies that were prepared for this project. These two additional studies are the following:

> "Hydrologic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Chang Consultants, dated June 2005.

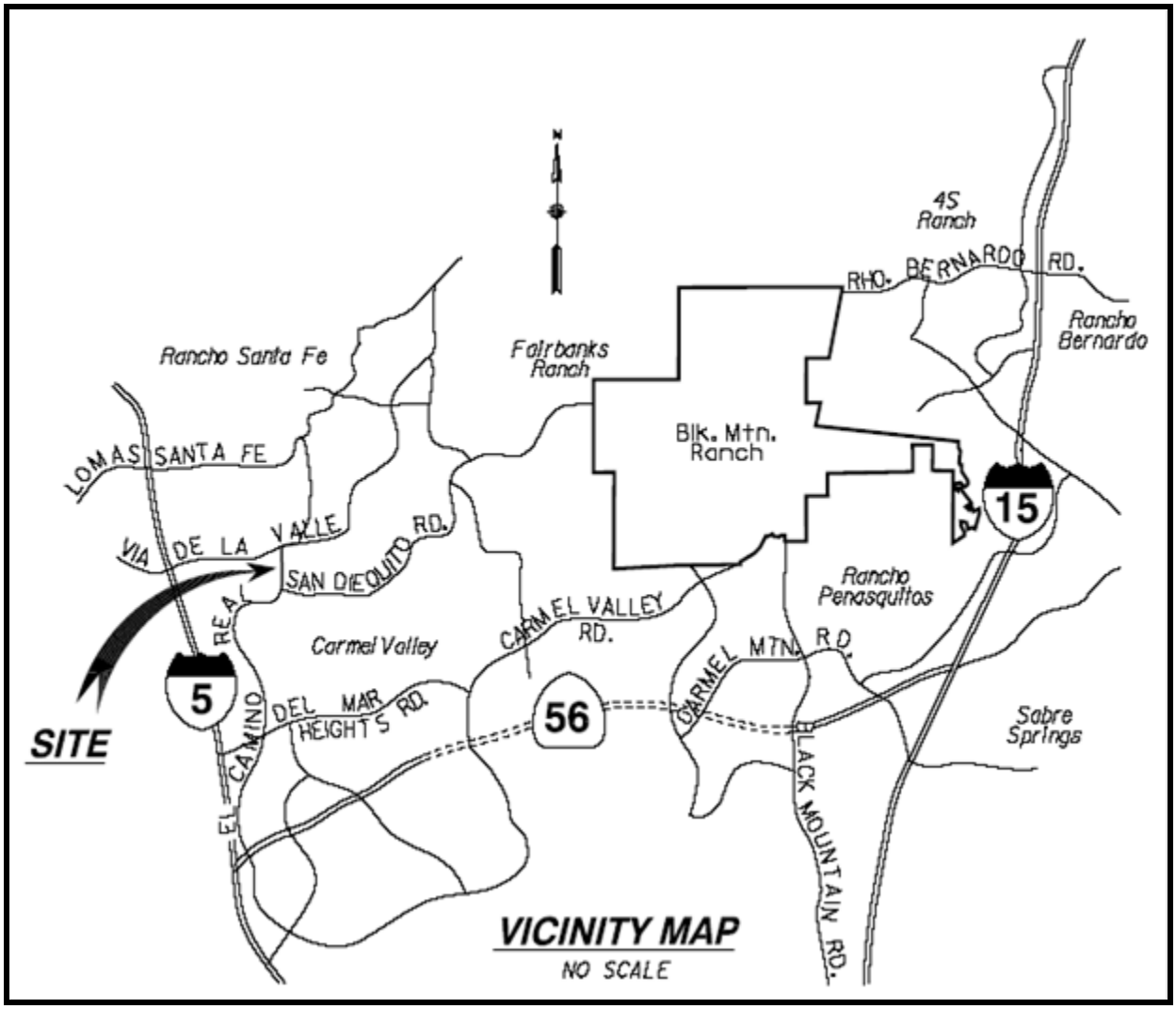
> "Hydraulic and Sediment Modeling of the San Dieguito River for Wetland Creation at the JPA/Boudreau Site," prepared by Chang Consultants, dated November 2005.

The above mentioned "Hydraulic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Rick Engineering Company, dated April 12, 2012, was further developed to reflect the temporary construction alternatives. To analyze the worst case obstruction of flow in the river during construction, the hydraulic models for the proposed condition include the piers from the Existing and the Proposed Bridge (i.e. – constructing the proposed bridge while the existing bridge remains in place).

The U.S. Army Corps of Engineers HEC-RAS 4.1 was used to perform the hydraulic analysis for the different construction alternatives.

Refer to Section 5.0 and 6.0 for more detailed information on the Hydraulic Analysis

2.0 VICINITY MAP



3.0. HYDROLOGIC METHODOLOGY

To determine the peak flow rates of storm water runoff for the existing land use condition, hydrologic analyses of the tributary watershed were prepared. Six watersheds were delineated and it was determined that the overall watershed area downstream of the Lake Hodges Dam to the project location is approximately 34.9 square miles. Per the City of San Diego Drainage Design Manual watersheds greater than one square-mile shall use the SCS Methods, tabular or computer, or U.S. Army Corps of Engineers' - HEC-1 computer method. Due to the size of the watershed area (bigger than 1 square mile) the SCS Method (HEC-1) was used to determine the existing condition flow rates.

The U.S. Army Corps of Engineers' HEC-1 flood hydrograph program was used for the hydrologic analysis of the watershed tributary to the San Dieguito River downstream of El Camino Real existing bridge location. The analysis involved calculating and comparing the surface runoff for existing condition. Type B rainfall distribution was created for the 6-hour and 24-hour storm durations. The 6-hour and 24-hour 2-year storm event was first analyzed in order to determine which storm duration created a higher peak runoff. It was determined that the precipitation for the 6-, and 24-hour durations from the County of San Diego Hydrology Manual, June 2003 isopluvial maps will be 1.3" and 2.0" respectively. It was determined that the 24-hour storm duration provided higher peak runoff, and was therefore used for the remaining analyses. The 10-, 5-, and 2-year storm events, 24-hour storm duration precipitations were plotted on log-probability to determine an approximate precipitation slope/distribution. On this slope/distribution, the 1.5" and 1.0" precipitations were plotted and equated to a return frequency storm event of 1.0- and 1.3-year storm event. Copies of the 2-year 6-hour and 2-year 24-hour HEC-1 analyses have been provided in Attachment 2 of this report, and the 24-hour only for the 1.0-and 1.3-year storm events.

The HEC-1 program has the ability to simulate both natural and improved or developed watersheds, and the impact of detention within the watershed. HEC-1 modeling parameters include basin area, lag time, precipitation and corresponding rainfall distribution, curve number, and detention routing. The sources of these parameters are discussed in more detail below.

Topographic Information

Topographic information used to develop the Existing Condition watershed boundaries was based on 1999 City of San Diego 2-foot contours wherever available, GIS based 40-foot USGS contours and imagery, and GIS based storm drain alignments obtained from the City of San Diego. All hydrologic data is on NGVD 29 vertical datum.

Runoff Curve Number

The SCS Synthetic unit hydrograph with curvilinear transformation was used to develop runoff hydrographs for the watershed. This unit hydrograph is dimensionless and is a function of the watershed area and lag time. Lag time for the watershed was calculated using criteria presented in the San Diego County Hydrology Manual. Runoff was estimated using SCS curve numbers for the watershed. The runoff curve number is used as a representation of the physical watershed characteristics, and is determined based on the distribution of land uses, and hydrologic soil types within the watershed. The curve numbers were calculated based on SSURGO Hydrologic Soil data (2007), SanGIS vegetative cover data, and City of San Diego existing land use data (January 14, 2009). Exhibits showing the hydrologic soil type and land use information for the tributary watersheds are included in Attachment 1 of this report.

The Curve Numbers calculated for the HEC-1 watersheds have been adjusted based on the Precipitation Zone Number (PZN), in accordance with County criteria.

Lag Calculations

The lag calculations recommended for use in the County of San Diego is NRCS Lag. NRCS Lag is calculated by adjusting the Corps Lag. The following are the corresponding formulas for calculating lag:

$$\textbf{Corps } T_l \textbf{ (hours)} = 24\, n\, ((L x L_c) / s^{0.5})^m$$

$$T_p = 0.862 \text{ Corps } T_l$$

$$\text{NRCS } T_l = T_p - D/2$$

Where:

n = basin factor Manning's n

L = Length of watercourse (miles)

L_c = Length from discharge point to centroid of watercourse (miles)

s = slope of watershed (feet/mile)

m = constant = 0.38 for San Diego County

D = HEC-1 computation interval (hours)

Precipitation

The 2-year precipitation values for the watershed were obtained from the Isopluvial maps included in the *June 2003 County Hydrology Manual*. The 2-year precipitation for the 6- and 24-hour duration was determined to be 1.3 and 2 inches respectively.

Backup for the Isopluvials, Lag, Curve Number Calculations and PZN Condition adjustment factor are included in Attachment 1 of this report.

4.0 HYDROLOGIC RESULTS

The following table presents a summary of the 1.0-, 1.3- and 2-year peak flow rates information at varying confluence locations.

Table 4.1: Summary of Peak Flow Rates within the San Dieguito River

Location Id	Total Tributary area (sqmi)	Peak Flow Rates (cfs) 1.0-year	Peak Flow Rates (cfs) 1.3-year	Peak Flow Rates (cfs) 2-year
A	3.5	173	647	1,306
B	20.4	425	1,397	2,707
C	34.5	427	1,629	3,462
D	34.9	426	1,624	3,450

The peak flow rates for the 1-, 1.3-, and 2-year storm events from Table 4.1 were used in the hydraulic models for the hydraulic study performed in this report. HEC-1 backup material is located in Attachment 1 and Attachment 2.

5.0 HYDRAULIC METHODOLOGY

The U.S. Army Corps of Engineers HEC-River Analysis System (HEC-RAS) was used to model the hydraulic characteristics of the San Dieguito River temporary construction phase study. HEC-RAS has the capability to model subcritical, supercritical, and mixed flow. HEC-RAS calculates water surface profiles based on the energy equation and the momentum equation. Geometric information, Manning's roughness and discharge as well as any known boundary conditions are required to complete the hydraulic model.

The following information describes the input parameters utilized for the portion of the San Diego River subject to this hydraulic study for the temporary construction phase of the El Camino Real Bridge.

Temporary Construction Phase

Two construction alternatives were modeled to analyze the temporary impacts to the San Dieguito River water surface elevation and the velocities within the area of study for this project.
For each alternative multiple hydraulic models were created.

Temporary berm construction

The following five options were created for the temporary construction berm alternative:

Option 1: 6- foot fill berm with two (2) - 3 foot deep trapezoidal berm openings with 3:1 side slopes, and three (3)-24" culverts (plastic or RCP) with a 3 foot total height trestle section across the berm openings span,

Option 2: 8- foot fill berm with two (2) - 5 foot deep trapezoidal berm openings with 3:1 side slopes and three (3)-48" culverts with a 3 foot total height trestle section across the berm openings span,

Option 3: 5- foot fill berm with three (3) - 2 foot deep trapezoidal berm openings with 3:1 side slopes with a 3 foot total height trestle section across the berm openings span,

Option 4: 6- foot fill berm with three (3) - 3 foot deep trapezoidal berm openings with 3:1 side slopes with a 3 foot total height trestle section across the berm openings span, and

Option 5: 8- foot fill berm with three (3) - 5 foot deep trapezoidal berm openings with 3:1 side slopes with a 3 foot total height trestle section across the berm openings span.

The top of each berm opening was assumed to be 40 feet wide with a total open area of 68 sqft, 93 sqft, and 125 sqft for the 2 foot, 3 foot and 5 foot berm respectively. At least one of the openings shall be located over the existing low flow channel within the San Dieguito River.

Temporary trestle construction

The following two options were created for the temporary construction trestle alternative:

Option 1: The trestle bottom elevation 3 - feet above lowest elevation within the channel cross-section, and

Option 2: The trestle bottom elevation 5 - feet above lowest elevation within the channel cross-section.

For each trestle option, a trestle was assumed to be set on the top of the piles and connected to them. The total height of the trestle construction was assumed to be 2 feet.

Hydraulic models were prepared for the existing and temporary construction alternatives condition, analyzing 100-, 50-, 10-year utilizing FEMA flow rates of 42,800, 32,500 and 5,900 cfs, respectively, and 2-, 1.3-, and 1.0-year storm events utilizing flow rates from the hydrologic study performed and presented in this report with flow rates of 3,450, 1,624 and 426 cfs, respectively. Also, another consideration for the temporary construction alternatives is comparing their capacity to convey the daily low-flows in the San Dieguito River, therefore the average daily flow-rates were also identified.

Average daily Flow-Rate

The gage stations along the San Dieguito River downstream of Lake Hodges are inactive and there are no known sufficient dry weather stream flow data available for this river channel. Average daily stream flow data was available only for the San Dieguito River at North Del Mar gage station, and this data is included in the Attachment 1 for reference. The average daily flow data is 3.7 cfs. Conservatively, it was determined to double the available average daily flow data and a flow rate of 7.4 cfs will be taken into consideration for the average daily flows for the temporary construction berm alternative.

6.0 HYDRAULIC RESULTS

Eastern Alignment

A summary of the water surface elevations and velocities for the San Dieguito River immediately upstream of El Camino Real Road Bridge from the "Hydraulic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Rick Engineering Company, dated April 12, 2012 is presented below in Tables 6.1 and 6.2 for the existing and proposed condition.

Table 6.1: Summary of the 100-, 50-, and 10-Year, Water Surface Elevations Upstream of Proposed El Camino Real Road Bridge (HEC-RAS Cross Section 2,649) On San Dieguito River

Hydraulic Model Condition	100-Year Storm Event (42,800 cfs) WSE (feet)	50-Year Storm Event (32,500 cfs) WSE (feet)	10-Year Storm Event (5,900 cfs) WSE (feet)
Existing Condition	21.9	20.2	13.3
Proposed Eastern Alignment	20.8	18.9	12.7

Table 6.2: Summary of the 100-, 50-, and 10-Year Velocities Upstream of Proposed El Camino Real Road Bridge (HEC-RAS Cross Section 2,649) On San Dieguito River

Hydraulic Model Condition	100-Year Storm Event (42,800 cfs) Velocity (ft/second)	50-Year Storm Event (32,500 cfs) Velocity (ft/second)	10-Year Storm Event (5,900 cfs) Velocity (ft/second)
Existing Condition	5.7	5.3	2.9
Proposed Eastern Alignment	9.2	7.8	2.8

The results of the existing and proposed condition from the "Hydraulic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Rick Engineering Company, dated April 12, 2012 are showing that there will be no increase to WSELs due to the proposed El Camino Real Bridge replacement project. There are also no significant increases in velocities up to and including the 10-year storm event. Larger storm events do result in erosive velocities for both the existing and proposed conditions. Refer to the 2012 study for more detailed information on existing and proposed conditions, as this report is specifically meant to address temporary conditions during construction.

Temporary berm construction

The temporary berm construction alternative analyzed 5 different options. The results from the hydraulic analyses for Option 1, 2 and 3 were showing that the proposed low flow trapezoidal channels with the temporary culverts were not sufficient to convey even the 1.0-year storm event, therefore the results will not be presented in this report.

A summary of the hydraulic impact of Option 4 and Option 5 are presented below in Table 6.3 and 6.4. See Attachment 3 and 4 for the 1.0-, 1.3-, 2-, 10-, 50- And 100-Year Construction Phase Condition HEC-RAS Analysis: Option 4 and 5 - Temporary Construction Berm.

Table 6.3: Summary of the Hydraulic Impact - Temporary Construction Berm, Option 4

6' Berm Option with three 3 foot high berm openings - Option 4						
Berm Deck High Chord EL	12					
Berm Deck Low Chord EL	9					
River Flowline Elevation (ft)	6.0	6.0	6.0	6.0	6.0	6.0
Opening Area (sq. ft.)[1]	279					
Storm Event	1.0" (1.0-Year)	1.5" (1.3-Year)	2" (2-Year)	10-Year	50-Year	100-Year
Q (cfs)	426	1,624	3,450	5,900	32,500	42,800
Existing Condition[2]						
WSEL (ft)	7.8	10.3	11.9	13.3	20.2	21.9
Flow Velocity (fps)	1.6	1.7	2.3	2.9	5.3	5.7
6' Berm Option with 3-3' height berm openings - Option 4						
WSEL (ft)	7.8	11.3	13.6	14.7	21.4	23.3
Flow Velocity (fps)	2.9	1.7	2.1	2.9	7.6	8.7
WSEL Increase @ sta 2.649 (ft)	0.0	1.0	1.7	1.4	1.2	1.4
Maximum WSEL Increase (ft)[4]	0.0	1.9	2.0	1.8	2.3	2.7

Notes:

[1] - Opening area of the proposed three berm openings at the bottom of the San Dieguito River

[2] - Existing Condition data based on interpolated cross-section 2.649

[3] - Temporary 3' berm option with 3-berm openings based on cross-section 2.649

[4] - Maximum WSEL elevation impact throughout all cross-sections.

Table 6.4: Summary of the Hydraulic Impact - Temporary Construction Berm, Option 5

8' Berm Option with three 5 foot high berm openings - Option 5						
Berm Deck High Chord EL	14					
Berm Deck Low Chord EL	11					
River Flowline Elevation (ft)	6.0	6.0	6.0	6.0	6.0	6.0
Opening Area (sq. ft.)[1]	375					
Storm Event	1.0" (1.0-Year)	1.5" (1.3-Year)	2" (2-Year)	10-Year	50-Year	100-Year
Q (cfs)	426	1,624	3,450	5,900	32,500	42,800
Existing Condition[2]						
WSEL (ft)	7.8	10.3	11.9	13.3	20.2	21.9
Flow Velocity (fps)	1.6	1.7	2.3	2.9	5.3	5.7
8' Berm Option with 3-5' height berm openings - Option 5						
WSEL (ft)	8.4	10.4	14.4	16.2	22.9	24.7
Flow Velocity (fps)	3.5	5.3	2.4	2.9	7.6	8.7
WSEL Increase @ sta 2.649 (ft)	0.6	0.1	2.5	2.9	2.7	2.8
Maximum WSEL Increase (ft)[4]	0.6	0.7	3.3	3.4	3.8	4.1

Notes:

[1] - Opening area of the proposed three berm openings at the bottom of the San Dieguito River

[2] - Existing Condition data based on interpolated cross-section 2.649

[3] - Temporary 5' berm option with 3-berm openings based on cross-section 2.649

[4] - Maximum WSEL elevation impact throughout all cross-sections.

Temporary trestle construction

A summary of the hydraulic impact of Option 1 and Option 2 are presented below in Table 6.5 and Table 6.6. See Attachment 5 and 6 for the 1.0-, 1.3-, 2-, 10-, 50- And 100-Year Construction Phase Condition HEC-RAS Analysis: Option 1 and 2 - Temporary Trestle ConstructionTable 6.5: Summary of the Hydraulic Impact - Temporary Trestle Construction, Option 1

Trestle Option with 3 foot high opening - Option 1						
Trestle Deck High Chord EL	11					
Trestle Deck Low Chord EL	9					
River Flowline Elevation (ft)	6.0	6.0	6.0	6.0	6.0	6.0
Opening Area (sq. ft.)[1]	768					
Storm Event	1.0" (1.0-Year)	1.5" (1.3-Year)	2" (2-Year)	10-Year	50-Year	100-Year
Q (cfs)	426	1,624	3,450	5,900	32,500	42,800
Existing Condition[2]						
WSEL (ft)	7.8	10.3	11.9	13.3	20.2	21.9
Flow Velocity (fps)	1.6	1.7	2.3	2.9	5.3	5.7
Trestle Option with 3' height piles - Option 1						
WSEL (ft)	7.6	10.1	12.1	13.4	20.3	22.2
Flow Velocity (fps)	0.9	1.4	1.9	2.7	7.2	8.3
WSEL Increase @ sta 2.649(ft)	-0.2	-0.2	0.2	0.1	0.1	0.3
Maximum WSEL Increase (ft)[4]	0.0	0.0	0.4	0.3	1.1	1.5

Notes:

[1] - Opening area between the proposed trestle piles within the San Dieguito River @ cross-section 2.649

[2] - Existing Condition data based on interpolated cross-section 2.649

[3] - Temporary trestle construction option with 3 feet pile height based on cross-section 2.649

[4] - Maximum WSEL elevation impact throughout all cross-sections.

Table 6.6: Summary of the Hydraulic Impact - Temporary Trestle Construction, Option 2

Trestle Option with 5 foot high opening - Option 2						
Trestle Deck High Chord EL	13					
Trestle Deck Low Chord EL	11					
River Flowline Elevation (ft)	6.0	6.0	6.0	6.0	6.0	6.0
Opening Area (sq. ft.)[1]	1,288					
Storm Event	1.0" (1.0-Year)	1.5" (1.3-Year)	2" (2-Year)	10-Year	50-Year	100-Year
Q (cfs)	426	1,624	3,450	5,900	32,500	42,800
Existing Condition[2]						
WSEL (ft)	7.8	10.3	11.9	13.3	20.2	21.9
Flow Velocity (fps)	2.0	1.9	2.6	3.2	2.2	2.1
Trestle Option with 5' height piles - Option 2						
WSEL (ft)	7.6	9.9	11.6	13.6	20.8	22.7
Flow Velocity (fps)	0.9	1.4	2.1	2.6	7.0	8.1
WSEL Increase @ sta 2.649 (ft)	-0.2	-0.4	-0.3	0.3	0.6	0.8
Maximum WSEL Increase (ft)[4]	0.0	0.0	0.0	0.6	1.5	1.9

Notes:

[1] - Opening area between the proposed trestle piles within the San Dieguito River @ cross-section 2.649

[2] - Existing Condition data based on interpolated cross-section 2.649

[3] - Temporary trestle construction option with 5 feet pile height based on cross-section 2.649

[4] - Maximum WSEL elevation impact throughout all cross-sections.

Hydraulic Impacts Summary

A summary of the hydraulic impact based on the results for the four (4) options presented in this report are as follows:

Temporary Construction Berm Alternative

Option 4:

Low Flow Conveyance - Option 4 safely conveys a 1-inch (1.15-year) storm event with 1.2' freeboard to top of berm.

Impact to WSEL: - There will be an increase in WSEL at cross-section 2.649 as a result of this option for all storm events except for the 1.0-year storm event. The WSEL increase during 100-year event at cross-section 2.649 is 1.4 feet. The maximum increase in the WSEL during 100-year throughout the river reach is 2.7 feet. This is due to the obstruction of the berm deck, anticipated fill in the river and decreasing the conveyance of the river in the area of disturbance. However, given the sediment transport characteristics of the river, the berm could be constructed with acceptable riverbed sand to allow washout during larger storm events which would lessen the increase to water surface elevations during construction.

Impact to velocity: There will be an increase in the 1.0-, 50-, and 100-year storm events. However, all storm events equal or less than the 10-year, have velocities that are primarily still non-erosive.

Option 5:

Low Flow Conveyance: - Option 5 safely conveys a 1-inch (1.15-year) and 1.5-inch (1.3-year) storm event with 2.6' and 0.6' freeboard to the bottom of berm deck, respectively.

Impact to WSEL: - There will be an increase in WSEL at cross-section 2.649 as a result of this option for all storm events except for the 1.0-, and 1.3-year storm event. The WSEL increase during 100-year event at cross-section 2.649 is 2.8 feet. The maximum increase in the WSEL during 100-year throughout the river reach is 4.1 feet. This is due to the obstruction of the berm deck, anticipated fill in the river and decreasing the conveyance of

the river in the area of disturbance. However, given the sediment transport characteristics of the river, the berm could be constructed with acceptable riverbed sand to allow washout during larger storm events which would lessen the increase to water surface elevations during construction.

Impact to velocity: There will be an increase in the 1.0-, 1.3-, 50-, and 100-year storm events. However, all storm events equal or less than the 10-year, have velocities that are primarily still non-erosive, although the increase is larger than the alternative berm option (#4).

Temporary Trestle Construction

Option 1:

Low Flow Conveyance - Option 1 safely conveys a 1-inch (1.0-year) storm event with 1.4' freeboard to bottom of the trestle deck, and conveys a 1.5-inch (1.3-year) storm event with 0.7 feet freeboard to top of the trestle deck.

Impact to WSEL: - There is no increase in the WSEL at cross-section 2.649 as a result of this option for the 1.0- year or 1.3-year storm event. There will be an increase throughout the river reach for the 2-, 10-, 50-, and 100-year storm event. The maximum increase in the WSEL during 100-year storm event throughout the river reach is 1.5 feet. This is due to the obstruction of the trestle construction and the decrease of the conveyance due to the piles that support the trestle deck.

Impact to velocity: There will only be an increase in the 50-, and 100-year storm event. Furthermore, all storm events equal or less than the 10-year, have velocities that are non-erosive.

Option 2:

Low Flow Conveyance - This option safely conveys the 1-inch (1.0-year) and 1.5" (1.3-year) storm event with 3.4' and 1.1' freeboard respectively to bottom of the trestle deck. The available conveyance is between 1.3-year (1.5”) and 2-year (2.0”) storm event.

Impact to WSEL - There is no increase in the WSEL at cross-section 2.649 as a result of this option for the 1.0-, 1.3-, and 2.0-year storm events. There will be an increase throughout the river reach for the 10-, 50-, and 100-year storm event. The maximum increase in the WSEL during 100-year storm event throughout the river reach is 1.9 feet. This is due to the obstruction of the trestle construction and the decrease of the conveyance due to the piles that support the trestle deck.

Impact to velocity: There will only be an increase in the 50-, and 100-year storm event. Furthermore, all storm events equal or less than the 10-year, have velocities that are non-erosive.

Overall, the conclusion for the two alternatives with the two options each hydraulic models presented in this report is that they each have capacity to convey the smallest 1.0-year storm event analyzed with a peak flow rate of 462 cfs. With this said, it is not anticipated that the daily low flows within San Dieguito River would surpass the lowest capacity of the proposed temporary construction berm alternative. Several alternatives provide more allowable conveyance, which on its own would be preferred, however, each has offsetting benefits when comparing velocities and water surface elevations.

The study reach of San Dieguito River is a sand bed river and based on the sediment samples taken from the river for the "Hydraulic and Sediment Modeling of the San Dieguito River for Wetland Creation at the JPA/Boudreau Site," prepared by Chang Consultants, dated November 2005 the bed material consist of sand with small amounts of fines (silt and clay) and gravel. The material used to construct the temporary berm shall be similar to the local material of the San Dieguito River in the area of disturbance.

It is important to note that while the hydraulic results for the temporary construction berm alternative are showing a maximum increase within the San Dieguito River upstream of the proposed El Camino Real Bridge higher than 1- foot during larger storm events, the berm

could be designed to washout similar to the riverbed characteristics reflected in previous sediment transport analyses.

Based on an initial review of these four (4) alternatives presented herein, the final construction methods shall be discussed with the Contractor, City, Resource Agencies, and project design team prior to construction to weigh pros and cons of the berm option versus trestle option. A separate memorandum has previously discussed the construction methods analysis as they relate to the following three considerations: environmental, structural, and hydraulic.

Once construction of the proposed bridge improvement is complete, the temporary berm/trestle would be removed by the contractor, and therefore the WSELs in the San Dieguito River would return to the existing condition.

7.0 CONCLUSION

This preliminary hydrologic and hydraulic report presents hydraulic results for the 100-, 50-, 10-, 2-, 1.3, and 1-year storm events for temporary impacts resulting from construction methods to complete the El Camino Real Bridge Replacement project at the San Dieguito River crossing. Hydraulic analyses were previously prepared to determine the 100-, 50-and 10-year water surface elevations and velocities in the San Diego River at the proposed bridge location existing and proposed conditions (see "Hydraulic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Rick Engineering Company, dated April 12, 2012).

The hydraulic modeling from the "Hydraulic Study for El Camino Real Bridge Project on the San Dieguito River," prepared by Rick Engineering Company, dated April 12, 2012 determined that the Eastern Alignment Alternative does not cause a rise in water surface elevation in the post-project condition. However, the construction phase modeling shows that the temporary construction berm and trestle will have temporary hydraulic impacts to the San Dieguito River.

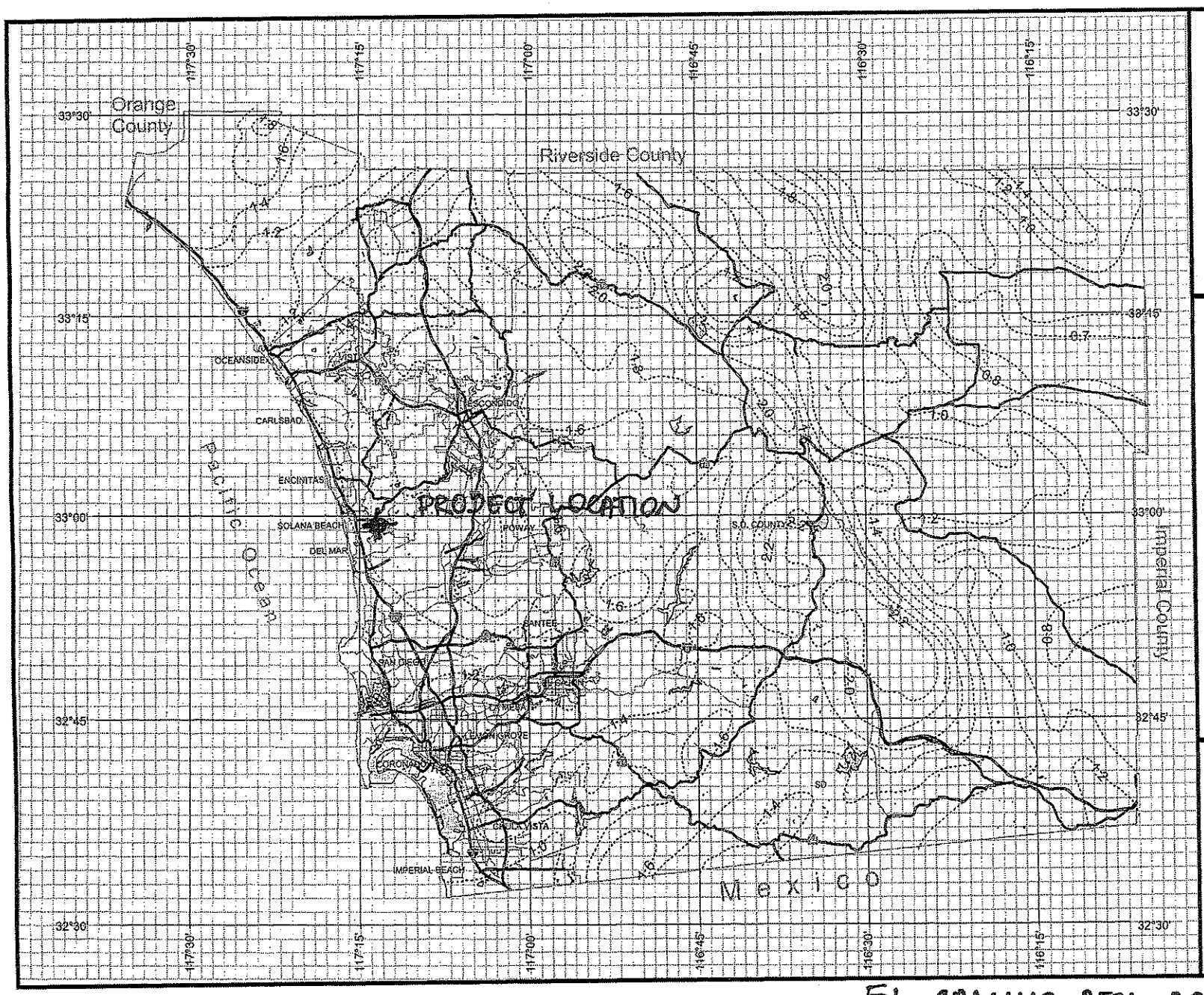
Upon selection of the final bridge design, additional modeling or analysis may be required in the Final Hydraulic Report such as scour and sediment transport analyses.

A total of two (2) berm options and two (2) trestle options are presented in detail with this report, with a summary of impacts to velocities and water surface elevations provided for a wide spectrum of storm events.

ATTACHMENT 1:

HYDROLOGIC BACKUP INFORMATION

- Curve Number Calculations
- HEC-1 Workmaps
- StreamsStats Data-Collection Station Report



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS

SanGIS
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3 0 3 Miles

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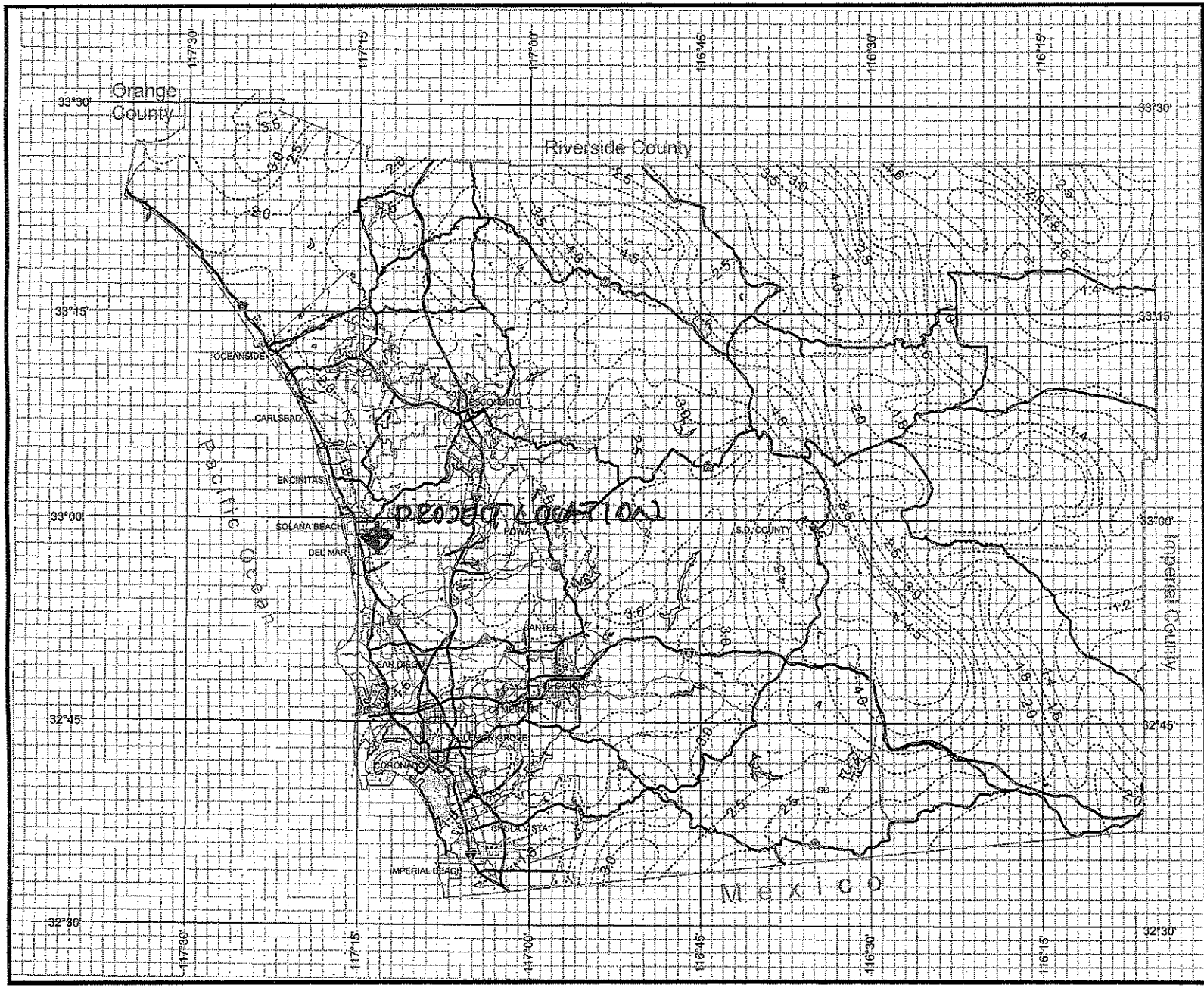
EL CAMINO REAL BRIDGE



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

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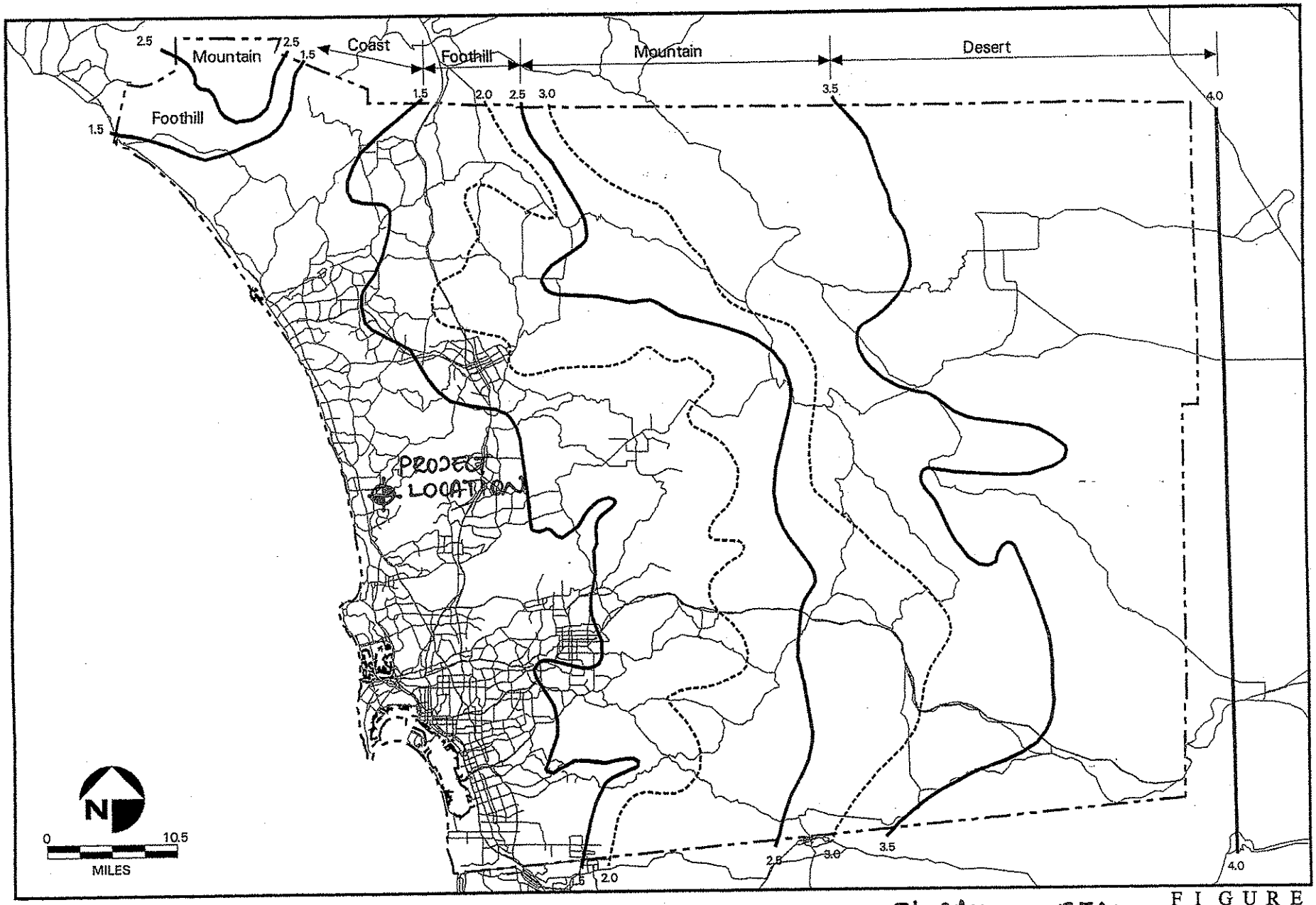
EL CAMINO REAL BRIDGE



EL CAMINO REAL BRIDGE

County of San Diego Hydrology Manual

Precipitation Zone Numbers (PZN)

FIGURE

C-1

El Camino Bridge Project - Construction Phase

BASIN ID	LAND USE DESCRIPTION	AREA (AC)	COVER DESCRIPTION (TBL 4-2)	HYDRO.COND. (TBL 4-2)	SOIL GROUP LETTER	CN2 (TBL 4-2)	FRAC OF A Ai/A	PART. CN2 CN2*(Ai/A)
100	AGR – Agriculture (20% Impervious)	50.10	Residental District by average lot size (20%)		D	84	0.022	1.854
100	COM – Commercial (90% Impervious)	55.71	Commercial and Business		D	95	0.025	2.332
100	LOW – Low Density Residential (25% Impervious)	335.36	Residental District by average lot size (25%)		D	85	0.148	12.559
100	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	13.99	Residental District by average lot size (45%)		D	88	0.006	0.543
100	OPE – Open Space Reserves and Preserves (0% Impervious)	1165.13	Desert Shrub-major plants	Fair	D	86	0.513	44.147
100	PAR – Parking (95% Impervious)	118.27	Commercial and Business		D	95	0.052	4.950
100	PAS – Passive Parks (40% Impervious)	34.14	Residental District by average lot size (40%)		D	87	0.015	1.309
100	VAC – Vacant and Undeveloped Land (0% Impervious)	497.02	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		D	94	0.219	20.584
	TOTAL:	**2269.7**	**ACRES**				**BASIN 100:**	**88**
		3.5	**Sq-Mi**					

El Camino Bridge Project - Construction Phase

BASIN NAME	LAND USE DESCRIPTION	AREA (AC)	COVER DESCRIPTION (TBL 4-2)	HYDRO.COND. (TBL 4-2)	SOIL GROUP LETTER	CN2 (TBL 4-2)	FRAC OF A Ai/A	PART. CN2 CN2*(Ai/A)
200	ACT – Active Parks (50% Impervious)	1.35	Residental District by average lot size (50%)		C	84	0.000	0.036
200	ACT – Active Parks (50% Impervious)	20.27	Residental District by average lot size (50%)		D	89	0.006	0.573
200	AGR – Agriculture (20% Impervious)	2.29	Residental District by average lot size (20%)		B	68	0.001	0.049
200	AGR – Agriculture (20% Impervious)	119.94	Residental District by average lot size (20%)		D	84	0.038	3.201
200	COM – Commercial (90% Impervious)	5.35	Commercial and Business		B	92	0.002	0.156
200	COM – Commercial (90% Impervious)	17.94	Commercial and Business		C	94	0.006	0.536
200	COM – Commercial (90% Impervious)	179.05	Commercial and Business		D	95	0.057	5.404
200	HIG – High Density Residential (TBD – 65% or 80% Impervious)	3.00	Residental District by average lot size (65%)		B	85	0.001	0.081
200	HIG – High Density Residential (TBD – 65% or 80% Impervious)	1.58	Residental District by average lot size (65%)		C	90	0.001	0.045
200	HIG – High Density Residential (TBD – 65% or 80% Impervious)	101.34	Residental District by average lot size (65%)		D	92	0.032	2.962
200	LIG – Light Industry (90% Impervious)	15.96	Commercial and Business		B	92	0.005	0.467
200	LIG – Light Industry (90% Impervious)	12.57	Commercial and Business		C	94	0.004	0.375
200	LIG – Light Industry (90% Impervious)	293.59	Commercial and Business		D	95	0.093	8.861
200	LOW – Low Density Residential (25% Impervious)	36.86	Residental District by average lot size (25%)		D	85	0.012	0.995
200	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	23.78	Residental District by average lot size (40%)		B	76	0.008	0.574
200	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	24.41	Residental District by average lot size (40%)		C	84	0.008	0.651
200	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	441.23	Residental District by average lot size (40%)		D	87	0.140	12.196
200	OPE – Open Space Reserves and Preserves (0% Impervious)	59.80	Desert Shrub-major plants	Fair	B	72	0.019	1.368
200	OPE – Open Space Reserves and Preserves (0% Impervious)	75.29	Desert Shrub-major plants	Fair	C	81	0.024	1.938
200	OPE – Open Space Reserves and Preserves (0% Impervious)	877.02	Desert Shrub-major plants	Fair	D	86	0.279	23.962
200	PAR – Parking (95% Impervious)	26.86	Impervious Areas: Paved parking lots		B	98	0.009	0.836
200	PAR – Parking (95% Impervious)	21.19	Impervious Areas: Paved parking lots		C	98	0.007	0.660
200	PAR – Parking (95% Impervious)	350.50	Impervious Areas: Paved parking lots		D	98	0.111	10.913
200	PAS – Passive Parks (40% Impervious)	16.45	Residental District by average lot size (40%)		D	87	0.005	0.455
200	STO – Store-front Commercial (95% Impervious)	0.62	Impervious Areas: Paved parking lots		B	98	0.000	0.019
200	STO – Store-front Commercial (95% Impervious)	10.28	Impervious Areas: Paved parking lots		D	98	0.003	0.320
200	VAC – Vacant and Undeveloped Land (0% Impervious)	4.90	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		B	86	0.002	0.134
200	VAC – Vacant and Undeveloped Land (0% Impervious)	13.69	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		C	91	0.004	0.396
200	VAC – Vacant and Undeveloped Land (0% Impervious)	373.97	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		D	94	0.119	11.168
200	WAT – Water (100% Impervious)	16.53	Water Surface		D	99	0.005	0.520
	TOTAL:	3147.6	ACRES				BASIN 200:	90
		4.9	Sq-Mi					

El Camino Bridge Project - Construction Phase

BASIN NAME	LAND USE DESCRIPTION	AREA (AC)	COVER DESCRIPTION (TBL 4-2)	HYDRO.COND. (TBL 4-2)	SOIL GROUP LETTER	CN2 (TBL 4-2)	FRAC OF A Ai/A	PART. CN2 CN2*(Ai/A)
300	AGR – Agriculture (20% Impervious)	137.09	Residental District by average lot size (20%)		D	84	0.063	5.280
300	COM – Commercial (90% Impervious)	4.56	Commercial and Business		D	95	0.002	0.199
300	LOW – Low Density Residential (25% Impervious)	1.47			A		0.001	0.000
300	LOW – Low Density Residential (25% Impervious)	2.35	Residental District by average lot size (25%)		C	70	0.001	0.076
300	LOW – Low Density Residential (25% Impervious)	703.36	Residental District by average lot size (25%)		D	80	0.323	25.801
300	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	2.04	Residental District by average lot size (40%)		A	63	0.001	0.059
300	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	4.26	Residental District by average lot size (40%)		C	84	0.002	0.164
300	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	359.51	Residental District by average lot size (40%)		D	87	0.165	14.342
300	OPE – Open Space Reserves and Preserves (0% Impervious)	21.25	Desert Shrub-major plants	Fair	A	55	0.010	0.536
300	OPE – Open Space Reserves and Preserves (0% Impervious)	5.92	Desert Shrub-major plants	Fair	C	81	0.003	0.220
300	OPE – Open Space Reserves and Preserves (0% Impervious)	144.54	Desert Shrub-major plants	Fair	D	86	0.066	5.700
300	PAR – Parking (95% Impervious)	0.21	Impervious Areas: Paved parking lots		A	98	0.000	0.009
300	PAR – Parking (95% Impervious)	0.90	Impervious Areas: Paved parking lots		C	98	0.000	0.041
300	PAR – Parking (95% Impervious)	97.10	Impervious Areas: Paved parking lots		D	98	0.045	4.363
300	PAS – Passive Parks (40% Impervious)	17.58	Residental District by average lot size (40%)		A	63	0.008	0.508
300	PAS – Passive Parks (40% Impervious)	132.32	Residental District by average lot size (40%)		D	87	0.061	5.278
300	VAC – Vacant and Undeveloped Land (0% Impervious)	4.90	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		A	77	0.002	0.173
300	VAC – Vacant and Undeveloped Land (0% Impervious)	11.36	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		C	91	0.005	0.474
300	VAC – Vacant and Undeveloped Land (0% Impervious)	530.14	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		D	94	0.243	22.850
	TOTAL:	**2180.9**	**ACRES**				**BASIN 300:**	**86**
		3.4	**Sq-Mi**					

El Camino Bridge Project - Construction Phase

BASIN NAME	LAND USE DESCRIPTION	AREA (AC)	COVER DESCRIPTION (TBL 4-2)	HYDRO.COND. (TBL 4-2)	SOIL GROUP LETTER	CN2 (TBL 4-2)	FRAC OF A Ai/A	PART. CN2 CN2*(Ai/A)
400	ACT – Active Parks (50% Impervious)	5.68	Residental District by average lot size (50%)		C	86	0.001	0.088
400	ACT – Active Parks (50% Impervious)	33.25	Residental District by average lot size (50%)		D	89	0.006	0.536
400	AGR – Agriculture (20% Impervious)	290.78	Residental District by average lot size (20%)		D	84	0.053	4.422
400	COM – Commercial (90% Impervious)	0.26	Commercial and Business		B	92	0.000	0.004
400	COM – Commercial (90% Impervious)	11.41	Commercial and Business		C	94	0.002	0.194
400	COM – Commercial (90% Impervious)	148.79	Commercial and Business		D	95	0.027	2.559
400	FRE – Freeway (95% Impervious)	0.10	Paved; open ditches including right-of-way		C	92	0.000	0.002
400	FRE – Freeway (95% Impervious)	7.64	Paved; open ditches including right-of-way		D	93	0.001	0.129
400	HIG – High Density Residential (TBD – 65% or 80% Impervious)	0.68	Residental District by average lot size (65%)		B	85	0.000	0.011
400	HIG – High Density Residential (TBD – 65% or 80% Impervious)	0.81	Residental District by average lot size (65%)		C	90	0.000	0.013
400	HIG – High Density Residential (TBD – 65% or 80% Impervious)	85.30	Residental District by average lot size (65%)		D	92	0.015	1.421
400	LIG – Light Industry (90% Impervious)	49.40	Commercial and Business		D	95	0.009	0.850
400	LOW – Low Density Residential (25% Impervious)	0.79	Residental District by average lot size (25%)		A	54	0.000	0.008
400	LOW – Low Density Residential (25% Impervious)	109.35	Residental District by average lot size (25%)		D	85	0.020	1.683
400	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	5.70	Residental District by average lot size (40%)		B	76	0.001	0.078
400	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	54.04	Residental District by average lot size (40%)		C	84	0.010	0.822
400	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	687.05	Residental District by average lot size (40%)		D	87	0.124	10.822
400	OPE – Open Space Reserves and Preserves (0% Impervious)	9.83	Desert Shrub-major plants	Fair	A	55	0.002	0.098
400	OPE – Open Space Reserves and Preserves (0% Impervious)	89.03	Desert Shrub-major plants	Fair	B	72	0.016	1.160
400	OPE – Open Space Reserves and Preserves (0% Impervious)	111.13	Desert Shrub-major plants	Fair	C	**81**	0.020	1.630
400	OPE – Open Space Reserves and Preserves (0% Impervious)	2864.23	Desert Shrub-major plants	Fair	D	86	0.519	44.595
400	PAR – Parking (95% Impervious)	4.33	Impervious Areas: Paved parking lots		B	98	0.001	0.077
400	PAR – Parking (95% Impervious)	27.77	Impervious Areas: Paved parking lots		C	98	0.005	0.493
400	PAR – Parking (95% Impervious)	370.47	Impervious Areas: Paved parking lots		D	98	0.067	6.573
400	PAS – Passive Parks (40% Impervious)	34.16	Residental District by average lot size (40%)		D	87	0.006	0.538
400	VAC – Vacant and Undeveloped Land (0% Impervious)	19.22	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		B	86	0.003	0.299
400	VAC – Vacant and Undeveloped Land (0% Impervious)	13.93	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		C	91	0.003	0.229
400	VAC – Vacant and Undeveloped Land (0% Impervious)	488.41	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		D	94	0.088	8.312
	Total:	**5523.5**	**ACRES**				**BASIN 400:**	**88**
		8.6	**Sq-Mi**					

El Camino Bridge Project - Construction Phase

BASIN NAME	LAND USE DESCRIPTION	AREA (AC)	COVER DESCRIPTION (TBL 4-2)	HYDRO.COND. (TBL 4-2)	SOIL GROUP LETTER	CN2 (TBL 4-2)	FRAC OF A Ai/A	PART. CN2 CN2*(Ai/A)
500	ACT – Active Parks (50% Impervious)	5.88	Residental District by average lot size (50%)		A	68	0.001	0.044
500	ACT – Active Parks (50% Impervious)	28.03	Residental District by average lot size (50%)		B	79	0.003	0.245
500	ACT – Active Parks (50% Impervious)	0.73	Residental District by average lot size (50%)		C	93	0.000	0.008
500	ACT – Active Parks (50% Impervious)	73.85	Residental District by average lot size (50%)		D	89	0.008	0.729
500	AGR – Agriculture (20% Impervious)	254.49	Residental District by average lot size (20%)		A	51	0.028	1.439
500	AGR – Agriculture (20% Impervious)	59.27	Residental District by average lot size (20%)		B	68	0.007	0.447
500	AGR – Agriculture (20% Impervious)	4.58	Residental District by average lot size (20%)		C	79	0.001	0.040
500	AGR – Agriculture (20% Impervious)	136.31	Residental District by average lot size (20%)		D	84	0.015	1.269
500	COM – Commercial (90% Impervious)	155.12	Commercial and Business		A	89	0.017	1.531
500	COM – Commercial (90% Impervious)	57.75	Commercial and Business		B	92	0.006	0.589
500	COM – Commercial (90% Impervious)	0.00	Commercial and Business		C	94	0.000	0.000
500	COM – Commercial (90% Impervious)	108.89	Commercial and Business		D	95	0.012	1.147
500	HIG – High Density Residential (TBD – 65% or 80% Impervious)	24.84	Residental District by average lot size (65%)		A	77	0.003	0.212
500	HIG – High Density Residential (TBD – 65% or 80% Impervious)	1.14	Residental District by average lot size (65%)		C	85	0.000	0.011
500	HIG – High Density Residential (TBD – 65% or 80% Impervious)	44.01	Residental District by average lot size (65%)		D	90	0.005	0.439
500	LOW – Low Density Residential (25% Impervious)	351.51	Residental District by average lot size (25%)		A	92	0.039	3.585
500	LOW – Low Density Residential (25% Impervious)	43.33	Residental District by average lot size (25%)		B	70	0.005	0.336
500	LOW – Low Density Residential (25% Impervious)	95.59	Residental District by average lot size (25%)		C	80	0.011	0.848
500	LOW – Low Density Residential (25% Impervious)	1382.64	Residental District by average lot size (25%)		D	85	0.153	13.029
500	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	191.02	Residental District by average lot size (40%)		A	62	0.021	1.313
500	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	25.21	Residental District by average lot size (40%)		B	76	0.003	0.212
500	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	185.82	Residental District by average lot size (40%)		C	84	0.021	1.730
500	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	2096.51	Residental District by average lot size (40%)		D	87	0.232	20.221
500	OPE – Open Space Reserves and Preserves (0% Impervious)	186.73	Desert Shrub-major plants	Fair	A	55	0.021	1.139
500	OPE – Open Space Reserves and Preserves (0% Impervious)	58.74	Desert Shrub-major plants	Fair	B	72	0.007	0.469
500	OPE – Open Space Reserves and Preserves (0% Impervious)	9.56	Desert Shrub-major plants	Fair	C	81	0.001	0.086
500	OPE – Open Space Reserves and Preserves (0% Impervious)	1253.35	Desert Shrub-major plants	Fair	D	86	0.139	11.950
500	PAR – Parking (95% Impervious)	106.38	Impervious Areas: Paved parking lots		A	98	0.012	1.156
500	PAR – Parking (95% Impervious)	37.56	Impervious Areas: Paved parking lots		B	98	0.004	0.408

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Pre_Post_Basin_500

BASIN NAME	LAND USE DESCRIPTION	AREA (AC)	COVER DESCRIPTION (TBL 4-2)	HYDRO.COND. (TBL 4-2)	SOIL GROUP LETTER	CN2 (TBL 4-2)	FRAC OF A Ai/A	PART. CN2 CN2*(Ai/A)
500	PAR – Parking (95% Impervious)	20.98	Impervious Areas: Paved parking lots		C	98	0.002	0.228
500	PAR – Parking (95% Impervious)	491.52	Impervious Areas: Paved parking lots		D	98	0.054	5.340
500	PAS – Passive Parks (40% Impervious)	307.94	Residental District by average lot size (40%)		A	62	0.034	2.117
500	PAS – Passive Parks (40% Impervious)	170.69	Residental District by average lot size (40%)		B	76	0.019	1.438
500	PAS – Passive Parks (40% Impervious)	449.74	Residental District by average lot size (40%)		D	87	0.050	4.338
500	STO – Store-front Commercial (95% Impervious)	0.10	Impervious Areas: Paved parking lots		A	98	0.000	0.001
500	STO – Store-front Commercial (95% Impervious)	0.10	Impervious Areas: Paved parking lots		B	98	0.000	0.001
500	STO – Store-front Commercial (95% Impervious)	2.34	Impervious Areas: Paved parking lots		D	98	0.000	0.025
500	VAC – Vacant and Undeveloped Land (0% Impervious)	49.48	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		A	77	0.005	0.422
500	VAC – Vacant and Undeveloped Land (0% Impervious)	29.78	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		B	86	0.003	0.284
500	VAC – Vacant and Undeveloped Land (0% Impervious)	13.17	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		C	91	0.001	0.133
500	VAC – Vacant and Undeveloped Land (0% Impervious)	465.74	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		D	94	0.052	4.854
500	WAT – Water (100% Impervious)	14.70	Water Surface		B	98	0.002	0.160
500	WAT – Water (100% Impervious)	24.92	Water Surface		D	99	0.003	0.274
	Total:	**9020.1**	**ACRES**				**BASIN 500:**	**78**
		14.1	**Sq-Mi**					

El Camino Bridge Project - Construction Phase

BASIN NAME	LAND USE DESCRIPTION	AREA (AC)	COVER DESCRIPTION (TBL 4-2)	HYDRO.COND. (TBL 4-2)	SOIL GROUP LETTER	CN2 (TBL 4-2)	FRAC OF A Ai/A	PART. CN2 CN2*(Ai/A)
600	AGR – Agriculture (20% Impervious)	15.81	Residental District by average lot size (20%)		A	51	0.070	3.574
600	AGR – Agriculture (20% Impervious)	22.25	Residental District by average lot size (20%)		B	68	0.099	6.705
600	AGR – Agriculture (20% Impervious)	13.67	Residental District by average lot size (20%)		D	84	0.061	5.088
600	COM – Commercial (90% Impervious)	1.37	Commercial and Business		A	89	0.006	0.542
600	COM – Commercial (90% Impervious)	0.00	Commercial and Business		B	92	0.000	0.002
600	HIG – High Density Residential (TBD – 65% or 80% Impervious)	0.21	Residental District by average lot size (65%)		C	90	0.001	0.082
600	HIG – High Density Residential (TBD – 65% or 80% Impervious)	0.31	Residental District by average lot size (65%)		D	92	0.001	0.127
600	LOW – Low Density Residential (25% Impervious)	0.00	Residental District by average lot size (25%)		C	80	0.000	0.000
600	LOW – Low Density Residential (25% Impervious)	0.24	Residental District by average lot size (25%)		D	85	0.001	0.091
600	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	6.90	Residental District by average lot size (40%)		A	62	0.031	1.896
600	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	31.76	Residental District by average lot size (40%)		C	84	0.141	11.825
600	MED – Medium Density Residential (TBD – 45% or 50% Impervious)	43.23	Residental District by average lot size (40%)		D	87	0.192	16.669
600	OPE – Open Space Reserves and Preserves (0% Impervious)	50.42	Desert Shrub-major plants	Fair	A	55	0.223	12.291
600	OPE – Open Space Reserves and Preserves (0% Impervious)	10.14	Desert Shrub-major plants	Fair	B	72	0.045	3.237
600	OPE – Open Space Reserves and Preserves (0% Impervious)	10.12	Desert Shrub-major plants	Fair	D	86	0.045	3.859
600	PAR – Parking (95% Impervious)	1.69	Impervious Areas: Paved parking lots		A	98	0.007	0.732
600	PAR – Parking (95% Impervious)	4.29	Impervious Areas: Paved parking lots		B	98	0.019	1.865
600	PAR – Parking (95% Impervious)	8.93	Impervious Areas: Paved parking lots		D	98	0.040	3.880
600	STO – Store-front Commercial (95% Impervious)	0.85	Impervious Areas: Paved parking lots		A	98	0.004	0.369
600	STO – Store-front Commercial (95% Impervious)	0.27	Impervious Areas: Paved parking lots		B	98	0.001	0.119
600	VAC – Vacant and Undeveloped Land (0% Impervious)	0.25	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		A	77	0.001	0.084
600	VAC – Vacant and Undeveloped Land (0% Impervious)	0.78	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		C	91	0.003	0.316
600	VAC – Vacant and Undeveloped Land (0% Impervious)	2.11	Developing urban areas and newly graded areas (pervious areas only, no vegetation)		D	94	0.009	0.881
	Total:	**225.6**	**ACRES**				**BASIN 600:**	**74**
		0.4	**Sq-Mi**					

RICK ENGINEERING COMPANY

Watershed Data Summary

Job Name: El Camino Bridge Project - Construction Phase
Job Number: 14752-C
Date: 4/19/2012

Pre-Post-Project Condition

Basin ID	Area	P6	P24	NRCS Lag	PZN	CN_2	CN2	Comments
	(sq miles)	*(inches)*	*(inches)*	*(hours)*			*(adusted)*	
100	3.5	1.3	2	0.306	1.3	88	85	
200	4.9	1.3	2	0.645	1.3	90	80	
300	3.4	1.3	2	0.466	1.3	86	83	
400	8.6	1.3	2	1.020	1.3	88	85	
500	14.1	1.3	2	0.937	1.3	78	74	
600	0.4	1.3	2	0.190	1.3	74	70	
Total Area=	34.9	sq-mi						

RICK ENGINEERING COMPANY

HEC-1 LAG Calculations

Job Name: El Camino Bridge Project - Construction Phase
Job Number: 14752-C
Date: 4/19/2012

Pre-Post-Project Condition

Basin ID	Watershed Length (L)	Length to Centroid (Lc)	Elevation Up	Elevation Down	Slope	Basin n-bar	Corps lag (Tl)	Time to Peak (Tp)	Calculated Time step (D)	Time step (D)	NRCS Lag (Tl)
	(miles)	*(miles)*	*(feet)*	*(feet)*	*(feet/mile)*		*(hours)*	*(hours)*	*(min)*	*(min)*	*(hours)*
100	2.31	0.84	1330	93	534.70	0.04	0.374	**0.323**	3.87	2.00	**0.306**
200	5.00	2.77	780	93	137.49	0.03	0.767	**0.661**	7.93	2.00	**0.645**
300	3.05	1.94	460	60	131.03	0.03	0.560	**0.483**	5.79	2.00	**0.466**
400	6.03	3.49	780	60	119.42	0.04	1.232	**1.062**	12.74	5.00	**1.020**
500	6.80	2.95	1140	5	166.89	0.04	1.136	**0.979**	11.75	5.00	**0.937**
600	1.24	0.30	310	3	247.621	0.04	0.230	0.198	2.378	1.00	**0.190**

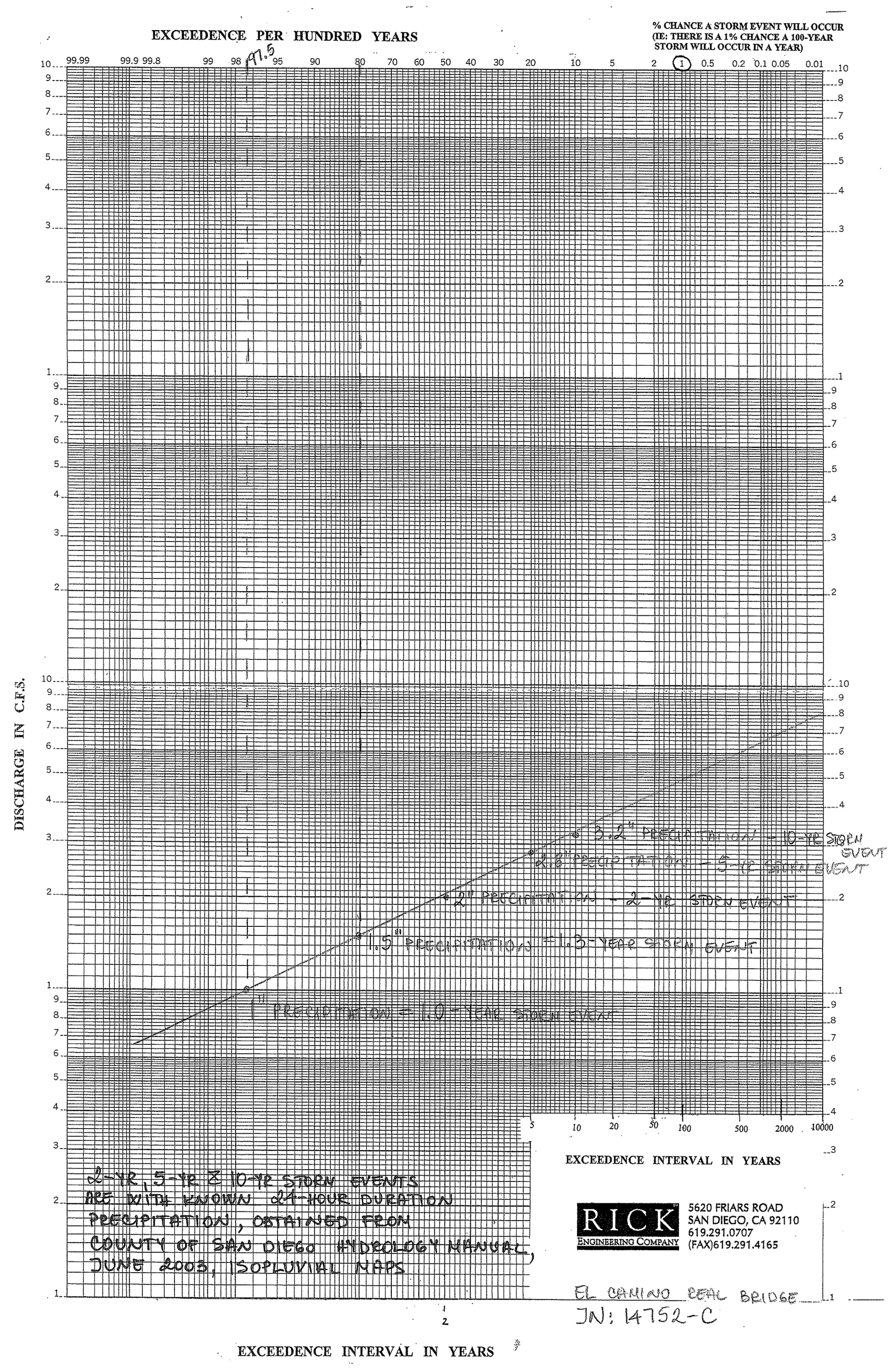
El Camino Bridge Project - Construction Phase

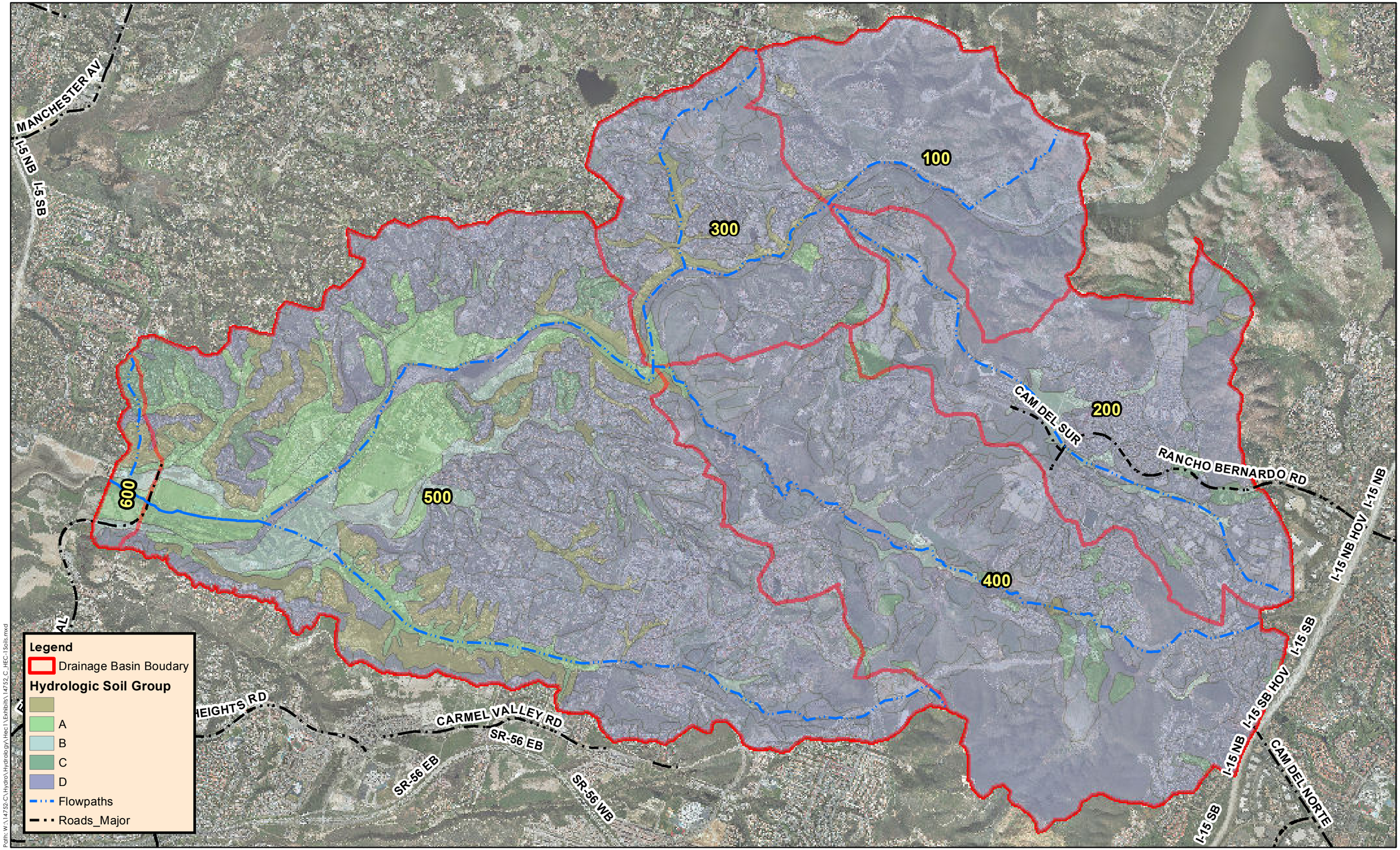
W-14752-C

BASIN		Storm Freq	6-HR PREC.	24-HR PREC.	PZN	PZN AF	CN1	CN2	CN3	CNx
ID	*NAME*	*YEAR*	*INCHES*	*INCHES*	*NO.*	*NO.*	*NO.*	*NO.*	*NO.*	*NO.*
1	Basin 100	2	1.3	2.0	1.3	1.8	75	88	95	85
2	Basin 200	2	1.3	2.0	1.3	1.8	78	90	96	80
3	Basin 300	2	1.3	2.0	1.3	1.8	72	86	94	83
4	Basin 400	2	1.3	2.0	1.3	1.8	75	88	95	85
5	Basin 500	2	1.3	2.0	1.3	1.8	60	78	90	74
6	Basin 600	2	1.3	2.0	1.3	1.8	55	74	88	70
			APPENDIX B		*APPENDIX C*		*TABLE 4-10*	*CALC'D*	*TABLE 4-10*	*CALC'D*
			SDCHM						*SDCHM*	

ABBREVIATIONS

AF = ADJUSTMENT FACTOR
CN = CURVE NUMBER
PREC = PRECIPITATION
PZN = PRECIPITATION ZONE NUMBER
SDCHM = SAN DIEGO COUNTY HYDROLOGY MANUAL


EXCEEDENCE PER HUNDRED YEARS
% CHANCE A STORM EVENT WILL OCCUR (IE: THERE IS A 1% CHANCE A 100-YEAR STORM WILL OCCUR IN A YEAR)
99.99 99.9 99.8 99 98 97.5 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
DISCHARGE IN C.F.S.
3.2" PRECIPITATION = 10-YR STORM EVENT
2.8" PRECIPITATION = 5-YR STORM EVENT
2" PRECIPITATION = 2-YR STORM EVENT
1.5" PRECIPITATION = 1.3-YEAR STORM EVENT
1" PRECIPITATION = 1.0-YEAR STORM EVENT
5 10 20 50 100 500 2000 10000
EXCEEDENCE INTERVAL IN YEARS
2-YR, 5-YR & 10-YR STORM EVENTS ARE WITH KNOWN 24-HOUR DURATION PRECIPITATION, OBTAINED FROM COUNTY OF SAN DIEGO HYDROLOGY MANUAL, JUNE 2003, ISOPLUVIAL MAPS
RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165
EL CAMINO REAL BRIDGE
JN: 14752-C
EXCEEDENCE INTERVAL IN YEARS



Path: W:\14752-C\Hydro\Hydrology\Hec1\Exhibits\14752_C_HEC-1Soils.mxd

RICK ENGINEERING COMPANY

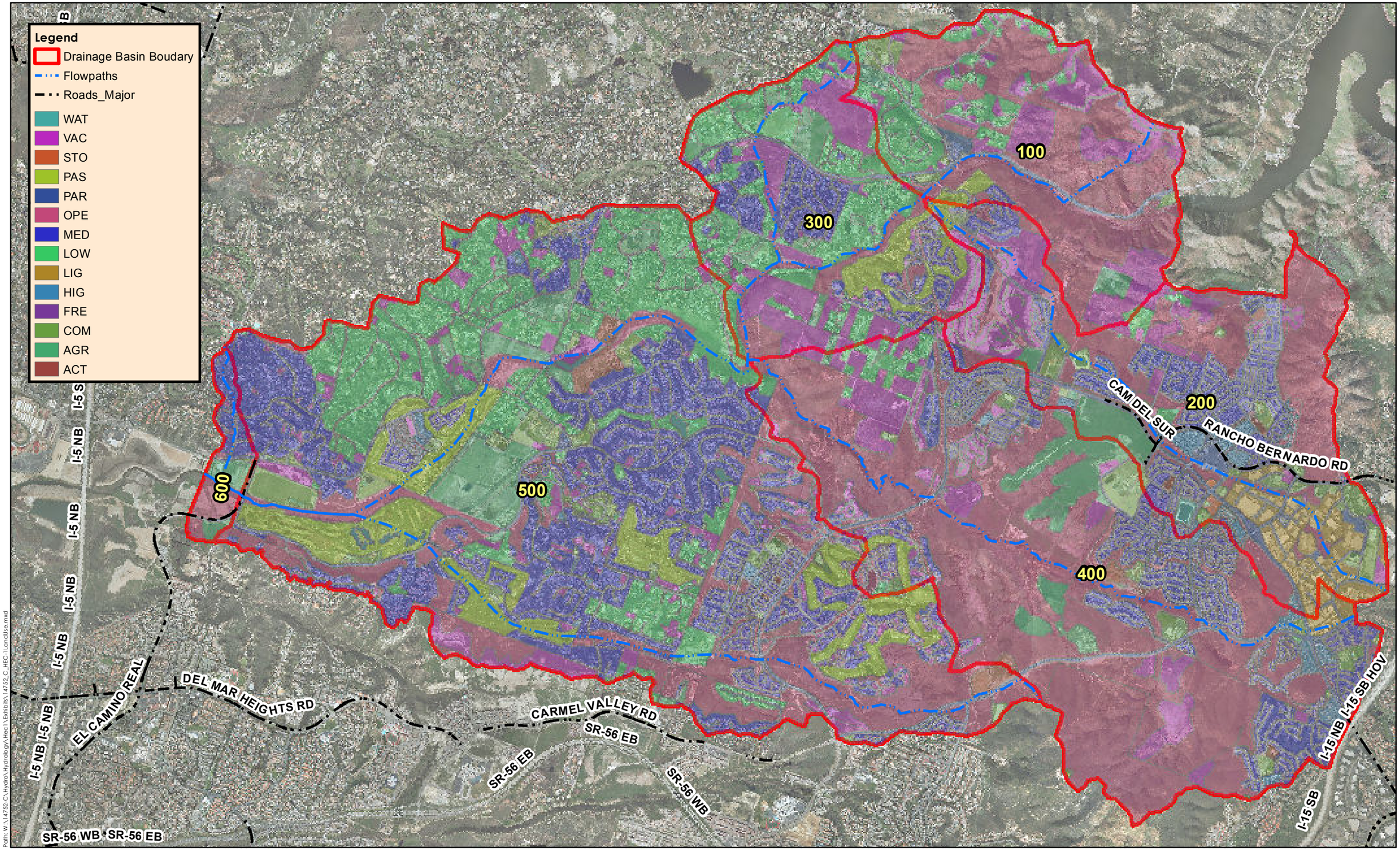
Scale in Feet
0 3,500 7,000
North

Date of Exhibit: 04.15.2013
Eagle Aerial Image: 03.2009

El Camino Real Bridge Replacement - Construction Phase

Project Soils Information

J-14752-C



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RICK ENGINEERING COMPANY

Scale in Feet
0 3,500 7,000
North

Date of Exhibit: 04.15.2013
Eagle Aerial Image: 03.2009

El Camino Real Bridge Replacement - Construction Phase

Project Land Use Information

J-14752-C

Path: W:\14752-C\Hydro\Hydrology\Hec1\Exhibits\14752_C_HEC-1Watersheds.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 3,500 7,000
North

Date of Exhibit: 04.15.2013
Eagle Aerial Image: 03.2009

El Camino Real Bridge Replacement - Construction Phase

Project Watershed Information

J-14752-C

Avg Daily Flows
(For Reference)

StreamStats Data-Collection Station Report

USGS Station Number	11030500
Station Name	SAN DIEGUITO R NR DEL MAR

Click here to link to available data on NWIS-Web for this site.

Descriptive Information

Station Type	Gaging Station, continuous record
Regulated?	Undefined
Period of Record	
Remarks	
Latitude (degrees NAD83)	32.9775445
Longitude (degrees NAD83)	-117.23059151
Hydrologic unit code	18070304
Local Basin	-
County	-
MCD	-
Directions to station	

Physical Characteristics

Characteristic Name	Value	Units	Citation Number
Drainage_Area	338	square miles	30

Streamflow Statistics

Statistic Name	Value	Units	Citation Number

Flow-Duration Statistics

1_Percent_Duration	60	cubic feet per second	41
10_Percent_Duration	2.16	cubic feet per second	41
20_Percent_Duration	0.65	cubic feet per second	41
25_Percent_Duration	0.52	cubic feet per second	41
30_Percent_Duration	0.42	cubic feet per second	41
40_Percent_Duration	0.26	cubic feet per second	41
5_Percent_Duration	19	cubic feet per second	41
50_Percent_Duration	0.16	cubic feet per second	41
60_Percent_Duration	0.06	cubic feet per second	41
70_Percent_Duration	0.02	cubic feet per second	41
75_Percent_Duration	0	cubic feet per second	41
80_Percent_Duration	0	cubic feet per second	41
90_Percent_Duration	0	cubic feet per second	41
95_Percent_Duration	0	cubic feet per second	41
99_Percent_Duration	0	cubic feet per second	41
General Flow Statistics			
Average_daily_streamflow	3.717	cubic feet per second	41
Maximum_daily_flow	1010	cubic feet per second	41
Minimum_daily_flow	0	cubic feet per second	41
Std_Dev_of_daily_flows	28.128	cubic feet per second	41
Base Flow Statistics			
Average_BFI_value	0.273	dimensionless	42
Number_of_years_to_compute_BFI	6	years	42
Std_dev_of_annual_BFI_values	0.222	dimensionless	42

Citations

Citation Number	Citation Name and URL
30	Imported from NWIS file
41	Wolock, D.M., 2003, Flow characteristics at U.S. Geological Survey streamgages in the conterminous United States: U.S. Geological Survey Open-File Report 03-146, digital data set
42	Wolock, D.M., 2003, Base-flow index grid for the conterminous United States: U.S. Geological Survey Open-File Report 03-263, digital data set

ATTACHMENT 2

HEC-1 OUTPUT

2-YEAR STORM EVENT
6 – hour Precipitation

```
1****************************************                                                    ****************************************
 *                                      *                                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                *                                                    *          609 SECOND STREET           *
 *                                      *                                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   29MAR13  TIME  10:05:13  *                                                    *           (916) 756-1104             *
 *                                      *                                                    *                                      *
 ****************************************                                                    ****************************************


                                                X     X  XXXXXXX   XXXXX           X
                                                X     X  X        X     X         XX
                                                X     X  X        X               X
                                                XXXXXXX  XXXX     X        XXXXX   X
                                                X     X  X        X               X
                                                X     X  X        X     X         X
                                                X     X  XXXXXXX   XXXXX         XXX


          THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

          THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                   HEC-1 INPUT                                                   PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                        *DIAGRAM
             1          ID   El Camino Real Bridge Construction Project,
             2          ID   2-YEAR, 6-HR STORM EVENT
             3          ID   ECR6HR_B.HC1, 3/28/2012
 *** FREE ***
             4          IT       2       0       0     300
             5          IO       5       2

             6          KK  100(A)  BASIN 100
             7          IN      15
             8          PB     1.3
             9          PI      .0   .0175   .0175   .0225   .0225   .0275   .0275   .0475   .0475    .185
            10          PI    .185   .0500   .0500   .0400   .0400   .0275   .0275   .0225   .0225    .020
            11          PI    .020   .0200   .0200   .0200   .0200
            12          BA     3.5
            13          LS       0      85
            14          UD    .306
                        *

            15          KK  200(A)  BASIN 200
            16          IN      15
            17          PB     1.3
            18          PI      .0   .0175   .0175   .0225   .0225   .0275   .0275   .0475   .0475    .185
            19          PI    .185   .0500   .0500   .0400   .0400   .0275   .0275   .0225   .0225    .020
            20          PI    .020   .0200   .0200   .0200   .0200
            21          BA     4.9
            22          LS       0      80
            23          UD    .645
                        *

            24          KK       A    100+200
            25          HC       2
                        *

            26          KK   RTA-B
            27          KM   ROUTE BASIN 100 AND 200 THROUGH BASIN 300
            28          RS       1    STOR      -1
            29          RC    0.04   0.035    0.04 12081.5   0.003     160
            30          RX       0   156.5   365.2   533.8   754.0   856.5  1123.8  1316.9
            31          RY     160     140     100      80      80     100     140     144
                        *

            32          KK     300  BASIN 300
            33          IN      15
            34          PB     1.3
            35          PI      .0   .0175   .0175   .0225   .0225   .0275   .0275   .0475   .0475    .185
            36          PI    .185   .0500   .0500   .0400   .0400   .0275   .0275   .0225   .0225    .020
            37          PI    .020   .0200   .0200   .0200   .0200
            38          BA     3.4
            39          LS       0      83
            40          UD    .466
                        *
1                                                   HEC-1 INPUT                                                   PAGE  2

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


            41          KK       B    100+200+300
            42          HC       2
                        *

            43          KK     400  BASIN 400
            44          IN      15
            45          PB     1.3
            46          PI      .0   .0175   .0175   .0225   .0225   .0275   .0275   .0475   .0475    .185
            47          PI    .185   .0500   .0500   .0400   .0400   .0275   .0275   .0225   .0225    .020
            48          PI    .020   .0200   .0200   .0200   .0200
```

```
            49          BA     8.6
            50          LS       0      85
            51          UD    1.02
                        *

            52          KK       B    100+200+300+400
            53          HC       2
                        *

            54          KK   RTB-C
            55          KM   ROUTE BASIN 100, 200, 300 AND 400 THROUGH BASIN 500
            56          RS       1    STOR      -1
            57          RC   0.035   0.030   0.035    2575   0.020      85
            58          RX       0   278.5   449.2  2891.2  3704.9    4382  4468.6  4602.3
            59          RY      85      80      40      30      30      35      40      80
                        *

            60          KK     500  BASIN 500
            61          IN      15
            62          PB     1.3
            63          PI      .0   .0175   .0175   .0225   .0225   .0275   .0275   .0475   .0475    .185
            64          PI    .185   .0500   .0500   .0400   .0400   .0275   .0275   .0225   .0225    .020
            65          PI    .020   .0200   .0200   .0200   .0200
            66          BA    14.1
            67          LS       0      74
            68          UD   0.937
                        *

            69          KK       C    100+200+300+400+500
            70          HC       2
                        *

            71          KK   RTC-D
            72          KM   ROUTE BASIN 100, 200, 300, 400 AND 500 THROUGH BASIN 600
            73          RS       1    STOR      -1
            74          RC    0.04   0.035    0.04  1682.3   0.001     220
            75          RX       0   484.1   726.3  2184.9  2424.5  3660.5  3767.9  4120.6
            76          RY     107      80      40      10      10      40      80     220
                        *
1                                                   HEC-1 INPUT                                                PAGE  3

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


            77          KK     600  BASIN 600
            78          IN      15
            79          PB     1.3
            80          PI      .0   .0175   .0175   .0225   .0225   .0275   .0275   .0475   .0475    .185
            81          PI    .185   .0500   .0500   .0400   .0400   .0275   .0275   .0225   .0225    .020
            82          PI    .020   .0200   .0200   .0200   .0200
            83          BA     0.4
            84          LS       0      70
            85          UD   0.190
                        *

            86          KK       D
            87          HC       2
            88          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6      100(A)
                .
                .
    15          .      200(A)
                .           .
                .           .
    24          A............
                V
                V
    26       RTA-B
                .
                .
    32          .         300
                .           .
                .           .
    41          B............
                .
                .
    43          .         400
                .           .
                .           .
    52          B............
                V
                V
    54       RTB-C
                .
                .
    60          .         500
                .           .
                .           .
    69          C............
                V
                V
    71       RTC-D
                .
                .
    77          .         600
                .           .
                .           .
    86          D............
```

```
 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                                                ****************************************
 *                                      *                                                *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                *   U.S. ARMY CORPS OF ENGINEERS       *
 *             JUN   1998               *                                                *   HYDROLOGIC ENGINEERING CENTER      *
 *           VERSION 4.1                *                                                *         609 SECOND STREET            *
 *                                      *                                                *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   29MAR13  TIME  10:05:13  *                                                *           (916) 756-1104             *
 *                                      *                                                *                                      *
 ****************************************                                                ****************************************




                           El Camino Real Bridge Construction Project,
                           2-YEAR, 6-HR STORM EVENT
                           ECR6HR_B.HC1, 3/28/2012

   5 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          2  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN          2  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1   0  ENDING DATE
                      NDTIME       0958  ENDING TIME
                       ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL     .03 HOURS
                        TOTAL TIME BASE    9.97 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT
1                                                              STATION   100(A)

                           (O) OUTFLOW
         0.       50.      100.      150.      200.      250.      300.      350.      400.        0.        0.        0.        0.
                                                                                                     (L) PRECIP,   (X) EXCESS
        .00       .00       .00       .00       .00       .00       .00       .00       .04       .03       .02       .01       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
  10122  42O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10124  43O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10126  44O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10128  45O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10130  46O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10132  47O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10134  48O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10136  49O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10138  50O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
  10142  52O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10144  53O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
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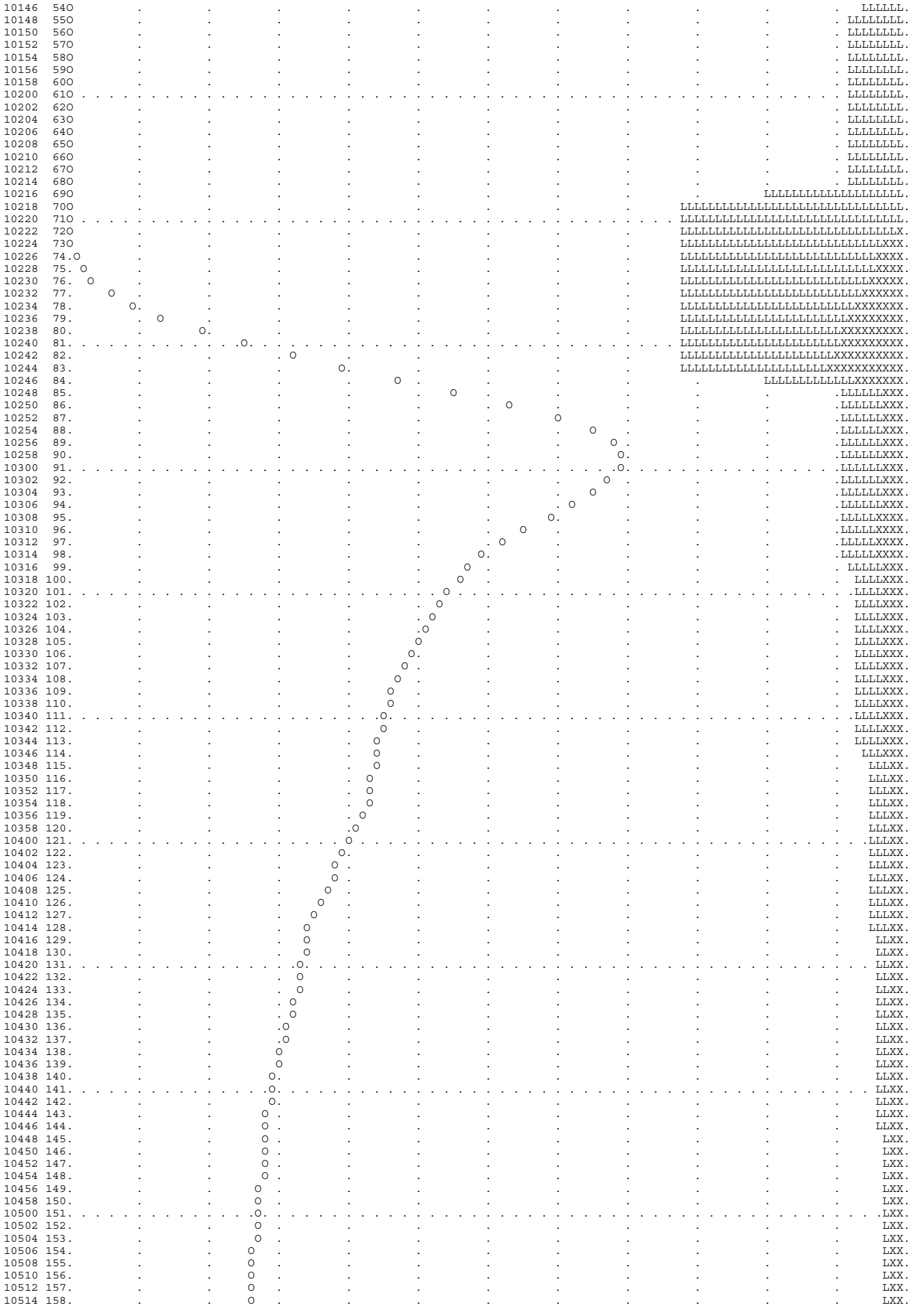

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10516 159.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10518 160.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10520 161. . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
10522 162.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10524 163.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10526 164.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10528 165.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10530 166.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10532 167.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10534 168.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10536 169.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10538 170.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10540 171. . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
10542 172.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10544 173.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10546 174.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10548 175.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10550 176.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10552 177.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10554 178.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10556 179.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10558 180.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10600 181. . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
10602 182.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10604 183.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10606 184.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10608 185.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10610 186.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10612 187.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10614 188.         .         .    O   .         .         .         .         .         .         .         .     LXX.
10616 189.         .         .    O   .         .         .         .         .         .         .         .      LX.
10618 190.         .         .    O   .         .         .         .         .         .         .         .       .
10620 191. . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10622 192.         .         .    O   .         .         .         .         .         .         .         .
10624 193.         .         .   O    .         .         .         .         .         .         .         .
10626 194.         .         .  O     .         .         .         .         .         .         .         .
10628 195.         .         . O      .         .         .         .         .         .         .         .
10630 196.         .        O         .         .         .         .         .         .         .         .
10632 197.         .      O .         .         .         .         .         .         .         .         .
10634 198.         .    O   .         .         .         .         .         .         .         .         .
10636 199.         .  O     .         .         .         .         .         .         .         .         .
10638 200.         . O      .         .         .         .         .         .         .         .         .
10640 201. . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10642 202.        O.        .         .         .         .         .         .         .         .         .
10644 203.      O  .        .         .         .         .         .         .         .         .         .
10646 204.     O   .        .         .         .         .         .         .         .         .         .
10648 205.    O    .        .         .         .         .         .         .         .         .         .
10650 206.   O     .        .         .         .         .         .         .         .         .         .
10652 207.   O     .        .         .         .         .         .         .         .         .         .
10654 208.  O      .        .         .         .         .         .         .         .         .         .
10656 209.  O      .        .         .         .         .         .         .         .         .         .
10658 210. O       .        .         .         .         .         .         .         .         .         .
10700 211. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10702 212. O       .        .         .         .         .         .         .         .         .         .
10704 213.O        .        .         .         .         .         .         .         .         .         .
10706 214.O        .        .         .         .         .         .         .         .         .         .
10708 215.O        .        .         .         .         .         .         .         .         .         .
10710 216.O        .        .         .         .         .         .         .         .         .         .
10712 217.O        .        .         .         .         .         .         .         .         .         .
10714 218.O        .        .         .         .         .         .         .         .         .         .
10716 219O         .        .         .         .         .         .         .         .         .         .
10718 220O         .        .         .         .         .         .         .         .         .         .
10720 221O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10722 222O         .        .         .         .         .         .         .         .         .         .
10724 223O         .        .         .         .         .         .         .         .         .         .
10726 224O         .        .         .         .         .         .         .         .         .         .
10728 225O         .        .         .         .         .         .         .         .         .         .
10730 226O         .        .         .         .         .         .         .         .         .         .
10732 227O         .        .         .         .         .         .         .         .         .         .
10734 228O         .        .         .         .         .         .         .         .         .         .
10736 229O         .        .         .         .         .         .         .         .         .         .
10738 230O         .        .         .         .         .         .         .         .         .         .
10740 231O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10742 232O         .        .         .         .         .         .         .         .         .         .
10744 233O         .        .         .         .         .         .         .         .         .         .
10746 234O         .        .         .         .         .         .         .         .         .         .
10748 235O         .        .         .         .         .         .         .         .         .         .
10750 236O         .        .         .         .         .         .         .         .         .         .
10752 237O         .        .         .         .         .         .         .         .         .         .
10754 238O         .        .         .         .         .         .         .         .         .         .
10756 239O         .        .         .         .         .         .         .         .         .         .
10758 240O         .        .         .         .         .         .         .         .         .         .
10800 241O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10802 242O         .        .         .         .         .         .         .         .         .         .
10804 243O         .        .         .         .         .         .         .         .         .         .
10806 244O         .        .         .         .         .         .         .         .         .         .
10808 245O         .        .         .         .         .         .         .         .         .         .
10810 246O         .        .         .         .         .         .         .         .         .         .
10812 247O         .        .         .         .         .         .         .         .         .         .
10814 248O         .        .         .         .         .         .         .         .         .         .
10816 249O         .        .         .         .         .         .         .         .         .         .
10818 250O         .        .         .         .         .         .         .         .         .         .
10820 251O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10822 252O         .        .         .         .         .         .         .         .         .         .
10824 253O         .        .         .         .         .         .         .         .         .         .
10826 254O         .        .         .         .         .         .         .         .         .         .
10828 255O         .        .         .         .         .         .         .         .         .         .
10830 256O         .        .         .         .         .         .         .         .         .         .
10832 257O         .        .         .         .         .         .         .         .         .         .
10834 258O         .        .         .         .         .         .         .         .         .         .
10836 259O         .        .         .         .         .         .         .         .         .         .
10838 260O         .        .         .         .         .         .         .         .         .         .
10840 261O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10842 262O         .        .         .         .         .         .         .         .         .         .
10844 263O         .        .         .         .         .         .         .         .         .         .
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  10846 2640         .         .         .         .         .         .         .         .         .         .         .         .
  10848 2650         .         .         .         .         .         .         .         .         .         .         .         .
  10850 2660         .         .         .         .         .         .         .         .         .         .         .         .
  10852 2670         .         .         .         .         .         .         .         .         .         .         .         .
  10854 2680         .         .         .         .         .         .         .         .         .         .         .         .
  10856 2690         .         .         .         .         .         .         .         .         .         .         .         .
  10858 2700         .         .         .         .         .         .         .         .         .         .         .         .
  10900 2710 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10902 2720         .         .         .         .         .         .         .         .         .         .         .         .
  10904 2730         .         .         .         .         .         .         .         .         .         .         .         .
  10906 2740         .         .         .         .         .         .         .         .         .         .         .         .
  10908 2750         .         .         .         .         .         .         .         .         .         .         .         .
  10910 2760         .         .         .         .         .         .         .         .         .         .         .         .
  10912 2770         .         .         .         .         .         .         .         .         .         .         .         .
  10914 2780         .         .         .         .         .         .         .         .         .         .         .         .
  10916 2790         .         .         .         .         .         .         .         .         .         .         .         .
  10918 2800         .         .         .         .         .         .         .         .         .         .         .         .
  10920 2810 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10922 2820         .         .         .         .         .         .         .         .         .         .         .         .
  10924 2830         .         .         .         .         .         .         .         .         .         .         .         .
  10926 2840         .         .         .         .         .         .         .         .         .         .         .         .
  10928 2850         .         .         .         .         .         .         .         .         .         .         .         .
  10930 2860         .         .         .         .         .         .         .         .         .         .         .         .
  10932 2870         .         .         .         .         .         .         .         .         .         .         .         .
  10934 2880         .         .         .         .         .         .         .         .         .         .         .         .
  10936 2890         .         .         .         .         .         .         .         .         .         .         .         .
  10938 2900         .         .         .         .         .         .         .         .         .         .         .         .
  10940 2910 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 2920         .         .         .         .         .         .         .         .         .         .         .         .
  10944 2930         .         .         .         .         .         .         .         .         .         .         .         .
  10946 2940         .         .         .         .         .         .         .         .         .         .         .         .
  10948 2950         .         .         .         .         .         .         .         .         .         .         .         .
  10950 2960         .         .         .         .         .         .         .         .         .         .         .         .
  10952 2970         .         .         .         .         .         .         .         .         .         .         .         .
  10954 2980         .         .         .         .         .         .         .         .         .         .         .         .
  10956 2990         .         .         .         .         .         .         .         .         .         .         .         .
  10958 3000---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                          STATION   200(A)

                          (O) OUTFLOW
          0.       40.       80.      120.      160.      200.        0.        0.        0.        0.        0.        0.        0.
                                                                                                      (L) PRECIP,   (X) EXCESS
        .00       .00       .00       .00       .00       .00       .00       .00       .04       .03       .02       .01       .00
 DAHRMN PER
  10000   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   20         .         .         .         .         .         .         .         .         .         .         .         .
  10004   30         .         .         .         .         .         .         .         .         .         .         .         .
  10006   40         .         .         .         .         .         .         .         .         .         .         .         .
  10008   50         .         .         .         .         .         .         .         .         .         .         .         .
  10010   60         .         .         .         .         .         .         .         .         .         .         .         .
  10012   70         .         .         .         .         .         .         .         .         .         .         .         .
  10014   80         .         .         .         .         .         .         .         .         .         .         .         .
  10016   90         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  100         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  120         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  130         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  140         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  150         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  160         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  170         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  180         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  190         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  200         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10042  220         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10044  230         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10046  240         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10048  250         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10050  260         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10052  270         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10054  280         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10056  290         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10058  300         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10100  310 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
  10102  320         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10104  330         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10106  340         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10108  350         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10110  360         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10112  370         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10114  380         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10116  390         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10118  400         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10120  410 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
  10122  420         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10124  430         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10126  440         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10128  450         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10130  460         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10132  470         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10134  480         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10136  490         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10138  500         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10140  510 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
  10142  520         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10144  530         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10146  540         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
  10148  550         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10150  560         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10152  570         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10154  580         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10156  590         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10158  600         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
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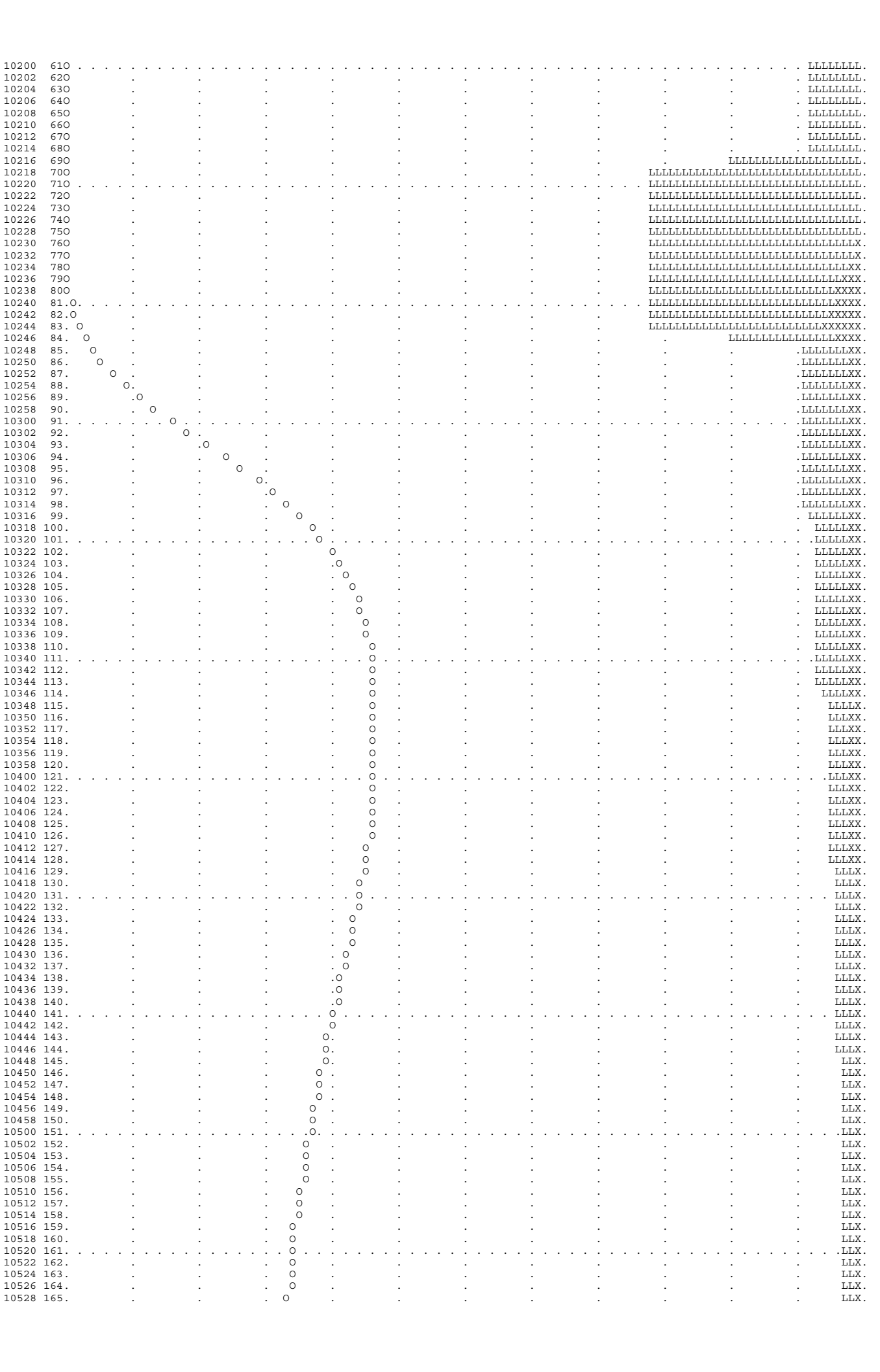

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10530 166.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
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10534 168.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10536 169.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10538 170.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
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10546 174.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10548 175.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10550 176.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
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10554 178.         .         .         .O        .         .         .         .         .         .         .         .      LLX.
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10558 180.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10600 181. . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
10602 182.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10604 183.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10606 184.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10608 185.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10610 186.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10612 187.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10614 188.         .         .         . O       .         .         .         .         .         .         .         .      LLX.
10616 189.         .         .         . O       .         .         .         .         .         .         .         .       LX.
10618 190.         .         .         . O       .         .         .         .         .         .         .         .        .
10620 191. . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10622 192.         .         .         . O       .         .         .         .         .         .         .         .        .
10624 193.         .         .         . O       .         .         .         .         .         .         .         .        .
10626 194.         .         .         . O       .         .         .         .         .         .         .         .        .
10628 195.         .         .         .O        .         .         .         .         .         .         .         .        .
10630 196.         .         .         .O        .         .         .         .         .         .         .         .        .
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10646 204.         .         .     O   .         .         .         .         .         .         .         .        .
10648 205.         .         .    O    .         .         .         .         .         .         .         .        .
10650 206.         .         .   O     .         .         .         .         .         .         .         .        .
10652 207.         .         . O       .         .         .         .         .         .         .         .        .
10654 208.         .         .O        .         .         .         .         .         .         .         .        .
10656 209.         .         O         .         .         .         .         .         .         .         .        .
10658 210.         .       O .         .         .         .         .         .         .         .         .        .
10700 211. . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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10720 221. . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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10726 224.     O   .         .         .         .         .         .         .         .         .         .        .
10728 225.     O   .         .         .         .         .         .         .         .         .         .        .
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10732 227.    O    .         .         .         .         .         .         .         .         .         .        .
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10736 229.   O     .         .         .         .         .         .         .         .         .         .        .
10738 230.   O     .         .         .         .         .         .         .         .         .         .        .
10740 231. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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10744 233.  O      .         .         .         .         .         .         .         .         .         .        .
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10748 235. O       .         .         .         .         .         .         .         .         .         .        .
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 10900 271O . . .
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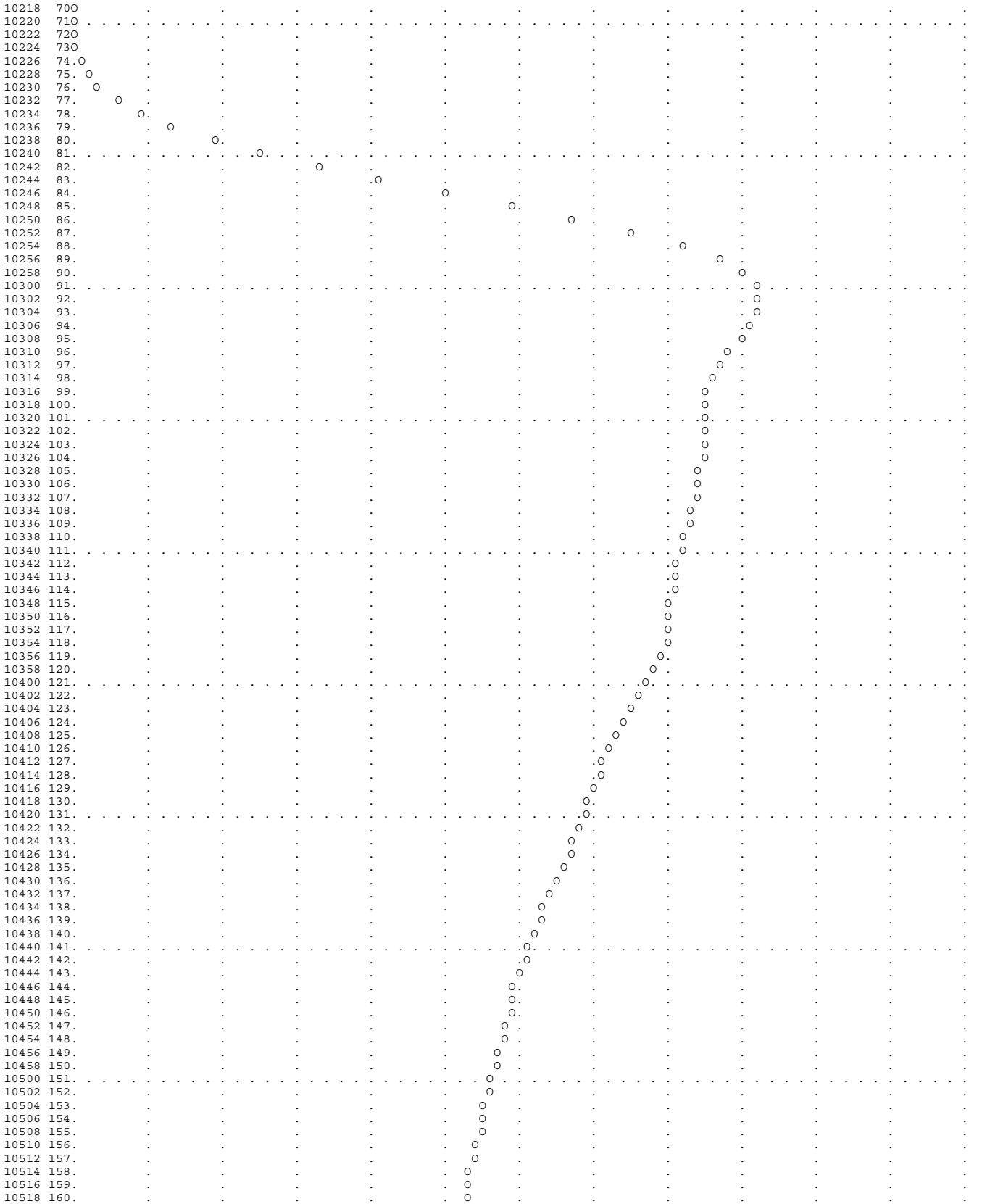

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10556 179.         .         .         .         . O       .         .         .         .         .         .         .
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10640 201. . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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10700 211. . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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  10932 287O         .         .         .         .         .         .         .         .         .         .         .         .
  10934 288O         .         .         .         .         .         .         .         .         .         .         .         .
  10936 289O         .         .         .         .         .         .         .         .         .         .         .         .
  10938 290O         .         .         .         .         .         .         .         .         .         .         .         .
  10940 291O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292O         .         .         .         .         .         .         .         .         .         .         .         .
  10944 293O         .         .         .         .         .         .         .         .         .         .         .         .
  10946 294O         .         .         .         .         .         .         .         .         .         .         .         .
  10948 295O         .         .         .         .         .         .         .         .         .         .         .         .
  10950 296O         .         .         .         .         .         .         .         .         .         .         .         .
  10952 297O         .         .         .         .         .         .         .         .         .         .         .         .
  10954 298O         .         .         .         .         .         .         .         .         .         .         .         .
  10956 299O         .         .         .         .         .         .         .         .         .         .         .         .
  10958 300O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                          STATION    RTA-B

                          (I) INFLOW,   (O) OUTFLOW
          0.      100.      200.      300.      400.      500.        0.        0.        0.        0.        0.        0.        0.
                                                                                 (S) STORAGE
          0.        0.        0.        0.        0.        0.        0.        5.       10.       15.       20.        0.        0.
 DAHRMN PER
  10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
  10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
  10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
  10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
  10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
  10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
  10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
  10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
  10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
  10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
  10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12I         .         .         .         .         .         S         .         .         .         .         .         .
  10024  13I         .         .         .         .         .         S         .         .         .         .         .         .
  10026  14I         .         .         .         .         .         S         .         .         .         .         .         .
  10028  15I         .         .         .         .         .         S         .         .         .         .         .         .
  10030  16I         .         .         .         .         .         S         .         .         .         .         .         .
  10032  17I         .         .         .         .         .         S         .         .         .         .         .         .
  10034  18I         .         .         .         .         .         S         .         .         .         .         .         .
  10036  19I         .         .         .         .         .         S         .         .         .         .         .         .
  10038  20I         .         .         .         .         .         S         .         .         .         .         .         .
  10040  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22I         .         .         .         .         .         S         .         .         .         .         .         .
  10044  23I         .         .         .         .         .         S         .         .         .         .         .         .
  10046  24I         .         .         .         .         .         S         .         .         .         .         .         .
  10048  25I         .         .         .         .         .         S         .         .         .         .         .         .
  10050  26I         .         .         .         .         .         S         .         .         .         .         .         .
  10052  27I         .         .         .         .         .         S         .         .         .         .         .         .
  10054  28I         .         .         .         .         .         S         .         .         .         .         .         .
  10056  29I         .         .         .         .         .         S         .         .         .         .         .         .
  10058  30I         .         .         .         .         .         S         .         .         .         .         .         .
  10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32I         .         .         .         .         .         S         .         .         .         .         .         .
  10104  33I         .         .         .         .         .         S         .         .         .         .         .         .
  10106  34I         .         .         .         .         .         S         .         .         .         .         .         .
  10108  35I         .         .         .         .         .         S         .         .         .         .         .         .
  10110  36I         .         .         .         .         .         S         .         .         .         .         .         .
  10112  37I         .         .         .         .         .         S         .         .         .         .         .         .
  10114  38I         .         .         .         .         .         S         .         .         .         .         .         .
  10116  39I         .         .         .         .         .         S         .         .         .         .         .         .
  10118  40I         .         .         .         .         .         S         .         .         .         .         .         .
  10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42I         .         .         .         .         .         S         .         .         .         .         .         .
  10124  43I         .         .         .         .         .         S         .         .         .         .         .         .
  10126  44I         .         .         .         .         .         S         .         .         .         .         .         .
  10128  45I         .         .         .         .         .         S         .         .         .         .         .         .
  10130  46I         .         .         .         .         .         S         .         .         .         .         .         .
  10132  47I         .         .         .         .         .         S         .         .         .         .         .         .
  10134  48I         .         .         .         .         .         S         .         .         .         .         .         .
  10136  49I         .         .         .         .         .         S         .         .         .         .         .         .
  10138  50I         .         .         .         .         .         S         .         .         .         .         .         .
  10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142  52I         .         .         .         .         .         S         .         .         .         .         .         .
  10144  53I         .         .         .         .         .         S         .         .         .         .         .         .
  10146  54I         .         .         .         .         .         S         .         .         .         .         .         .
  10148  55I         .         .         .         .         .         S         .         .         .         .         .         .
  10150  56I         .         .         .         .         .         S         .         .         .         .         .         .
  10152  57I         .         .         .         .         .         S         .         .         .         .         .         .
  10154  58I         .         .         .         .         .         S         .         .         .         .         .         .
  10156  59I         .         .         .         .         .         S         .         .         .         .         .         .
  10158  60I         .         .         .         .         .         S         .         .         .         .         .         .
  10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10202  62I         .         .         .         .         .         S         .         .         .         .         .         .
  10204  63I         .         .         .         .         .         S         .         .         .         .         .         .
  10206  64I         .         .         .         .         .         S         .         .         .         .         .         .
  10208  65I         .         .         .         .         .         S         .         .         .         .         .         .
  10210  66I         .         .         .         .         .         S         .         .         .         .         .         .
  10212  67I         .         .         .         .         .         S         .         .         .         .         .         .
  10214  68I         .         .         .         .         .         S         .         .         .         .         .         .
  10216  69I         .         .         .         .         .         S         .         .         .         .         .         .
  10218  70I         .         .         .         .         .         S         .         .         .         .         .         .
  10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10222  72I         .         .         .         .         .         S         .         .         .         .         .         .
  10224  73I         .         .         .         .         .         S         .         .         .         .         .         .
  10226  74I         .         .         .         .         .         S         .         .         .         .         .         .
  10228  75OI        .         .         .         .         .         S         .         .         .         .         .         .
  10230  76O I       .         .         .         .         .         S         .         .         .         .         .         .
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10232  77O  I      .         .         .         .         .         S         .         .         .         .         .         .
10234  78O    I    .         .         .         .         .         S         .         .         .         .         .         .
10236  79.O     I  .         .         .         .         .         .S        .         .         .         .         .         .
10238  80.O       I.         .         .         .         .         .S        .         .         .         .         .         .
10240  81. O . . . . .I. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82. O       .     I   .         .         .         .         .         . S       .         .         .         .         .
10244  83.  O      .         I         .         .         .         .         .  S      .         .         .         .         .
10246  84.   O     .         .    I    .         .         .         .         .   S     .         .         .         .         .
10248  85.     O   .         .        I.         .         .         .         .    S    .         .         .         .         .
10250  86.      O  .         .         .   I     .         .         .         .      S  .         .         .         .         .
10252  87.        O.         .         .       I .         .         .         .       S .         .         .         .         .
10254  88.         O         .         .         .I        .         .         .         S         .         .         .         .
10256  89.         . O       .         .         .  I      .         .         .         . S       .         .         .         .
10258  90.         .   O     .         .         .    I    .         .         .         .  S      .         .         .         .
10300  91. . . . . . . .O. . . . . . . . . . . . . . . I . . . . . . . . . . . . . . S. . . . . . . . . . . . . . . . . . . . . .
10302  92.         .      O  .         .         .     I   .         .         .         .      S  .         .         .         .
10304  93.         .        O.         .         .     I   .         .         .         .       S .         .         .         .
10306  94.         .         O         .         .    I    .         .         .         .         S         .         .         .
10308  95.         .         . O       .         .    I    .         .         .         .         .S        .         .         .
10310  96.         .         .  O      .         .   I     .         .         .         .         . S       .         .         .
10312  97.         .         .   O     .         .  I      .         .         .         .         .  S      .         .         .
10314  98.         .         .    O    .         .  I      .         .         .         .         .    S    .         .         .
10316  99.         .         .     O   .         .  I      .         .         .         .         .    S    .         .         .
10318 100.         .         .      O  .         . I       .         .         .         .         .     S   .         .         .
10320 101. . . . . . . . . . . . . . O . . . . . . I . . . . . . . . . . . . . . . . . . . . . . S. . . . . . . . . . . . . . . .
10322 102.         .         .       O .         . I       .         .         .         .         .       S .         .         .
10324 103.         .         .        O.         . I       .         .         .         .         .        S.         .         .
10326 104.         .         .         O         . I       .         .         .         .         .        S.         .         .
10328 105.         .         .         .O        . I       .         .         .         .         .         S         .         .
10330 106.         .         .         .O        . I       .         .         .         .         .         .S        .         .
10332 107.         .         .         . O       . I       .         .         .         .         .         .S        .         .
10334 108.         .         .         . O       . I       .         .         .         .         .         . S       .         .
10336 109.         .         .         .  O      .I        .         .         .         .         .         . S       .         .
10338 110.         .         .         .  O      .I        .         .         .         .         .         .  S      .         .
10340 111. . . . . . . . . . . . . . . . . O . . .I. . . . . . . . . . . . . . . . . . . . . . . . . S. . . . . . . . . . . . .
10342 112.         .         .         .   O     .I        .         .         .         .         .         .   S     .         .
10344 113.         .         .         .   O     I         .         .         .         .         .         .   S     .         .
10346 114.         .         .         .    O    I         .         .         .         .         .         .   S     .         .
10348 115.         .         .         .    O    I         .         .         .         .         .         .   S     .         .
10350 116.         .         .         .    O    I         .         .         .         .         .         .    S    .         .
10352 117.         .         .         .     O   I         .         .         .         .         .         .    S    .         .
10354 118.         .         .         .     O   I         .         .         .         .         .         .    S    .         .
10356 119.         .         .         .     O   I         .         .         .         .         .         .    S    .         .
10358 120.         .         .         .     O  I.         .         .         .         .         .         .     S   .         .
10400 121. . . . . . . . . . . . . . . . . . O .I. . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . .
10402 122.         .         .         .      OI .         .         .         .         .         .         .     S   .         .
10404 123.         .         .         .      OI .         .         .         .         .         .         .     S   .         .
10406 124.         .         .         .      I  .         .         .         .         .         .         .     S   .         .
10408 125.         .         .         .      I  .         .         .         .         .         .         .     S   .         .
10410 126.         .         .         .     IO  .         .         .         .         .         .         .     S   .         .
10412 127.         .         .         .     IO  .         .         .         .         .         .         .     S   .         .
10414 128.         .         .         .    I O  .         .         .         .         .         .         .     S   .         .
10416 129.         .         .         .    IO   .         .         .         .         .         .         .     S   .         .
10418 130.         .         .         .    IO   .         .         .         .         .         .         .     S   .         .
10420 131. . . . . . . . . . . . . . . . . I O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . .
10422 132.         .         .         .   I O   .         .         .         .         .         .         .     S   .         .
10424 133.         .         .         .   I O   .         .         .         .         .         .         .    S    .         .
10426 134.         .         .         .  I  O   .         .         .         .         .         .         .    S    .         .
10428 135.         .         .         .  I  O   .         .         .         .         .         .         .    S    .         .
10430 136.         .         .         .  I  O   .         .         .         .         .         .         .    S    .         .
10432 137.         .         .         . I  O    .         .         .         .         .         .         .    S    .         .
10434 138.         .         .         . I  O    .         .         .         .         .         .         .    S    .         .
10436 139.         .         .         .I   O    .         .         .         .         .         .         .   S     .         .
10438 140.         .         .         .I   O    .         .         .         .         .         .         .   S     .         .
10440 141. . . . . . . . . . . . . . . .I. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . .
10442 142.         .         .         I   O     .         .         .         .         .         .         .   S     .         .
10444 143.         .         .         I   O     .         .         .         .         .         .         .   S     .         .
10446 144.         .         .         I   O     .         .         .         .         .         .         .  S      .         .
10448 145.         .         .        I.   O     .         .         .         .         .         .         .  S      .         .
10450 146.         .         .        I.  O      .         .         .         .         .         .         .  S      .         .
10452 147.         .         .        I.  O      .         .         .         .         .         .         .  S      .         .
10454 148.         .         .        I.  O      .         .         .         .         .         .         . S       .         .
10456 149.         .         .        I.  O      .         .         .         .         .         .         . S       .         .
10458 150.         .         .       I . O       .         .         .         .         .         .         . S       .         .
10500 151. . . . . . . . . . . . . . I . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . .
10502 152.         .         .       I . O       .         .         .         .         .         .         .S        .         .
10504 153.         .         .       I . O       .         .         .         .         .         .         .S        .         .
10506 154.         .         .      I  . O       .         .         .         .         .         .         .S        .         .
10508 155.         .         .      I  .O        .         .         .         .         .         .         .S        .         .
10510 156.         .         .      I  .O        .         .         .         .         .         .         .S        .         .
10512 157.         .         .      I  .O        .         .         .         .         .         .         S         .         .
10514 158.         .         .      I  .O        .         .         .         .         .         .         S         .         .
10516 159.         .         .      I  O         .         .         .         .         .         .         S         .         .
10518 160.         .         .     I   O         .         .         .         .         .         .         S         .         .
10520 161. . . . . . . . . . . . . I . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S. . . . . . . . . . . . . . .
10522 162.         .         .     I   O         .         .         .         .         .         .        S.         .         .
10524 163.         .         .     I   O         .         .         .         .         .         .        S.         .         .
10526 164.         .         .     I  O.         .         .         .         .         .         .        S.         .         .
10528 165.         .         .     I  O.         .         .         .         .         .         .        S.         .         .
10530 166.         .         .     I  O.         .         .         .         .         .         .        S.         .         .
10532 167.         .         .     I  O.         .         .         .         .         .         .       S .         .         .
10534 168.         .         .     I  O.         .         .         .         .         .         .       S .         .         .
10536 169.         .         .     I  O.         .         .         .         .         .         .       S .         .         .
10538 170.         .         .     I O .         .         .         .         .         .         .       S .         .         .
10540 171. . . . . . . . . . . . . I O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . .
10542 172.         .         .     I O .         .         .         .         .         .         .       S .         .         .
10544 173.         .         .     I O .         .         .         .         .         .         .       S .         .         .
10546 174.         .         .     I O .         .         .         .         .         .         .      S  .         .         .
10548 175.         .         .     I O .         .         .         .         .         .         .      S  .         .         .
10550 176.         .         .     I O .         .         .         .         .         .         .      S  .         .         .
10552 177.         .         .     I O .         .         .         .         .         .         .      S  .         .         .
10554 178.         .         .     I O .         .         .         .         .         .         .      S  .         .         .
10556 179.         .         .     IO  .         .         .         .         .         .         .      S  .         .         .
10558 180.         .         .     IO  .         .         .         .         .         .         .      S  .         .         .
10600 181. . . . . . . . . . . . . IO. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S. . . . . . . . . . . . . . . .
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10602 182.         .         .     IO  .         .         .         .         .         .      S  .         .         .         .
10604 183.         .         .     IO  .         .         .         .         .         .      S  .         .         .         .
10606 184.         .         .     IO  .         .         .         .         .         .      S  .         .         .         .
10608 185.         .         .     IO  .         .         .         .         .         .      S  .         .         .         .
10610 186.         .         .     IO  .         .         .         .         .         .      S  .         .         .         .
10612 187.         .         .     IO  .         .         .         .         .         .     S   .         .         .         .
10614 188.         .         .     IO  .         .         .         .         .         .     S   .         .         .         .
10616 189.         .         .     IO  .         .         .         .         .         .     S   .         .         .         .
10618 190.         .         .     IO  .         .         .         .         .         .     S   .         .         .         .
10620 191. . . . . . . . . . . . IO. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . .
10622 192.         .         .     IO  .         .         .         .         .         .     S   .         .         .         .
10624 193.         .         .     IO  .         .         .         .         .         .     S   .         .         .         .
10626 194.         .         .    I O  .         .         .         .         .         .     S   .         .         .         .
10628 195.         .         .   I  O  .         .         .         .         .         .     S   .         .         .         .
10630 196.         .         .  I  O   .         .         .         .         .         .     S   .         .         .         .
10632 197.         .         . I   O   .         .         .         .         .         .     S   .         .         .         .
10634 198.         .         .I    O   .         .         .         .         .         .    S    .         .         .         .
10636 199.         .        I.     O   .         .         .         .         .         .    S    .         .         .         .
10638 200.         .       I .    O    .         .         .         .         .         .    S    .         .         .         .
10640 201. . . . . . . . .I. . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . .
10642 202.         .     I   .   O     .         .         .         .         .         .   S     .         .         .         .
10644 203.         .   I     .   O     .         .         .         .         .         .  S      .         .         .         .
10646 204.         .  I      .  O      .         .         .         .         .         .  S      .         .         .         .
10648 205.         . I       .  O      .         .         .         .         .         . S       .         .         .         .
10650 206.         . I       . O       .         .         .         .         .         . S       .         .         .         .
10652 207.         .I        . O       .         .         .         .         .         .S        .         .         .         .
10654 208.         I         .O        .         .         .         .         .         .S        .         .         .         .
10656 209.        I.         O         .         .         .         .         .         S         .         .         .         .
10658 210.        I.         O         .         .         .         .         .        S.         .         .         .         .
10700 211. . . . I . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
10702 212.      I  .       O .         .         .         .         .         .       S .         .         .         .         .
10704 213.      I  .       O .         .         .         .         .         .      S  .         .         .         .         .
10706 214.     I   .      O  .         .         .         .         .         .      S  .         .         .         .         .
10708 215.     I   .      O  .         .         .         .         .         .     S   .         .         .         .         .
10710 216.    I    .     O   .         .         .         .         .         .     S   .         .         .         .         .
10712 217.    I    .    O    .         .         .         .         .         .    S    .         .         .         .         .
10714 218.   I     .    O    .         .         .         .         .         .   S     .         .         .         .         .
10716 219.   I     .   O     .         .         .         .         .         .   S     .         .         .         .         .
10718 220.   I     .   O     .         .         .         .         .         .  S      .         .         .         .         .
10720 221. .I. . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . .
10722 222.  I      . O       .         .         .         .         .         . S       .         .         .         .         .
10724 223.  I      . O       .         .         .         .         .         . S       .         .         .         .         .
10726 224. I       .O        .         .         .         .         .         .S        .         .         .         .         .
10728 225. I       .O        .         .         .         .         .         .S        .         .         .         .         .
10730 226. I       O         .         .         .         .         .         S         .         .         .         .         .
10732 227. I       O         .         .         .         .         .         S         .         .         .         .         .
10734 228. I       O         .         .         .         .         .        S.         .         .         .         .         .
10736 229. I      O.         .         .         .         .         .        S.         .         .         .         .         .
10738 230.I       O.         .         .         .         .         .        S.         .         .         .         .         .
10740 231.I. . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . .
10742 232.I      O .         .         .         .         .         .       S .         .         .         .         .         .
10744 233.I      O .         .         .         .         .         .       S .         .         .         .         .         .
10746 234.I     O  .         .         .         .         .         .      S  .         .         .         .         .         .
10748 235.I     O  .         .         .         .         .         .      S  .         .         .         .         .         .
10750 236.I     O  .         .         .         .         .         .     S   .         .         .         .         .         .
10752 237.I    O   .         .         .         .         .         .     S   .         .         .         .         .         .
10754 238.I    O   .         .         .         .         .         .     S   .         .         .         .         .         .
10756 239.I    O   .         .         .         .         .         .     S   .         .         .         .         .         .
10758 240.I   O    .         .         .         .         .         .    S    .         .         .         .         .         .
10800 241.I. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . .
10802 242.I   O    .         .         .         .         .         .    S    .         .         .         .         .         .
10804 243I    O    .         .         .         .         .         .    S    .         .         .         .         .         .
10806 244I   O     .         .         .         .         .         .   S     .         .         .         .         .         .
10808 245I   O     .         .         .         .         .         .   S     .         .         .         .         .         .
10810 246I   O     .         .         .         .         .         .   S     .         .         .         .         .         .
10812 247I   O     .         .         .         .         .         .   S     .         .         .         .         .         .
10814 248I   O     .         .         .         .         .         .   S     .         .         .         .         .         .
10816 249I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
10818 250I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
10820 251I .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10822 252I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
10824 253I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
10826 254I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
10828 255I  O      .         .         .         .         .         . S       .         .         .         .         .         .
10830 256I O       .         .         .         .         .         . S       .         .         .         .         .         .
10832 257I O       .         .         .         .         .         . S       .         .         .         .         .         .
10834 258I O       .         .         .         .         .         . S       .         .         .         .         .         .
10836 259I O       .         .         .         .         .         . S       .         .         .         .         .         .
10838 260I O       .         .         .         .         .         . S       .         .         .         .         .         .
10840 261I O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10842 262I O       .         .         .         .         .         . S       .         .         .         .         .         .
10844 263I O       .         .         .         .         .         . S       .         .         .         .         .         .
10846 264I O       .         .         .         .         .         . S       .         .         .         .         .         .
10848 265IO        .         .         .         .         .         .S        .         .         .         .         .         .
10850 266IO        .         .         .         .         .         .S        .         .         .         .         .         .
10852 267IO        .         .         .         .         .         .S        .         .         .         .         .         .
10854 268IO        .         .         .         .         .         .S        .         .         .         .         .         .
10856 269IO        .         .         .         .         .         .S        .         .         .         .         .         .
10858 270IO        .         .         .         .         .         .S        .         .         .         .         .         .
10900 271IO. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10902 272IO        .         .         .         .         .         .S        .         .         .         .         .         .
10904 273IO        .         .         .         .         .         .S        .         .         .         .         .         .
10906 274IO        .         .         .         .         .         .S        .         .         .         .         .         .
10908 275IO        .         .         .         .         .         .S        .         .         .         .         .         .
10910 276IO        .         .         .         .         .         .S        .         .         .         .         .         .
10912 277IO        .         .         .         .         .         .S        .         .         .         .         .         .
10914 278IO        .         .         .         .         .         .S        .         .         .         .         .         .
10916 279IO        .         .         .         .         .         .S        .         .         .         .         .         .
10918 280IO        .         .         .         .         .         .S        .         .         .         .         .         .
10920 281IO. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10922 282IO        .         .         .         .         .         .S        .         .         .         .         .         .
10924 283IO        .         .         .         .         .         .S        .         .         .         .         .         .
10926 284IO        .         .         .         .         .         .S        .         .         .         .         .         .
10928 285I         .         .         .         .         .         S         .         .         .         .         .         .
10930 286I         .         .         .         .         .         S         .         .         .         .         .         .
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  10932 287I         .         .         .         .         .         S         .         .         .         .         .         .
  10934 288I         .         .         .         .         .         S         .         .         .         .         .         .
  10936 289I         .         .         .         .         .         S         .         .         .         .         .         .
  10938 290I         .         .         .         .         .         S         .         .         .         .         .         .
  10940 291I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292I         .         .         .         .         .         S         .         .         .         .         .         .
  10944 293I         .         .         .         .         .         S         .         .         .         .         .         .
  10946 294I         .         .         .         .         .         S         .         .         .         .         .         .
  10948 295I         .         .         .         .         .         S         .         .         .         .         .         .
  10950 296I         .         .         .         .         .         S         .         .         .         .         .         .
  10952 297I         .         .         .         .         .         S         .         .         .         .         .         .
  10954 298I         .         .         .         .         .         S         .         .         .         .         .         .
  10956 299I         .         .         .         .         .         S         .         .         .         .         .         .
  10958 300I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
1
1                                                          STATION      300

                          (O) OUTFLOW
          0.       40.       80.      120.      160.      200.      240.        0.        0.        0.        0.        0.        0.
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .04       .03       .02       .01       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
  10122  42O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10124  43O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10126  44O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10128  45O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10130  46O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10132  47O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10134  48O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10136  49O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10138  50O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
  10142  52O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10144  53O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10146  54O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
  10148  55O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10150  56O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10152  57O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10154  58O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10156  59O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10158  60O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLL.
  10202  62O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10204  63O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10206  64O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10208  65O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10210  66O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10212  67O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10214  68O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
  10216  69O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLL.
  10218  70O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
  10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
  10222  72O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
  10224  73O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLX.
  10226  74O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLX.
  10228  75O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
  10230  76O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
  10232  77.O        .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLXXXX.
  10234  78.O        .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLXXXXX.
  10236  79. O       .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLXXXXXX.
  10238  80.   O     .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLXXXXXX.
  10240  81. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLXXXXXXX.
  10242  82.       O .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
  10244  83.         .O        .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
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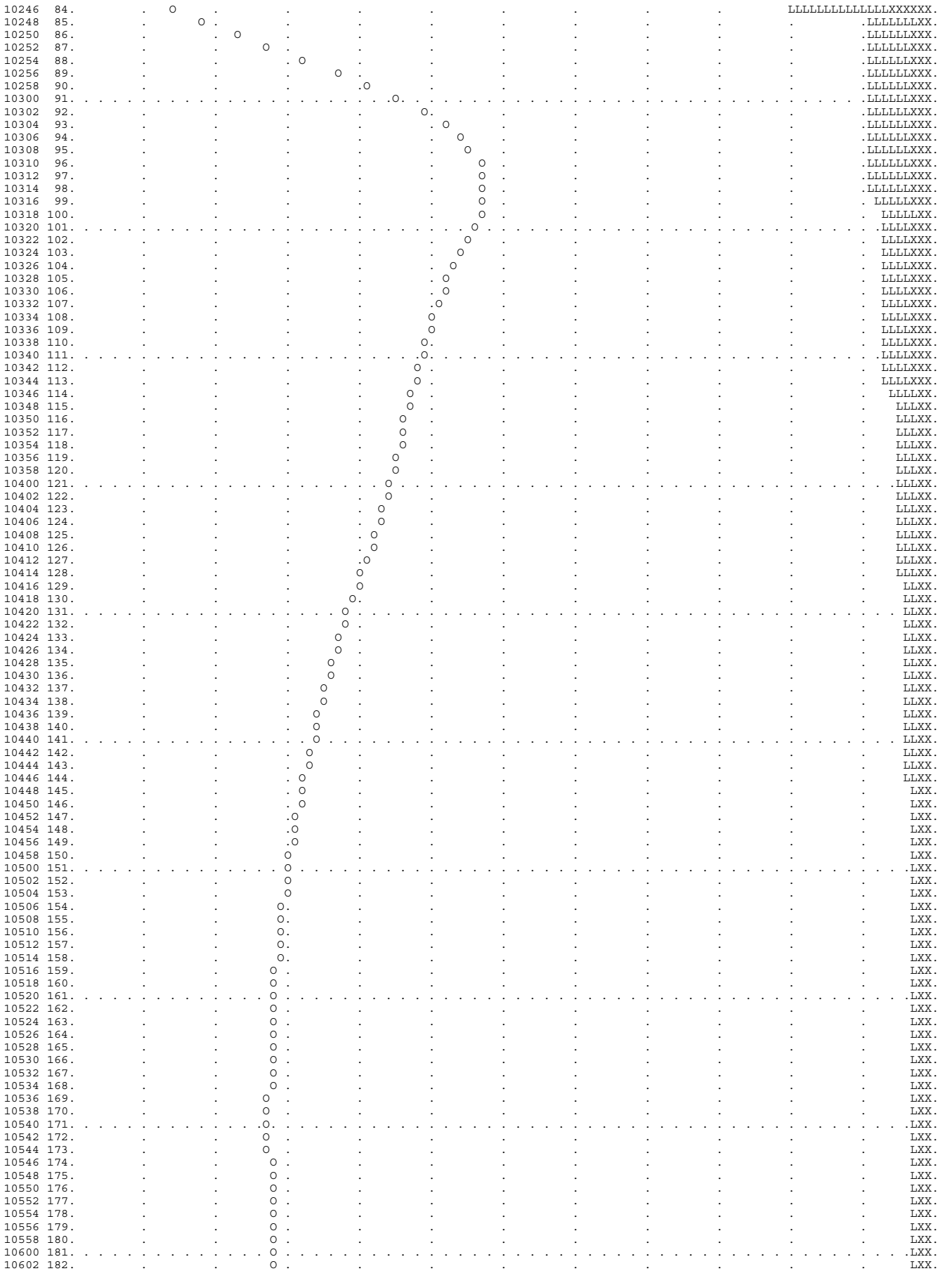

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10616 189.         .         .       O .         .         .         .         .         .         .         .         .       LX.
10618 190.         .         .       O .         .         .         .         .         .         .         .         .         .
10620 191. . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10622 192.         .         .       O .         .         .         .         .         .         .         .         .         .
10624 193.         .         .       O .         .         .         .         .         .         .         .         .         .
10626 194.         .         .      O  .         .         .         .         .         .         .         .         .         .
10628 195.         .         .      O  .         .         .         .         .         .         .         .         .         .
10630 196.         .         .    O    .         .         .         .         .         .         .         .         .         .
10632 197.         .         .   O     .         .         .         .         .         .         .         .         .         .
10634 198.         .         .  O      .         .         .         .         .         .         .         .         .         .
10636 199.         .         . O       .         .         .         .         .         .         .         .         .         .
10638 200.         .         O         .         .         .         .         .         .         .         .         .         .
10640 201. . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10642 202.         .        O.         .         .         .         .         .         .         .         .         .         .
10644 203.         .      O  .         .         .         .         .         .         .         .         .         .         .
10646 204.         .     O   .         .         .         .         .         .         .         .         .         .         .
10648 205.         .   O     .         .         .         .         .         .         .         .         .         .         .
10650 206.         .  O      .         .         .         .         .         .         .         .         .         .         .
10652 207.         . O       .         .         .         .         .         .         .         .         .         .         .
10654 208.         O         .         .         .         .         .         .         .         .         .         .         .
10656 209.        O.         .         .         .         .         .         .         .         .         .         .         .
10658 210.       O .         .         .         .         .         .         .         .         .         .         .         .
10700 211. . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10702 212.      O  .         .         .         .         .         .         .         .         .         .         .         .
10704 213.     O   .         .         .         .         .         .         .         .         .         .         .         .
10706 214.    O    .         .         .         .         .         .         .         .         .         .         .         .
10708 215.    O    .         .         .         .         .         .         .         .         .         .         .         .
10710 216.   O     .         .         .         .         .         .         .         .         .         .         .         .
10712 217.   O     .         .         .         .         .         .         .         .         .         .         .         .
10714 218.  O      .         .         .         .         .         .         .         .         .         .         .         .
10716 219.  O      .         .         .         .         .         .         .         .         .         .         .         .
10718 220.  O      .         .         .         .         .         .         .         .         .         .         .         .
10720 221. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10722 222. O       .         .         .         .         .         .         .         .         .         .         .         .
10724 223. O       .         .         .         .         .         .         .         .         .         .         .         .
10726 224. O       .         .         .         .         .         .         .         .         .         .         .         .
10728 225.O        .         .         .         .         .         .         .         .         .         .         .         .
10730 226.O        .         .         .         .         .         .         .         .         .         .         .         .
10732 227.O        .         .         .         .         .         .         .         .         .         .         .         .
10734 228.O        .         .         .         .         .         .         .         .         .         .         .         .
10736 229.O        .         .         .         .         .         .         .         .         .         .         .         .
10738 230.O        .         .         .         .         .         .         .         .         .         .         .         .
10740 231.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10742 232.O        .         .         .         .         .         .         .         .         .         .         .         .
10744 233.O        .         .         .         .         .         .         .         .         .         .         .         .
10746 234.O        .         .         .         .         .         .         .         .         .         .         .         .
10748 235O         .         .         .         .         .         .         .         .         .         .         .         .
10750 236O         .         .         .         .         .         .         .         .         .         .         .         .
10752 237O         .         .         .         .         .         .         .         .         .         .         .         .
10754 238O         .         .         .         .         .         .         .         .         .         .         .         .
10756 239O         .         .         .         .         .         .         .         .         .         .         .         .
10758 240O         .         .         .         .         .         .         .         .         .         .         .         .
10800 241O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10802 242O         .         .         .         .         .         .         .         .         .         .         .         .
10804 243O         .         .         .         .         .         .         .         .         .         .         .         .
10806 244O         .         .         .         .         .         .         .         .         .         .         .         .
10808 245O         .         .         .         .         .         .         .         .         .         .         .         .
10810 246O         .         .         .         .         .         .         .         .         .         .         .         .
10812 247O         .         .         .         .         .         .         .         .         .         .         .         .
10814 248O         .         .         .         .         .         .         .         .         .         .         .         .
10816 249O         .         .         .         .         .         .         .         .         .         .         .         .
10818 250O         .         .         .         .         .         .         .         .         .         .         .         .
10820 251O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10822 252O         .         .         .         .         .         .         .         .         .         .         .         .
10824 253O         .         .         .         .         .         .         .         .         .         .         .         .
10826 254O         .         .         .         .         .         .         .         .         .         .         .         .
10828 255O         .         .         .         .         .         .         .         .         .         .         .         .
10830 256O         .         .         .         .         .         .         .         .         .         .         .         .
10832 257O         .         .         .         .         .         .         .         .         .         .         .         .
10834 258O         .         .         .         .         .         .         .         .         .         .         .         .
10836 259O         .         .         .         .         .         .         .         .         .         .         .         .
10838 260O         .         .         .         .         .         .         .         .         .         .         .         .
10840 261O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10842 262O         .         .         .         .         .         .         .         .         .         .         .         .
10844 263O         .         .         .         .         .         .         .         .         .         .         .         .
10846 264O         .         .         .         .         .         .         .         .         .         .         .         .
10848 265O         .         .         .         .         .         .         .         .         .         .         .         .
10850 266O         .         .         .         .         .         .         .         .         .         .         .         .
10852 267O         .         .         .         .         .         .         .         .         .         .         .         .
10854 268O         .         .         .         .         .         .         .         .         .         .         .         .
10856 269O         .         .         .         .         .         .         .         .         .         .         .         .
10858 270O         .         .         .         .         .         .         .         .         .         .         .         .
10900 271O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10902 272O         .         .         .         .         .         .         .         .         .         .         .         .
10904 273O         .         .         .         .         .         .         .         .         .         .         .         .
10906 274O         .         .         .         .         .         .         .         .         .         .         .         .
10908 275O         .         .         .         .         .         .         .         .         .         .         .         .
10910 276O         .         .         .         .         .         .         .         .         .         .         .         .
10912 277O         .         .         .         .         .         .         .         .         .         .         .         .
10914 278O         .         .         .         .         .         .         .         .         .         .         .         .
10916 279O         .         .         .         .         .         .         .         .         .         .         .         .
10918 280O         .         .         .         .         .         .         .         .         .         .         .         .
10920 281O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10922 282O         .         .         .         .         .         .         .         .         .         .         .         .
10924 283O         .         .         .         .         .         .         .         .         .         .         .         .
10926 284O         .         .         .         .         .         .         .         .         .         .         .         .
10928 285O         .         .         .         .         .         .         .         .         .         .         .         .
10930 286O         .         .         .         .         .         .         .         .         .         .         .         .
10932 287O         .         .         .         .         .         .         .         .         .         .         .         .
10934 288O         .         .         .         .         .         .         .         .         .         .         .         .
10936 289O         .         .         .         .         .         .         .         .         .         .         .         .
10938 290O         .         .         .         .         .         .         .         .         .         .         .         .
10940 291O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10942 292O         .         .         .         .         .         .         .         .         .         .         .         .
10944 293O         .         .         .         .         .         .         .         .         .         .         .         .
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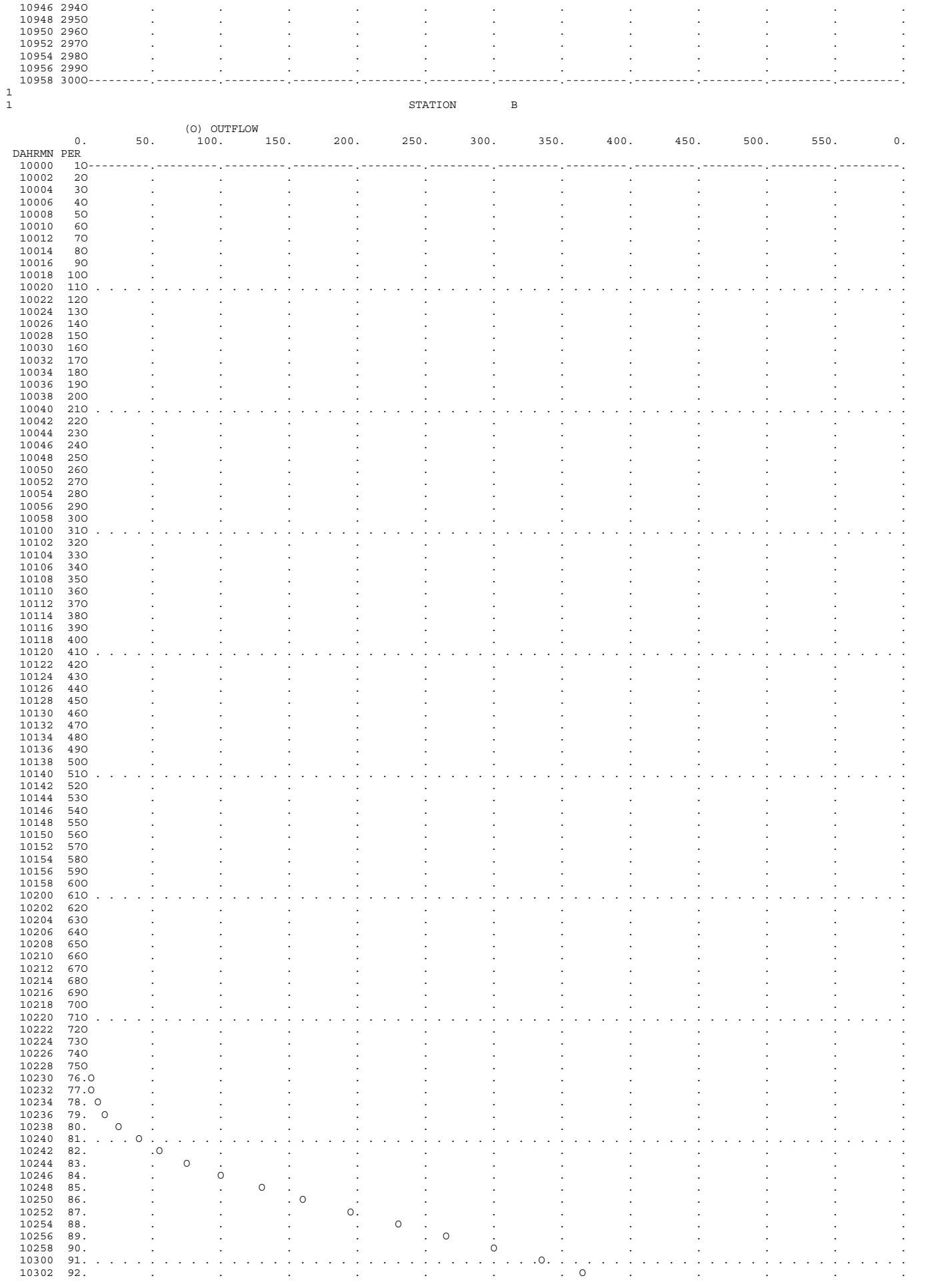
10946 294O
10948 295O
10950 296O
10952 297O
10954 298O
10956 299O
10958 300O
1
1
STATION B
(O) OUTFLOW
0. 50. 100. 150. 200. 250. 300. 350. 400. 450. 500. 550. 0.
DAHRMN PER
10000 1O
10002 2O
10004 3O
10006 4O
10008 5O
10010 6O
10012 7O
10014 8O
10016 9O
10018 10O
10020 11O
10022 12O
10024 13O
10026 14O
10028 15O
10030 16O
10032 17O
10034 18O
10036 19O
10038 20O
10040 21O
10042 22O
10044 23O
10046 24O
10048 25O
10050 26O
10052 27O
10054 28O
10056 29O
10058 30O
10100 31O
10102 32O
10104 33O
10106 34O
10108 35O
10110 36O
10112 37O
10114 38O
10116 39O
10118 40O
10120 41O
10122 42O
10124 43O
10126 44O
10128 45O
10130 46O
10132 47O
10134 48O
10136 49O
10138 50O
10140 51O
10142 52O
10144 53O
10146 54O
10148 55O
10150 56O
10152 57O
10154 58O
10156 59O
10158 60O
10200 61O
10202 62O
10204 63O
10206 64O
10208 65O
10210 66O
10212 67O
10214 68O
10216 69O
10218 70O
10220 71O
10222 72O
10224 73O
10226 74O
10228 75O
10230 76.O
10232 77.O
10234 78. O
10236 79. O
10238 80. O
10240 81. O
10242 82. O
10244 83. O
10246 84. O
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10252 87. O
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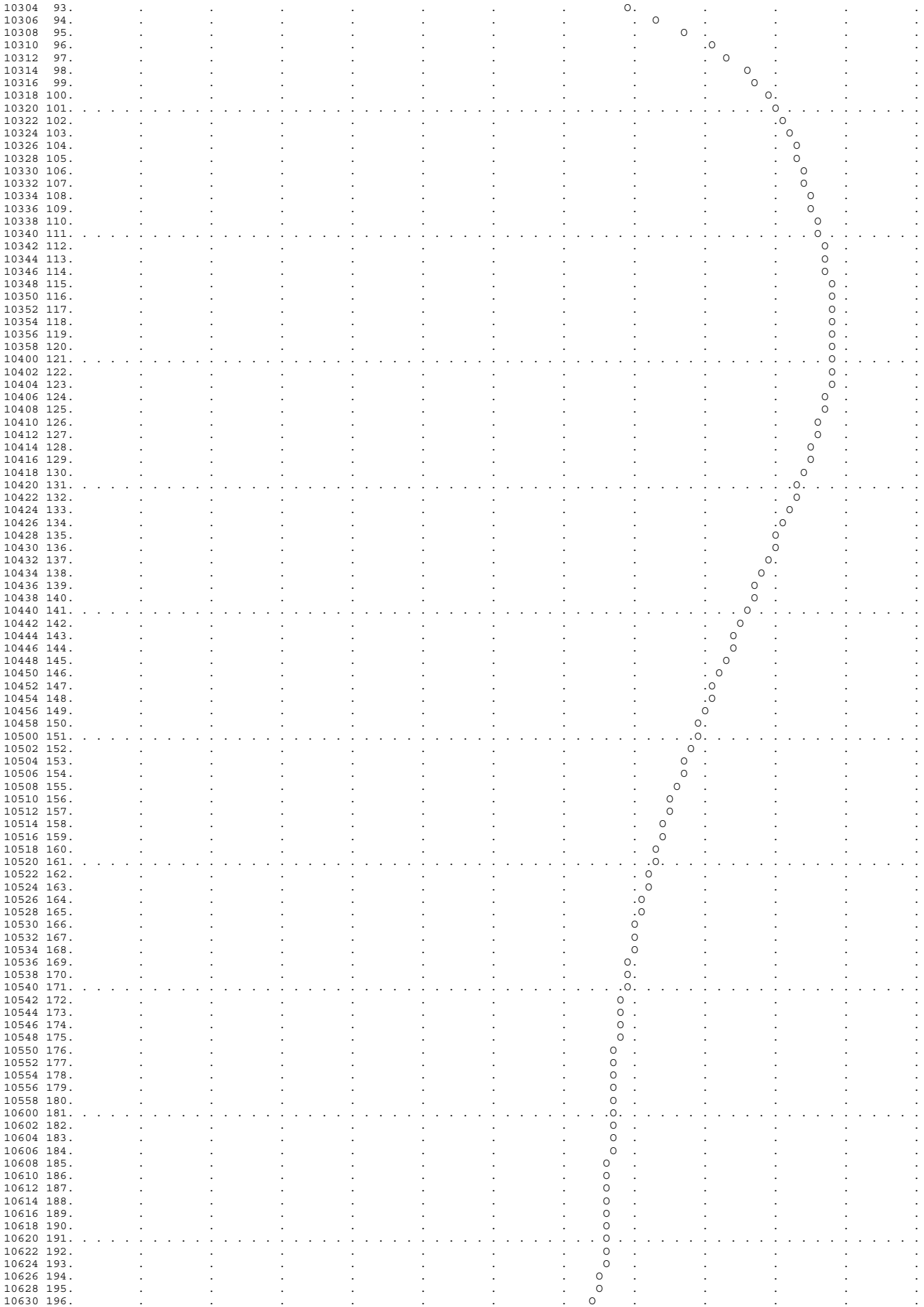
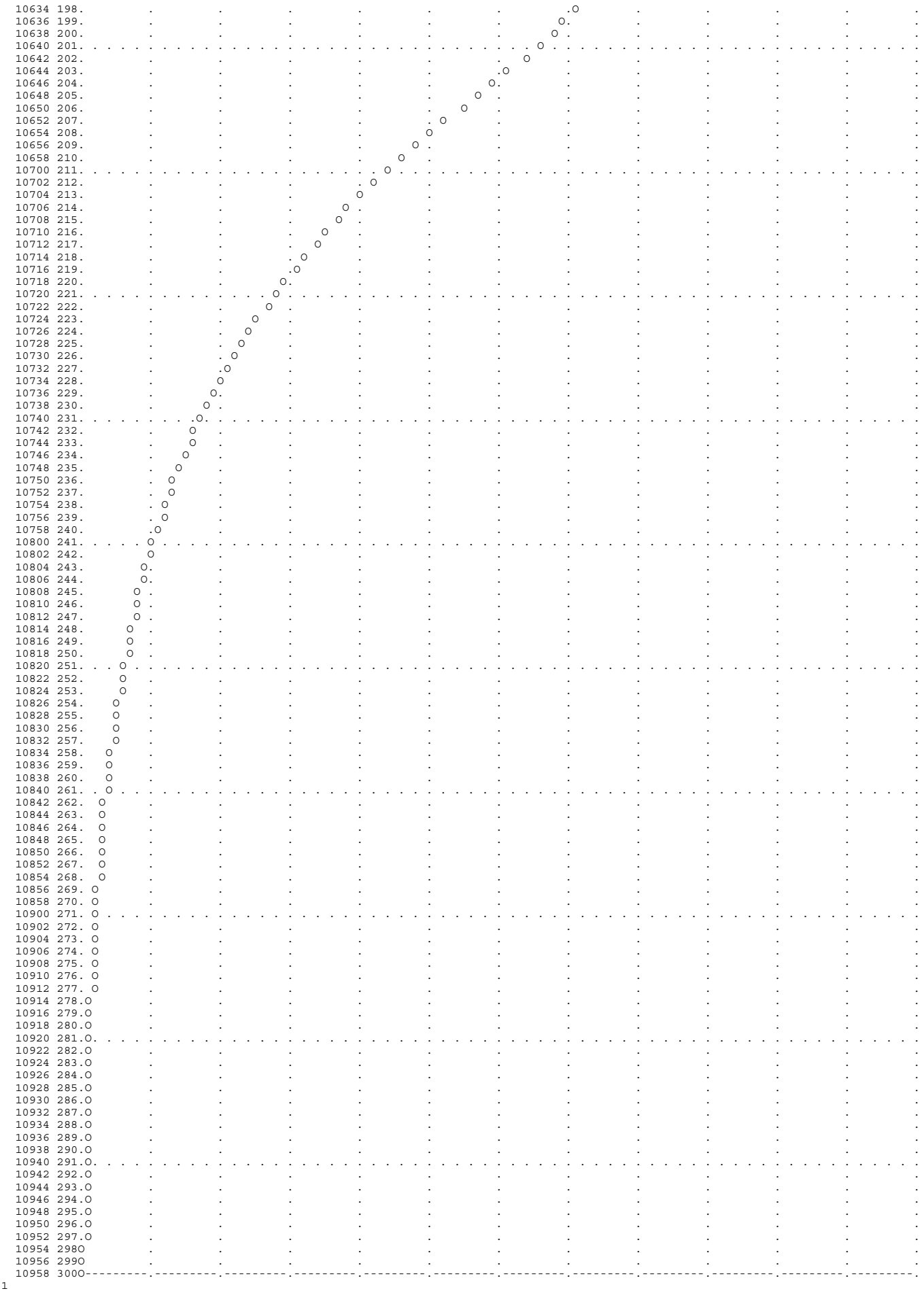
10256 89. O
10258 90. O
10300 91. O
10302 92. O





1

1 STATION 400

```
                        (O) OUTFLOW
        0.      100.      200.      300.      400.      500.      600.        0.        0.        0.        0.        0.        0.
                                                                                                   (L) PRECIP,   (X) EXCESS
       .00       .00       .00       .00       .00       .00       .00       .00       .04       .03       .02       .01       .00
DAHRMN PER
 10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
 10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
 10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
 10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
 10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
 10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
 10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
 10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
 10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
 10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
 10048  25O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10050  26O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10052  27O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10054  28O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10056  29O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10058  30O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
 10102  32O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10104  33O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10106  34O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10108  35O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10110  36O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10112  37O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10114  38O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
 10118  40O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
 10122  42O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10124  43O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10126  44O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10128  45O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10130  46O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10132  47O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10134  48O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10136  49O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10138  50O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
 10142  52O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10144  53O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
 10146  54O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
 10148  55O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10150  56O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10152  57O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10154  58O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10156  59O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10158  60O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLL.
 10202  62O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10204  63O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10206  64O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10208  65O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10210  66O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10212  67O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10214  68O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
 10216  69O         .         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLL.
 10218  70O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
 10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
 10222  72O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLX.
 10224  73O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
 10226  74O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXXX.
 10228  75O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXXX.
 10230  76O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXXXX.
 10232  77O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXXXX.
 10234  78.O        .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLXXXXXXX.
 10236  79.O        .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
 10238  80.O        .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLXXXXXXXXX.
 10240  81. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLXXXXXXXXX.
 10242  82. O        .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLXXXXXXXXXX.
 10244  83.  O       .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLXXXXXXXXXXX.
 10246  84.  O       .         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLXXXXXXX.
 10248  85.   O      .         .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10250  86.    O     .         .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10252  87.     O    .         .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10254  88.      O   .         .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10256  89.       O  .         .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10258  90.        O .         .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10300  91. . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLXXX.
 10302  92.         .  O      .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10304  93.         .    O    .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10306  94.         .      O  .         .         .         .         .         .         .         .         .         .         .LLLLLLXXX.
 10308  95.         .        O         .         .         .         .         .         .         .         .         .         .LLLLLXXXX.
 10310  96.         .         . O      .         .         .         .         .         .         .         .         .         .LLLLLXXXX.
 10312  97.         .          .  O    .         .         .         .         .         .         .         .         .         .LLLLLXXXX.
 10314  98.         .          .    O  .         .         .         .         .         .         .         .         .         .LLLLLXXXX.
 10316  99.         .          .      O .         .         .         .         .         .         .         .         .         . LLLLLXXX.
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10318 100.        .        .        .O       .        .        .        .        .        .        .        .  LLLLXXX.
10320 101. . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . .
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  10648 205.         .         .         O         .         .         .         .         .         .         .         .         .
  10650 206.         .         .         O         .         .         .         .         .         .         .         .         .
  10652 207.         .         .        O.         .         .         .         .         .         .         .         .         .
  10654 208.         .         .        O.         .         .         .         .         .         .         .         .         .
  10656 209.         .         .       O .         .         .         .         .         .         .         .         .         .
  10658 210.         .         .       O .         .         .         .         .         .         .         .         .         .
  10700 211. . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10702 212.         .         .     O   .         .         .         .         .         .         .         .         .         .
  10704 213.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10706 214.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10708 215.         .         .   O     .         .         .         .         .         .         .         .         .         .
  10710 216.         .         .  O      .         .         .         .         .         .         .         .         .         .
  10712 217.         .         . O       .         .         .         .         .         .         .         .         .         .
  10714 218.         .         . O       .         .         .         .         .         .         .         .         .         .
  10716 219.         .         .O        .         .         .         .         .         .         .         .         .         .
  10718 220.         .         O         .         .         .         .         .         .         .         .         .         .
  10720 221. . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10722 222.         .       O .         .         .         .         .         .         .         .         .         .         .
  10724 223.         .       O .         .         .         .         .         .         .         .         .         .         .
  10726 224.         .      O  .         .         .         .         .         .         .         .         .         .         .
  10728 225.         .     O   .         .         .         .         .         .         .         .         .         .         .
  10730 226.         .    O    .         .         .         .         .         .         .         .         .         .         .
  10732 227.         .    O    .         .         .         .         .         .         .         .         .         .         .
  10734 228.         .   O     .         .         .         .         .         .         .         .         .         .         .
  10736 229.         .  O      .         .         .         .         .         .         .         .         .         .         .
  10738 230.         .  O      .         .         .         .         .         .         .         .         .         .         .
  10740 231. . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10742 232.         .O        .         .         .         .         .         .         .         .         .         .         .
  10744 233.         .O        .         .         .         .         .         .         .         .         .         .         .
  10746 234.         O         .         .         .         .         .         .         .         .         .         .         .
  10748 235.         O         .         .         .         .         .         .         .         .         .         .         .
  10750 236.        O.         .         .         .         .         .         .         .         .         .         .         .
  10752 237.        O.         .         .         .         .         .         .         .         .         .         .         .
  10754 238.       O .         .         .         .         .         .         .         .         .         .         .         .
  10756 239.       O .         .         .         .         .         .         .         .         .         .         .         .
  10758 240.      O  .         .         .         .         .         .         .         .         .         .         .         .
  10800 241. . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10802 242.      O  .         .         .         .         .         .         .         .         .         .         .         .
  10804 243.     O   .         .         .         .         .         .         .         .         .         .         .         .
  10806 244.     O   .         .         .         .         .         .         .         .         .         .         .         .
  10808 245.     O   .         .         .         .         .         .         .         .         .         .         .         .
  10810 246.    O    .         .         .         .         .         .         .         .         .         .         .         .
  10812 247.    O    .         .         .         .         .         .         .         .         .         .         .         .
  10814 248.    O    .         .         .         .         .         .         .         .         .         .         .         .
  10816 249.    O    .         .         .         .         .         .         .         .         .         .         .         .
  10818 250.   O     .         .         .         .         .         .         .         .         .         .         .         .
  10820 251. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10822 252.   O     .         .         .         .         .         .         .         .         .         .         .         .
  10824 253.   O     .         .         .         .         .         .         .         .         .         .         .         .
  10826 254.  O      .         .         .         .         .         .         .         .         .         .         .         .
  10828 255.  O      .         .         .         .         .         .         .         .         .         .         .         .
  10830 256.  O      .         .         .         .         .         .         .         .         .         .         .         .
  10832 257.  O      .         .         .         .         .         .         .         .         .         .         .         .
  10834 258.  O      .         .         .         .         .         .         .         .         .         .         .         .
  10836 259.  O      .         .         .         .         .         .         .         .         .         .         .         .
  10838 260.  O      .         .         .         .         .         .         .         .         .         .         .         .
  10840 261. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10842 262. O       .         .         .         .         .         .         .         .         .         .         .         .
  10844 263. O       .         .         .         .         .         .         .         .         .         .         .         .
  10846 264. O       .         .         .         .         .         .         .         .         .         .         .         .
  10848 265. O       .         .         .         .         .         .         .         .         .         .         .         .
  10850 266. O       .         .         .         .         .         .         .         .         .         .         .         .
  10852 267. O       .         .         .         .         .         .         .         .         .         .         .         .
  10854 268. O       .         .         .         .         .         .         .         .         .         .         .         .
  10856 269. O       .         .         .         .         .         .         .         .         .         .         .         .
  10858 270.O        .         .         .         .         .         .         .         .         .         .         .         .
  10900 271.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10902 272.O        .         .         .         .         .         .         .         .         .         .         .         .
  10904 273.O        .         .         .         .         .         .         .         .         .         .         .         .
  10906 274.O        .         .         .         .         .         .         .         .         .         .         .         .
  10908 275.O        .         .         .         .         .         .         .         .         .         .         .         .
  10910 276.O        .         .         .         .         .         .         .         .         .         .         .         .
  10912 277.O        .         .         .         .         .         .         .         .         .         .         .         .
  10914 278.O        .         .         .         .         .         .         .         .         .         .         .         .
  10916 279.O        .         .         .         .         .         .         .         .         .         .         .         .
  10918 280.O        .         .         .         .         .         .         .         .         .         .         .         .
  10920 281.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10922 282.O        .         .         .         .         .         .         .         .         .         .         .         .
  10924 283.O        .         .         .         .         .         .         .         .         .         .         .         .
  10926 284.O        .         .         .         .         .         .         .         .         .         .         .         .
  10928 285.O        .         .         .         .         .         .         .         .         .         .         .         .
  10930 286.O        .         .         .         .         .         .         .         .         .         .         .         .
  10932 287.O        .         .         .         .         .         .         .         .         .         .         .         .
  10934 288.O        .         .         .         .         .         .         .         .         .         .         .         .
  10936 289.O        .         .         .         .         .         .         .         .         .         .         .         .
  10938 290O         .         .         .         .         .         .         .         .         .         .         .         .
  10940 291O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292O         .         .         .         .         .         .         .         .         .         .         .         .
  10944 293O         .         .         .         .         .         .         .         .         .         .         .         .
  10946 294O         .         .         .         .         .         .         .         .         .         .         .         .
  10948 295O         .         .         .         .         .         .         .         .         .         .         .         .
  10950 296O         .         .         .         .         .         .         .         .         .         .         .         .
  10952 297O         .         .         .         .         .         .         .         .         .         .         .         .
  10954 298O         .         .         .         .         .         .         .         .         .         .         .         .
  10956 299O         .         .         .         .         .         .         .         .         .         .         .         .
  10958 300O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                          STATION        B

                          (O) OUTFLOW
          0.      100.      200.      300.      400.      500.      600.      700.      800.      900.     1000.     1100.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
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10006   4O        .        .        .        .        .        .        .        .        .        .        .        .
10008   5O        .        .        .        .        .        .        .        .        .        .        .        .
10010   6O        .        .        .        .        .        .        .        .        .        .        .        .
10012   7O        .        .        .        .        .        .        .        .        .        .        .        .
10014   8O        .        .        .        .        .        .        .        .        .        .        .        .
10016   9O        .        .        .        .        .        .        .        .        .        .        .        .
10018  10O        .        .        .        .        .        .        .        .        .        .        .        .
10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10022  12O        .        .        .        .        .        .        .        .        .        .        .        .
10024  13O        .        .        .        .        .        .        .        .        .        .        .        .
10026  14O        .        .        .        .        .        .        .        .        .        .        .        .
10028  15O        .        .        .        .        .        .        .        .        .        .        .        .
10030  16O        .        .        .        .        .        .        .        .        .        .        .        .
10032  17O        .        .        .        .        .        .        .        .        .        .        .        .
10034  18O        .        .        .        .        .        .        .        .        .        .        .        .
10036  19O        .        .        .        .        .        .        .        .        .        .        .        .
10038  20O        .        .        .        .        .        .        .        .        .        .        .        .
10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10042  22O        .        .        .        .        .        .        .        .        .        .        .        .
10044  23O        .        .        .        .        .        .        .        .        .        .        .        .
10046  24O        .        .        .        .        .        .        .        .        .        .        .        .
10048  25O        .        .        .        .        .        .        .        .        .        .        .        .
10050  26O        .        .        .        .        .        .        .        .        .        .        .        .
10052  27O        .        .        .        .        .        .        .        .        .        .        .        .
10054  28O        .        .        .        .        .        .        .        .        .        .        .        .
10056  29O        .        .        .        .        .        .        .        .        .        .        .        .
10058  30O        .        .        .        .        .        .        .        .        .        .        .        .
10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10102  32O        .        .        .        .        .        .        .        .        .        .        .        .
10104  33O        .        .        .        .        .        .        .        .        .        .        .        .
10106  34O        .        .        .        .        .        .        .        .        .        .        .        .
10108  35O        .        .        .        .        .        .        .        .        .        .        .        .
10110  36O        .        .        .        .        .        .        .        .        .        .        .        .
10112  37O        .        .        .        .        .        .        .        .        .        .        .        .
10114  38O        .        .        .        .        .        .        .        .        .        .        .        .
10116  39O        .        .        .        .        .        .        .        .        .        .        .        .
10118  40O        .        .        .        .        .        .        .        .        .        .        .        .
10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10122  42O        .        .        .        .        .        .        .        .        .        .        .        .
10124  43O        .        .        .        .        .        .        .        .        .        .        .        .
10126  44O        .        .        .        .        .        .        .        .        .        .        .        .
10128  45O        .        .        .        .        .        .        .        .        .        .        .        .
10130  46O        .        .        .        .        .        .        .        .        .        .        .        .
10132  47O        .        .        .        .        .        .        .        .        .        .        .        .
10134  48O        .        .        .        .        .        .        .        .        .        .        .        .
10136  49O        .        .        .        .        .        .        .        .        .        .        .        .
10138  50O        .        .        .        .        .        .        .        .        .        .        .        .
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10142  52O        .        .        .        .        .        .        .        .        .        .        .        .
10144  53O        .        .        .        .        .        .        .        .        .        .        .        .
10146  54O        .        .        .        .        .        .        .        .        .        .        .        .
10148  55O        .        .        .        .        .        .        .        .        .        .        .        .
10150  56O        .        .        .        .        .        .        .        .        .        .        .        .
10152  57O        .        .        .        .        .        .        .        .        .        .        .        .
10154  58O        .        .        .        .        .        .        .        .        .        .        .        .
10156  59O        .        .        .        .        .        .        .        .        .        .        .        .
10158  60O        .        .        .        .        .        .        .        .        .        .        .        .
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62O        .        .        .        .        .        .        .        .        .        .        .        .
10204  63O        .        .        .        .        .        .        .        .        .        .        .        .
10206  64O        .        .        .        .        .        .        .        .        .        .        .        .
10208  65O        .        .        .        .        .        .        .        .        .        .        .        .
10210  66O        .        .        .        .        .        .        .        .        .        .        .        .
10212  67O        .        .        .        .        .        .        .        .        .        .        .        .
10214  68O        .        .        .        .        .        .        .        .        .        .        .        .
10216  69O        .        .        .        .        .        .        .        .        .        .        .        .
10218  70O        .        .        .        .        .        .        .        .        .        .        .        .
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72O        .        .        .        .        .        .        .        .        .        .        .        .
10224  73O        .        .        .        .        .        .        .        .        .        .        .        .
10226  74O        .        .        .        .        .        .        .        .        .        .        .        .
10228  75O        .        .        .        .        .        .        .        .        .        .        .        .
10230  76O        .        .        .        .        .        .        .        .        .        .        .        .
10232  77.O       .        .        .        .        .        .        .        .        .        .        .        .
10234  78. O      .        .        .        .        .        .        .        .        .        .        .        .
10236  79. O      .        .        .        .        .        .        .        .        .        .        .        .
10238  80.   O    .        .        .        .        .        .        .        .        .        .        .        .
10240  81. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82.     O  .        .        .        .        .        .        .        .        .        .        .        .
10244  83.        O        .        .        .        .        .        .        .        .        .        .        .
10246  84.         .  O     .        .        .        .        .        .        .        .        .        .        .
10248  85.         .     O  .        .        .        .        .        .        .        .        .        .        .
10250  86.         .        .O       .        .        .        .        .        .        .        .        .        .
10252  87.         .        .    O   .        .        .        .        .        .        .        .        .        .
10254  88.         .        .       .O        .        .        .        .        .        .        .        .        .
10256  89.         .        .        .    O   .        .        .        .        .        .        .        .        .
10258  90.         .        .        .        .O       .        .        .        .        .        .        .        .
10300  91. . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92.        .        .        .        .        O        .        .        .        .        .        .        .
10304  93.        .        .        .        .        .   O    .        .        .        .        .        .        .
10306  94.        .        .        .        .        .      O.        .        .        .        .        .        .
10308  95.        .        .        .        .        .        . O      .        .        .        .        .        .
10310  96.        .        .        .        .        .        .    O   .        .        .        .        .        .
10312  97.        .        .        .        .        .        .       .O        .        .        .        .        .
10314  98.        .        .        .        .        .        .        .  O     .        .        .        .        .
10316  99.        .        .        .        .        .        .        .    O   .        .        .        .        .
10318 100.        .        .        .        .        .        .        .       O        .        .        .        .
10320 101. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . .
10322 102.        .        .        .        .        .        .        .        .   O    .        .        .        .
10324 103.        .        .        .        .        .        .        .        .      O .        .        .        .
10326 104.        .        .        .        .        .        .        .        .       O        .        .        .
10328 105.        .        .        .        .        .        .        .        .        . O      .        .        .
10330 106.        .        .        .        .        .        .        .        .        .  O     .        .        .
10332 107.        .        .        .        .        .        .        .        .        .    O   .        .        .
10334 108.        .        .        .        .        .        .        .        .        .      O .        .        .
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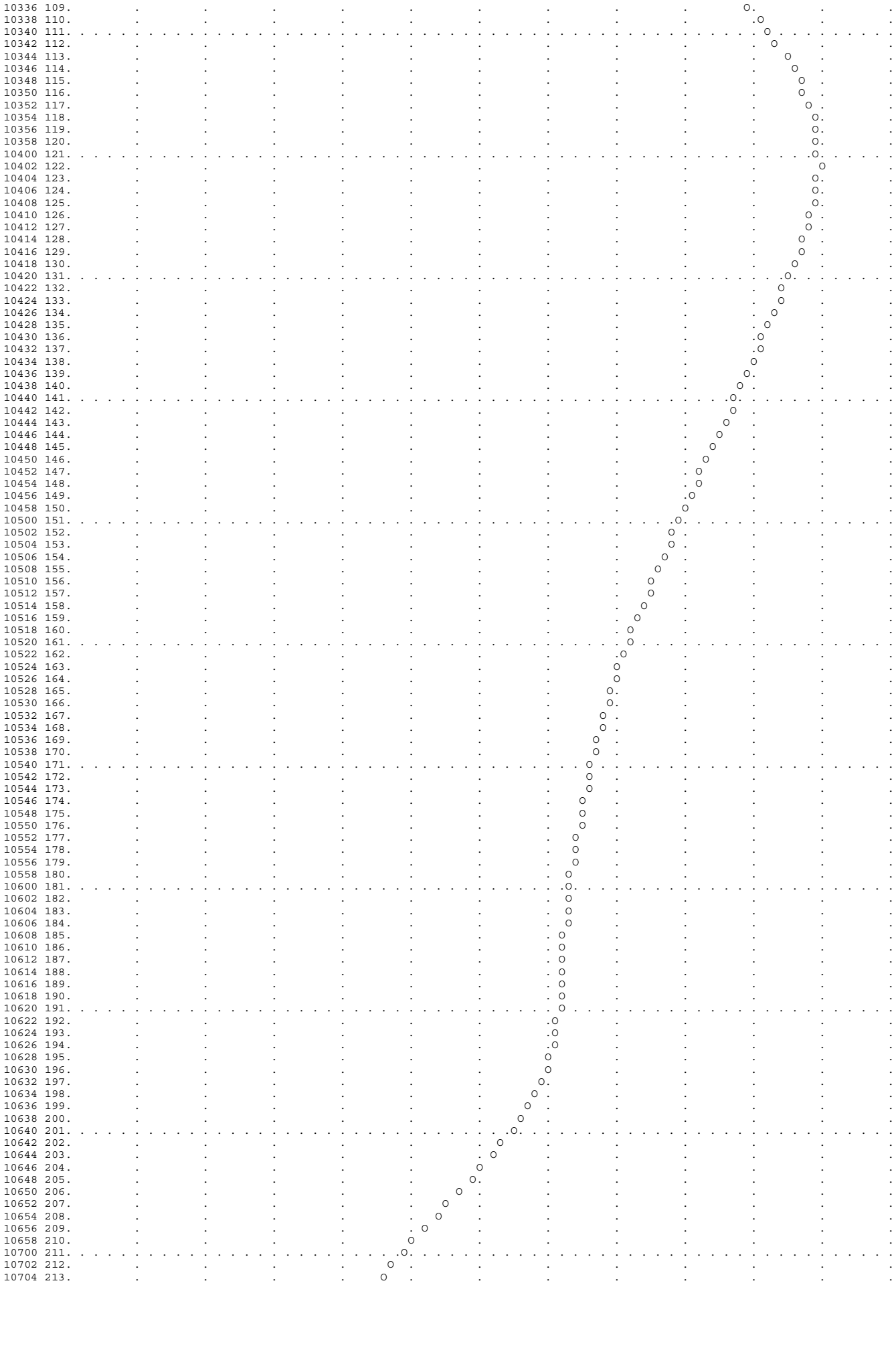

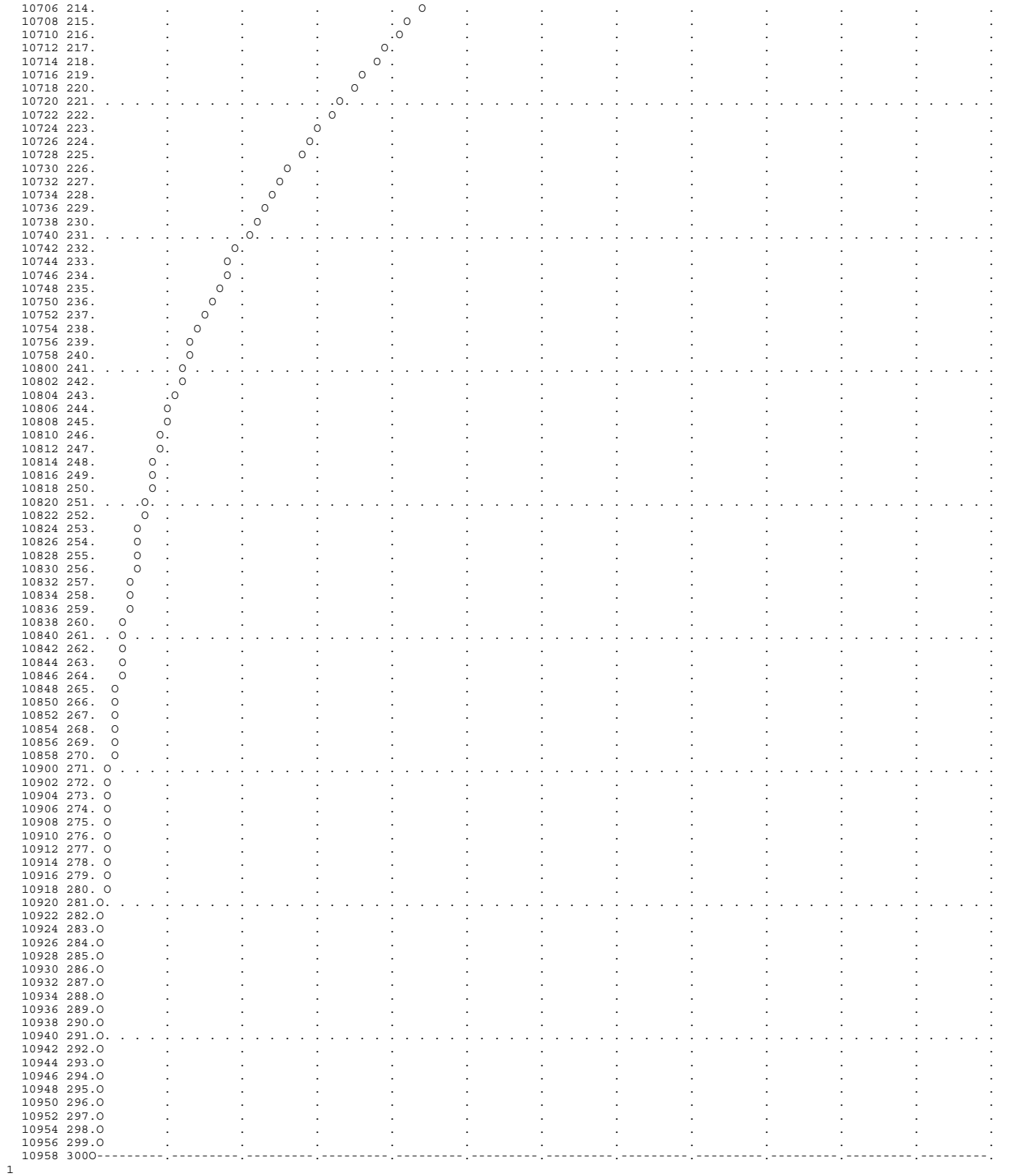

1
1 STATION RTB-C

(I) INFLOW, (O) OUTFLOW

0. 200. 400. 600. 800. 1000. 1200. 0. 0. 0. 0. 0. 0.

(S) STORAGE

0. 0. 0. 0. 0. 0. 0. 2. 4. 6. 0. 0. 0.

DAHRMN PER

10000 1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
10002 2I . . . . . S . . . . . .
10004 3I . . . . . S . . . . . .
10006 4I . . . . . S . . . . . .
10008 5I . . . . . S . . . . . .
10010 6I . . . . . S . . . . . .
10012 7I . . . . . S . . . . . .
10014 8I . . . . . S . . . . . .
10016 9I . . . . . S . . . . . .
10018 10I . . . . . S . . . . . .

```
10020  11I . . . . . .S . . . . . .
10022  12I       .       .       .       .       .S       .       .       .       .       .       .
10024  13I       .       .       .       .       .S       .       .       .       .       .       .
10026  14I       .       .       .       .       .S       .       .       .       .       .       .
10028  15I       .       .       .       .       .S       .       .       .       .       .       .
10030  16I       .       .       .       .       .S       .       .       .       .       .       .
10032  17I       .       .       .       .       .S       .       .       .       .       .       .
10034  18I       .       .       .       .       .S       .       .       .       .       .       .
10036  19I       .       .       .       .       .S       .       .       .       .       .       .
10038  20I       .       .       .       .       .S       .       .       .       .       .       .
10040  21I . . . . . .S . . . . . .
10042  22I       .       .       .       .       .S       .       .       .       .       .       .
10044  23I       .       .       .       .       .S       .       .       .       .       .       .
10046  24I       .       .       .       .       .S       .       .       .       .       .       .
10048  25I       .       .       .       .       .S       .       .       .       .       .       .
10050  26I       .       .       .       .       .S       .       .       .       .       .       .
10052  27I       .       .       .       .       .S       .       .       .       .       .       .
10054  28I       .       .       .       .       .S       .       .       .       .       .       .
10056  29I       .       .       .       .       .S       .       .       .       .       .       .
10058  30I       .       .       .       .       .S       .       .       .       .       .       .
10100  31I . . . . . .S . . . . . .
10102  32I       .       .       .       .       .S       .       .       .       .       .       .
10104  33I       .       .       .       .       .S       .       .       .       .       .       .
10106  34I       .       .       .       .       .S       .       .       .       .       .       .
10108  35I       .       .       .       .       .S       .       .       .       .       .       .
10110  36I       .       .       .       .       .S       .       .       .       .       .       .
10112  37I       .       .       .       .       .S       .       .       .       .       .       .
10114  38I       .       .       .       .       .S       .       .       .       .       .       .
10116  39I       .       .       .       .       .S       .       .       .       .       .       .
10118  40I       .       .       .       .       .S       .       .       .       .       .       .
10120  41I . . . . . .S . . . . . .
10122  42I       .       .       .       .       .S       .       .       .       .       .       .
10124  43I       .       .       .       .       .S       .       .       .       .       .       .
10126  44I       .       .       .       .       .S       .       .       .       .       .       .
10128  45I       .       .       .       .       .S       .       .       .       .       .       .
10130  46I       .       .       .       .       .S       .       .       .       .       .       .
10132  47I       .       .       .       .       .S       .       .       .       .       .       .
10134  48I       .       .       .       .       .S       .       .       .       .       .       .
10136  49I       .       .       .       .       .S       .       .       .       .       .       .
10138  50I       .       .       .       .       .S       .       .       .       .       .       .
10140  51I . . . . . .S . . . . . .
10142  52I       .       .       .       .       .S       .       .       .       .       .       .
10144  53I       .       .       .       .       .S       .       .       .       .       .       .
10146  54I       .       .       .       .       .S       .       .       .       .       .       .
10148  55I       .       .       .       .       .S       .       .       .       .       .       .
10150  56I       .       .       .       .       .S       .       .       .       .       .       .
10152  57I       .       .       .       .       .S       .       .       .       .       .       .
10154  58I       .       .       .       .       .S       .       .       .       .       .       .
10156  59I       .       .       .       .       .S       .       .       .       .       .       .
10158  60I       .       .       .       .       .S       .       .       .       .       .       .
10200  61I . . . . . .S . . . . . .
10202  62I       .       .       .       .       .S       .       .       .       .       .       .
10204  63I       .       .       .       .       .S       .       .       .       .       .       .
10206  64I       .       .       .       .       .S       .       .       .       .       .       .
10208  65I       .       .       .       .       .S       .       .       .       .       .       .
10210  66I       .       .       .       .       .S       .       .       .       .       .       .
10212  67I       .       .       .       .       .S       .       .       .       .       .       .
10214  68I       .       .       .       .       .S       .       .       .       .       .       .
10216  69I       .       .       .       .       .S       .       .       .       .       .       .
10218  70I       .       .       .       .       .S       .       .       .       .       .       .
10220  71I . . . . . .S . . . . . .
10222  72I       .       .       .       .       .S       .       .       .       .       .       .
10224  73I       .       .       .       .       .S       .       .       .       .       .       .
10226  74I       .       .       .       .       .S       .       .       .       .       .       .
10228  75I       .       .       .       .       .S       .       .       .       .       .       .
10230  76I       .       .       .       .       .S       .       .       .       .       .       .
10232  77I       .       .       .       .       .S       .       .       .       .       .       .
10234  78OI      .       .       .       .       .S       .       .       .       .       .       .
10236  79.I      .       .       .       .       .S       .       .       .       .       .       .
10238  80.OI     .       .       .       .       .S       .       .       .       .       .       .
10240  81. OI. . . . . .S. . . . . .
10242  82. O I   .       .       .       .       .S       .       .       .       .       .       .
10244  83.  O I  .       .       .       .       . S      .       .       .       .       .       .
10246  84.   O  I .       .       .       .       . S      .       .       .       .       .       .
10248  85.    O  I.       .       .       .       .  S     .       .       .       .       .       .
10250  86.     O  .I      .       .       .       .   S    .       .       .       .       .       .
10252  87.       O.  I    .       .       .       .    S   .       .       .       .       .       .
10254  88.        .O   I  .       .       .       .     S  .       .       .       .       .       .
10256  89.        .  O   I .       .       .       .      S .       .       .       .       .       .
10258  90.        .    O  I       .       .       .       S .       .       .       .       .       .
10300  91. . . . . . O . .I. . . . . .S. . . . . .
10302  92.        .       .O  I   .       .       .        .S      .       .       .       .       .
10304  93.        .       .  O  I .       .       .        . S     .       .       .       .       .
10306  94.        .       .   O   I       .       .        .  S    .       .       .       .       .
10308  95.        .       .     O . I     .       .        .   S   .       .       .       .       .
10310  96.        .       .       O  I    .       .        .    S  .       .       .       .       .
10312  97.        .       .       . O  I  .       .        .     S .       .       .       .       .
10314  98.        .       .       .  O  I .       .        .      S.       .       .       .       .
10316  99.        .       .       .   O  I.       .        .       S.      .       .       .       .
10318 100.        .       .       .     O  I      .        .        S.     .       .       .       .
10320 101. . . . . . . . . . . . .O.I. . . . . .S. . . . . .
10322 102.        .       .       .       O  I    .        .        .S     .       .       .       .
10324 103.        .       .       .       .O  I   .        .        . S    .       .       .       .
10326 104.        .       .       .       .  O I  .        .        . S    .       .       .       .
10328 105.        .       .       .       .   O I .        .        .  S   .       .       .       .
10330 106.        .       .       .       .    O I .        .        .  S   .       .       .       .
10332 107.        .       .       .       .     O I .        .        .   S  .       .       .       .
10334 108.        .       .       .       .      O I.        .        .   S  .       .       .       .
10336 109.        .       .       .       .       O I        .        .    S .       .       .       .
10338 110.        .       .       .       .        OI        .        .    S .       .       .       .
10340 111. . . . . . . . . . . . . . . . . . . . . OI. . . . . .S. . . . . .
10342 112.        .       .       .       .        O I      .        .     S .       .       .       .
10344 113.        .       .       .       .        .OI      .        .      S .       .       .       .
10346 114.        .       .       .       .        . OI     .        .      S .       .       .       .
10348 115.        .       .       .       .        . OI     .        .      S .       .       .       .
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10350 116.         .         .         .         .  OI     .         .         .      S  .         .         .
10352 117.         .         .         .         .  OI     .         .         .      S  .         .         .
10354 118.         .         .         .         .   I     .         .         .      S  .         .         .
10356 119.         .         .         .         .   I     .         .         .      S  .         .         .
10358 120.         .         .         .         .   OI    .         .         .      S  .         .         .
10400 121. . . . . . . . . . . . . . . . . . . . . . OI. . . . . . . . . . . . . . . . . . . .
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  10720 221. . . . . . . . .IO . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . .
  10722 222.         .     IO  .         .         .         .         .        S.         .         .         .         .         .
  10724 223.         .    I O  .         .         .         .         .        S.         .         .         .         .         .
  10726 224.         .   I O   .         .         .         .         .       S .         .         .         .         .         .
  10728 225.         .   IO    .         .         .         .         .       S .         .         .         .         .         .
  10730 226.         .  IO     .         .         .         .         .      S  .         .         .         .         .         .
  10732 227.         .  IO     .         .         .         .         .      S  .         .         .         .         .         .
  10734 228.         . IO      .         .         .         .         .      S  .         .         .         .         .         .
  10736 229.         .I O      .         .         .         .         .     S   .         .         .         .         .         .
  10738 230.         .IO       .         .         .         .         .     S   .         .         .         .         .         .
  10740 231. . . . . IO. . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10742 232.         IO        .         .         .         .         .     S   .         .         .         .         .         .
  10744 233.        IO         .         .         .         .         .    S    .         .         .         .         .         .
  10746 234.        IO         .         .         .         .         .    S    .         .         .         .         .         .
  10748 235.       IO.         .         .         .         .         .    S    .         .         .         .         .         .
  10750 236.       IO.         .         .         .         .         .    S    .         .         .         .         .         .
  10752 237.      IO .         .         .         .         .         .   S     .         .         .         .         .         .
  10754 238.      IO .         .         .         .         .         .   S     .         .         .         .         .         .
  10756 239.      I  .         .         .         .         .         .   S     .         .         .         .         .         .
  10758 240.     IO  .         .         .         .         .         .   S     .         .         .         .         .         .
  10800 241. . . IO. . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10802 242.     I   .         .         .         .         .         .  S      .         .         .         .         .         .
  10804 243.    IO   .         .         .         .         .         .  S      .         .         .         .         .         .
  10806 244.    IO   .         .         .         .         .         .  S      .         .         .         .         .         .
  10808 245.    I    .         .         .         .         .         .  S      .         .         .         .         .         .
  10810 246.    I    .         .         .         .         .         .  S      .         .         .         .         .         .
  10812 247.   IO    .         .         .         .         .         .  S      .         .         .         .         .         .
  10814 248.   IO    .         .         .         .         .         . S       .         .         .         .         .         .
  10816 249.   I     .         .         .         .         .         . S       .         .         .         .         .         .
  10818 250.   I     .         .         .         .         .         . S       .         .         .         .         .         .
  10820 251. . I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10822 252.  IO     .         .         .         .         .         . S       .         .         .         .         .         .
  10824 253.  IO     .         .         .         .         .         . S       .         .         .         .         .         .
  10826 254.  I      .         .         .         .         .         . S       .         .         .         .         .         .
  10828 255.  I      .         .         .         .         .         . S       .         .         .         .         .         .
  10830 256.  I      .         .         .         .         .         . S       .         .         .         .         .         .
  10832 257.  I      .         .         .         .         .         . S       .         .         .         .         .         .
  10834 258. IO      .         .         .         .         .         .S        .         .         .         .         .         .
  10836 259. IO      .         .         .         .         .         .S        .         .         .         .         .         .
  10838 260. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10840 261. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10842 262. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10844 263. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10846 264. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10848 265. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10850 266. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10852 267. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10854 268.IO       .         .         .         .         .         .S        .         .         .         .         .         .
  10856 269.IO       .         .         .         .         .         .S        .         .         .         .         .         .
  10858 270.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10900 271.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10902 272.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10904 273.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10906 274.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10908 275.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10910 276.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10912 277.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10914 278.I        .         .         .         .         .         S         .         .         .         .         .         .
  10916 279.I        .         .         .         .         .         S         .         .         .         .         .         .
  10918 280.I        .         .         .         .         .         S         .         .         .         .         .         .
  10920 281.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10922 282.I        .         .         .         .         .         S         .         .         .         .         .         .
  10924 283.I        .         .         .         .         .         S         .         .         .         .         .         .
  10926 284.I        .         .         .         .         .         S         .         .         .         .         .         .
  10928 285.I        .         .         .         .         .         S         .         .         .         .         .         .
  10930 286.I        .         .         .         .         .         S         .         .         .         .         .         .
  10932 287.I        .         .         .         .         .         S         .         .         .         .         .         .
  10934 288IO        .         .         .         .         .         S         .         .         .         .         .         .
  10936 289IO        .         .         .         .         .         S         .         .         .         .         .         .
  10938 290I         .         .         .         .         .         S         .         .         .         .         .         .
  10940 291I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292I         .         .         .         .         .         S         .         .         .         .         .         .
  10944 293I         .         .         .         .         .         S         .         .         .         .         .         .
  10946 294I         .         .         .         .         .         S         .         .         .         .         .         .
  10948 295I         .         .         .         .         .         S         .         .         .         .         .         .
  10950 296I         .         .         .         .         .         S         .         .         .         .         .         .
  10952 297I         .         .         .         .         .         S         .         .         .         .         .         .
  10954 298I         .         .         .         .         .         S         .         .         .         .         .         .
  10956 299I         .         .         .         .         .         S         .         .         .         .         .         .
  10958 300I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
1
1                                                          STATION      500

                              (O) OUTFLOW
          0.        40.        80.       120.       160.       200.       240.         0.         0.         0.         0.         0.         0.
                                                                                                                  (L) PRECIP,  (X) EXCESS
        .00        .00        .00        .00        .00        .00        .00        .00        .04        .03        .02        .01        .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
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10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10048  25O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10050  26O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10052  27O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10054  28O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10056  29O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10058  30O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10102  32O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10104  33O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10106  34O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10108  35O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10110  36O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10112  37O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10114  38O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10118  40O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10122  42O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10124  43O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10126  44O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10128  45O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10130  46O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10132  47O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10134  48O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10136  49O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10148  55O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10150  56O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10152  57O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10154  58O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10156  59O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10158  60O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLL.
10202  62O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10216  69O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLL.
10218  70O         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10220  71O . . . . . . . . . . . . . . . . . . .
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10404 123.         .         .         .    O   .         .         .         .         .         .         .         .    LLLLX.
10406 124.         .         .         .     O  .         .         .         .         .         .         .         .    LLLLX.
10408 125.         .         .         .      O .         .         .         .         .         .         .         .    LLLLX.
10410 126.         .         .         .       O.         .         .         .         .         .         .         .    LLLLX.
10412 127.         .         .         .        .O        .         .         .         .         .         .         .    LLLLX.
10414 128.         .         .         .        . O       .         .         .         .         .         .         .    LLLLX.
10416 129.         .         .         .        .  O      .         .         .         .         .         .         .     LLLX.
10418 130.         .         .         .        .   O     .         .         .         .         .         .         .     LLLX.
10420 131. . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . .
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  10734 228.         .         .O        .         .         .         .         .         .         .         .         .
  10736 229.         .         O         .         .         .         .         .         .         .         .         .
  10738 230.         .        O.         .         .         .         .         .         .         .         .         .
  10740 231. . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10742 232.         .     O   .         .         .         .         .         .         .         .         .         .
  10744 233.         .     O   .         .         .         .         .         .         .         .         .         .
  10746 234.         .    O    .         .         .         .         .         .         .         .         .         .
  10748 235.         .   O     .         .         .         .         .         .         .         .         .         .
  10750 236.         .  O      .         .         .         .         .         .         .         .         .         .
  10752 237.         . O       .         .         .         .         .         .         .         .         .         .
  10754 238.         . O       .         .         .         .         .         .         .         .         .         .
  10756 239.         .O        .         .         .         .         .         .         .         .         .         .
  10758 240.         O         .         .         .         .         .         .         .         .         .         .
  10800 241. . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10802 242.        O.         .         .         .         .         .         .         .         .         .         .
  10804 243.        O.         .         .         .         .         .         .         .         .         .         .
  10806 244.       O .         .         .         .         .         .         .         .         .         .         .
  10808 245.       O .         .         .         .         .         .         .         .         .         .         .
  10810 246.      O  .         .         .         .         .         .         .         .         .         .         .
  10812 247.      O  .         .         .         .         .         .         .         .         .         .         .
  10814 248.      O  .         .         .         .         .         .         .         .         .         .         .
  10816 249.     O   .         .         .         .         .         .         .         .         .         .         .
  10818 250.     O   .         .         .         .         .         .         .         .         .         .         .
  10820 251. . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10822 252.    O    .         .         .         .         .         .         .         .         .         .         .
  10824 253.    O    .         .         .         .         .         .         .         .         .         .         .
  10826 254.    O    .         .         .         .         .         .         .         .         .         .         .
  10828 255.   O     .         .         .         .         .         .         .         .         .         .         .
  10830 256.   O     .         .         .         .         .         .         .         .         .         .         .
  10832 257.   O     .         .         .         .         .         .         .         .         .         .         .
  10834 258.   O     .         .         .         .         .         .         .         .         .         .         .
  10836 259.  O      .         .         .         .         .         .         .         .         .         .         .
  10838 260.  O      .         .         .         .         .         .         .         .         .         .         .
  10840 261. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10842 262.  O      .         .         .         .         .         .         .         .         .         .         .
  10844 263.  O      .         .         .         .         .         .         .         .         .         .         .
  10846 264.  O      .         .         .         .         .         .         .         .         .         .         .
  10848 265. O       .         .         .         .         .         .         .         .         .         .         .
  10850 266. O       .         .         .         .         .         .         .         .         .         .         .
  10852 267. O       .         .         .         .         .         .         .         .         .         .         .
  10854 268. O       .         .         .         .         .         .         .         .         .         .         .
  10856 269. O       .         .         .         .         .         .         .         .         .         .         .
  10858 270. O       .         .         .         .         .         .         .         .         .         .         .
  10900 271. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10902 272. O       .         .         .         .         .         .         .         .         .         .         .
  10904 273. O       .         .         .         .         .         .         .         .         .         .         .
  10906 274.O        .         .         .         .         .         .         .         .         .         .         .
  10908 275.O        .         .         .         .         .         .         .         .         .         .         .
  10910 276.O        .         .         .         .         .         .         .         .         .         .         .
  10912 277.O        .         .         .         .         .         .         .         .         .         .         .
  10914 278.O        .         .         .         .         .         .         .         .         .         .         .
  10916 279.O        .         .         .         .         .         .         .         .         .         .         .
  10918 280.O        .         .         .         .         .         .         .         .         .         .         .
  10920 281.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10922 282.O        .         .         .         .         .         .         .         .         .         .         .
  10924 283.O        .         .         .         .         .         .         .         .         .         .         .
  10926 284.O        .         .         .         .         .         .         .         .         .         .         .
  10928 285.O        .         .         .         .         .         .         .         .         .         .         .
  10930 286.O        .         .         .         .         .         .         .         .         .         .         .
  10932 287.O        .         .         .         .         .         .         .         .         .         .         .
  10934 288.O        .         .         .         .         .         .         .         .         .         .         .
  10936 289.O        .         .         .         .         .         .         .         .         .         .         .
  10938 290.O        .         .         .         .         .         .         .         .         .         .         .
  10940 291.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292O         .         .         .         .         .         .         .         .         .         .         .         .
  10944 293O         .         .         .         .         .         .         .         .         .         .         .         .
  10946 294O         .         .         .         .         .         .         .         .         .         .         .         .
  10948 295O         .         .         .         .         .         .         .         .         .         .         .         .
  10950 296O         .         .         .         .         .         .         .         .         .         .         .         .
  10952 297O         .         .         .         .         .         .         .         .         .         .         .         .
  10954 298O         .         .         .         .         .         .         .         .         .         .         .         .
  10956 299O         .         .         .         .         .         .         .         .         .         .         .         .
  10958 300O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                          STATION        C

                          (O) OUTFLOW
          0.      200.      400.      600.      800.     1000.     1200.     1400.        0.        0.        0.        0.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
```

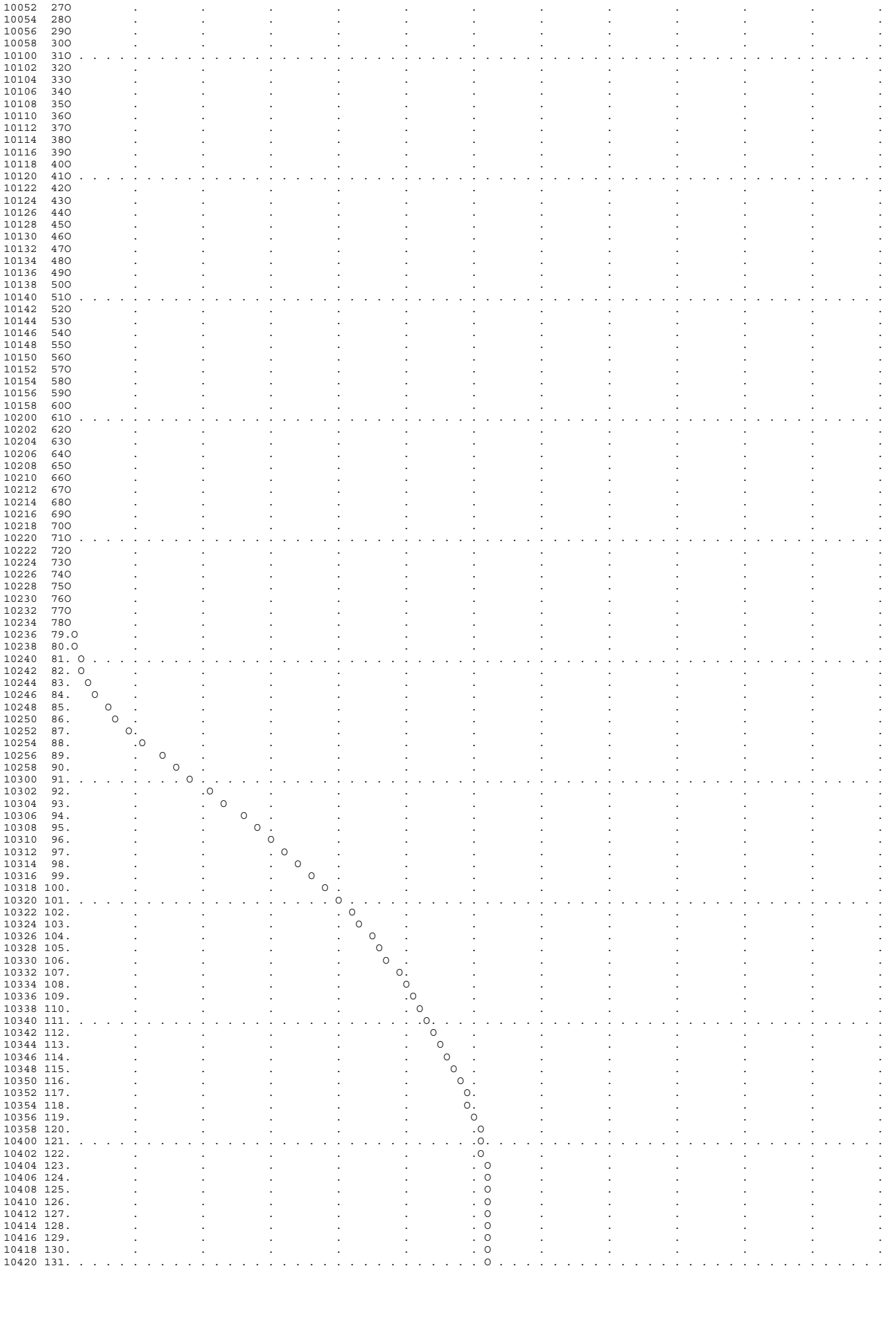

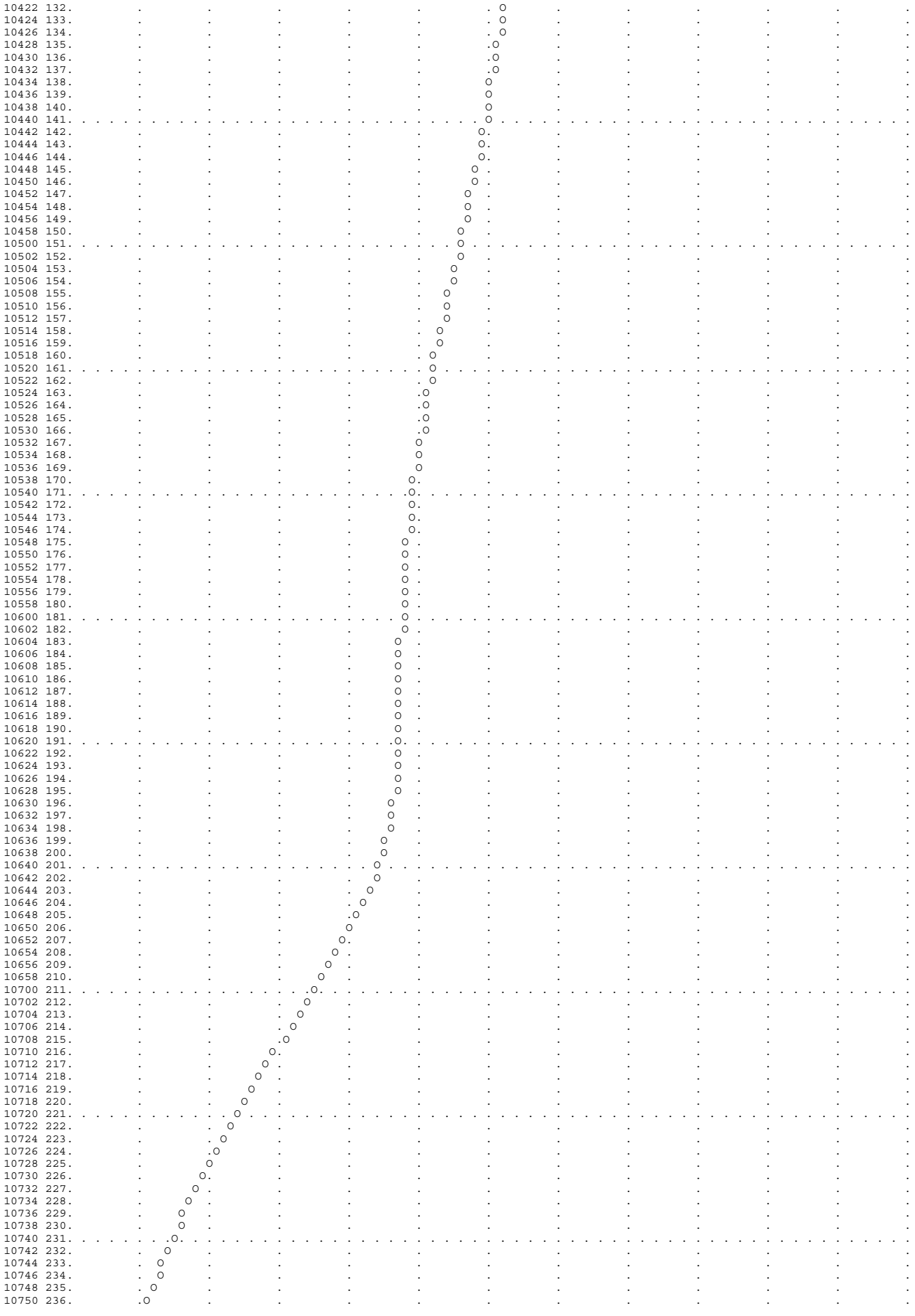

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 10752 237.         .O        .         .         .         .         .         .         .         .         .         .         .
 10754 238.         O         .         .         .         .         .         .         .         .         .         .         .
 10756 239.         O         .         .         .         .         .         .         .         .         .         .         .
 10758 240.        O.         .         .         .         .         .         .         .         .         .         .         .
 10800 241. . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10802 242.       O .         .         .         .         .         .         .         .         .         .         .         .
 10804 243.       O .         .         .         .         .         .         .         .         .         .         .         .
 10806 244.      O  .         .         .         .         .         .         .         .         .         .         .         .
 10808 245.      O  .         .         .         .         .         .         .         .         .         .         .         .
 10810 246.      O  .         .         .         .         .         .         .         .         .         .         .         .
 10812 247.     O   .         .         .         .         .         .         .         .         .         .         .         .
 10814 248.     O   .         .         .         .         .         .         .         .         .         .         .         .
 10816 249.     O   .         .         .         .         .         .         .         .         .         .         .         .
 10818 250.    O    .         .         .         .         .         .         .         .         .         .         .         .
 10820 251. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10822 252.    O    .         .         .         .         .         .         .         .         .         .         .         .
 10824 253.    O    .         .         .         .         .         .         .         .         .         .         .         .
 10826 254.   O     .         .         .         .         .         .         .         .         .         .         .         .
 10828 255.   O     .         .         .         .         .         .         .         .         .         .         .         .
 10830 256.   O     .         .         .         .         .         .         .         .         .         .         .         .
 10832 257.   O     .         .         .         .         .         .         .         .         .         .         .         .
 10834 258.  O      .         .         .         .         .         .         .         .         .         .         .         .
 10836 259.  O      .         .         .         .         .         .         .         .         .         .         .         .
 10838 260.  O      .         .         .         .         .         .         .         .         .         .         .         .
 10840 261. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10842 262.  O      .         .         .         .         .         .         .         .         .         .         .         .
 10844 263.  O      .         .         .         .         .         .         .         .         .         .         .         .
 10846 264.  O      .         .         .         .         .         .         .         .         .         .         .         .
 10848 265. O       .         .         .         .         .         .         .         .         .         .         .         .
 10850 266. O       .         .         .         .         .         .         .         .         .         .         .         .
 10852 267. O       .         .         .         .         .         .         .         .         .         .         .         .
 10854 268. O       .         .         .         .         .         .         .         .         .         .         .         .
 10856 269. O       .         .         .         .         .         .         .         .         .         .         .         .
 10858 270. O       .         .         .         .         .         .         .         .         .         .         .         .
 10900 271. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10902 272. O       .         .         .         .         .         .         .         .         .         .         .         .
 10904 273. O       .         .         .         .         .         .         .         .         .         .         .         .
 10906 274.O        .         .         .         .         .         .         .         .         .         .         .         .
 10908 275.O        .         .         .         .         .         .         .         .         .         .         .         .
 10910 276.O        .         .         .         .         .         .         .         .         .         .         .         .
 10912 277.O        .         .         .         .         .         .         .         .         .         .         .         .
 10914 278.O        .         .         .         .         .         .         .         .         .         .         .         .
 10916 279.O        .         .         .         .         .         .         .         .         .         .         .         .
 10918 280.O        .         .         .         .         .         .         .         .         .         .         .         .
 10920 281.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10922 282.O        .         .         .         .         .         .         .         .         .         .         .         .
 10924 283.O        .         .         .         .         .         .         .         .         .         .         .         .
 10926 284.O        .         .         .         .         .         .         .         .         .         .         .         .
 10928 285.O        .         .         .         .         .         .         .         .         .         .         .         .
 10930 286.O        .         .         .         .         .         .         .         .         .         .         .         .
 10932 287.O        .         .         .         .         .         .         .         .         .         .         .         .
 10934 288.O        .         .         .         .         .         .         .         .         .         .         .         .
 10936 289.O        .         .         .         .         .         .         .         .         .         .         .         .
 10938 290.O        .         .         .         .         .         .         .         .         .         .         .         .
 10940 291.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10942 292.O        .         .         .         .         .         .         .         .         .         .         .         .
 10944 293O         .         .         .         .         .         .         .         .         .         .         .         .
 10946 294O         .         .         .         .         .         .         .         .         .         .         .         .
 10948 295O         .         .         .         .         .         .         .         .         .         .         .         .
 10950 296O         .         .         .         .         .         .         .         .         .         .         .         .
 10952 297O         .         .         .         .         .         .         .         .         .         .         .         .
 10954 298O         .         .         .         .         .         .         .         .         .         .         .         .
 10956 299O         .         .         .         .         .         .         .         .         .         .         .         .
 10958 300O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                    STATION    RTC-D

                        (I) INFLOW,   (O) OUTFLOW
          0.      200.      400.      600.      800.     1000.     1200.     1400.        0.        0.        0.        0.        0.
                                                                                   (S) STORAGE
          0.        0.        0.        0.        0.        0.        0.        4.        8.       12.        0.        0.        0.
 DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
 10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
 10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
 10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  12I         .         .         .         .         .         S         .         .         .         .         .         .
 10024  13I         .         .         .         .         .         S         .         .         .         .         .         .
 10026  14I         .         .         .         .         .         S         .         .         .         .         .         .
 10028  15I         .         .         .         .         .         S         .         .         .         .         .         .
 10030  16I         .         .         .         .         .         S         .         .         .         .         .         .
 10032  17I         .         .         .         .         .         S         .         .         .         .         .         .
 10034  18I         .         .         .         .         .         S         .         .         .         .         .         .
 10036  19I         .         .         .         .         .         S         .         .         .         .         .         .
 10038  20I         .         .         .         .         .         S         .         .         .         .         .         .
 10040  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10042  22I         .         .         .         .         .         S         .         .         .         .         .         .
 10044  23I         .         .         .         .         .         S         .         .         .         .         .         .
 10046  24I         .         .         .         .         .         S         .         .         .         .         .         .
 10048  25I         .         .         .         .         .         S         .         .         .         .         .         .
 10050  26I         .         .         .         .         .         S         .         .         .         .         .         .
 10052  27I         .         .         .         .         .         S         .         .         .         .         .         .
 10054  28I         .         .         .         .         .         S         .         .         .         .         .         .
 10056  29I         .         .         .         .         .         S         .         .         .         .         .         .
 10058  30I         .         .         .         .         .         S         .         .         .         .         .         .
 10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10102  32I         .         .         .         .         .         S         .         .         .         .         .         .
 10104  33I         .         .         .         .         .         S         .         .         .         .         .         .
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10106  34I         .         .         .         .         .         S         .         .         .         .         .         .
10108  35I         .         .         .         .         .         S         .         .         .         .         .         .
10110  36I         .         .         .         .         .         S         .         .         .         .         .         .
10112  37I         .         .         .         .         .         S         .         .         .         .         .         .
10114  38I         .         .         .         .         .         S         .         .         .         .         .         .
10116  39I         .         .         .         .         .         S         .         .         .         .         .         .
10118  40I         .         .         .         .         .         S         .         .         .         .         .         .
10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10122  42I         .         .         .         .         .         S         .         .         .         .         .         .
10124  43I         .         .         .         .         .         S         .         .         .         .         .         .
10126  44I         .         .         .         .         .         S         .         .         .         .         .         .
10128  45I         .         .         .         .         .         S         .         .         .         .         .         .
10130  46I         .         .         .         .         .         S         .         .         .         .         .         .
10132  47I         .         .         .         .         .         S         .         .         .         .         .         .
10134  48I         .         .         .         .         .         S         .         .         .         .         .         .
10136  49I         .         .         .         .         .         S         .         .         .         .         .         .
10138  50I         .         .         .         .         .         S         .         .         .         .         .         .
10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10142  52I         .         .         .         .         .         S         .         .         .         .         .         .
10144  53I         .         .         .         .         .         S         .         .         .         .         .         .
10146  54I         .         .         .         .         .         S         .         .         .         .         .         .
10148  55I         .         .         .         .         .         S         .         .         .         .         .         .
10150  56I         .         .         .         .         .         S         .         .         .         .         .         .
10152  57I         .         .         .         .         .         S         .         .         .         .         .         .
10154  58I         .         .         .         .         .         S         .         .         .         .         .         .
10156  59I         .         .         .         .         .         S         .         .         .         .         .         .
10158  60I         .         .         .         .         .         S         .         .         .         .         .         .
10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62I         .         .         .         .         .         S         .         .         .         .         .         .
10204  63I         .         .         .         .         .         S         .         .         .         .         .         .
10206  64I         .         .         .         .         .         S         .         .         .         .         .         .
10208  65I         .         .         .         .         .         S         .         .         .         .         .         .
10210  66I         .         .         .         .         .         S         .         .         .         .         .         .
10212  67I         .         .         .         .         .         S         .         .         .         .         .         .
10214  68I         .         .         .         .         .         S         .         .         .         .         .         .
10216  69I         .         .         .         .         .         S         .         .         .         .         .         .
10218  70I         .         .         .         .         .         S         .         .         .         .         .         .
10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72I         .         .         .         .         .         S         .         .         .         .         .         .
10224  73I         .         .         .         .         .         S         .         .         .         .         .         .
10226  74I         .         .         .         .         .         S         .         .         .         .         .         .
10228  75I         .         .         .         .         .         S         .         .         .         .         .         .
10230  76I         .         .         .         .         .         S         .         .         .         .         .         .
10232  77I         .         .         .         .         .         S         .         .         .         .         .         .
10234  78I         .         .         .         .         .         S         .         .         .         .         .         .
10236  79OI        .         .         .         .         .         S         .         .         .         .         .         .
10238  80OI        .         .         .         .         .         S         .         .         .         .         .         .
10240  81.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82.OI       .         .         .         .         .         S         .         .         .         .         .         .
10244  83.O I      .         .         .         .         .         .S        .         .         .         .         .         .
10246  84. O I     .         .         .         .         .         .S        .         .         .         .         .         .
10248  85.  O  I   .         .         .         .         .         .S        .         .         .         .         .         .
10250  86.   O  I  .         .         .         .         .         . S       .         .         .         .         .         .
10252  87.    O   I.         .         .         .         .         . S       .         .         .         .         .         .
10254  88.      O  .I        .         .         .         .         .  S      .         .         .         .         .         .
10256  89.       O .   I     .         .         .         .         .  S      .         .         .         .         .         .
10258  90.         O     I   .         .         .         .         .   S     .         .         .         .         .         .
10300  91. . . . . . O . . I . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92.         .   O     .I        .         .         .         .     S   .         .         .         .         .         .
10304  93.         .      O  .  I      .         .         .         .      S  .         .         .         .         .         .
10306  94.         .        O.     I   .         .         .         .       S .         .         .         .         .         .
10308  95.         .         .O      I .         .         .         .        S.         .         .         .         .         .
10310  96.         .         .   O     I         .         .         .         S         .         .         .         .         .
10312  97.         .         .     O   . I       .         .         .         .S        .         .         .         .         .
10314  98.         .         .       O . I       .         .         .         .S        .         .         .         .         .
10316  99.         .         .         O     I   .         .         .         . S       .         .         .         .         .
10318 100.         .         .         . O     I .         .         .         .  S      .         .         .         .         .
10320 101. . . . . . . . . . . . . . . . . O . . I . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . .
10322 102.         .         .         .     O   . I       .         .         .    S    .         .         .         .         .
10324 103.         .         .         .       O .  I      .         .         .    S    .         .         .         .         .
10326 104.         .         .         .         O    I    .         .         .     S   .         .         .         .         .
10328 105.         .         .         .         .O    I   .         .         .      S  .         .         .         .         .
10330 106.         .         .         .         .  O   I  .         .         .      S  .         .         .         .         .
10332 107.         .         .         .         .   O    I.         .         .       S .         .         .         .         .
10334 108.         .         .         .         .     O   I         .         .        S.         .         .         .         .
10336 109.         .         .         .         .      O  .I        .         .        S.         .         .         .         .
10338 110.         .         .         .         .        O. I       .         .         S         .         .         .         .
10340 111. . . . . . . . . . . . . . . . . . . . . . . . . O .I. . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . .
10342 112.         .         .         .         .         .O  I     .         .         .S        .         .         .         .
10344 113.         .         .         .         .         . O  I    .         .         .S        .         .         .         .
10346 114.         .         .         .         .         .  O  I   .         .         . S       .         .         .         .
10348 115.         .         .         .         .         .   O  I  .         .         . S       .         .         .         .
10350 116.         .         .         .         .         .    O  I .         .         . S       .         .         .         .
10352 117.         .         .         .         .         .     O  I.         .         .  S      .         .         .         .
10354 118.         .         .         .         .         .      O I.         .         .  S      .         .         .         .
10356 119.         .         .         .         .         .       O I         .         .   S     .         .         .         .
10358 120.         .         .         .         .         .       O .I        .         .   S     .         .         .         .
10400 121. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O.I. . . . . . . . . . S . . . . . . . . . . . . . . . . . .
10402 122.         .         .         .         .         .         OI        .         .   S     .         .         .         .
10404 123.         .         .         .         .         .         O I       .         .    S    .         .         .         .
10406 124.         .         .         .         .         .         .OI       .         .    S    .         .         .         .
10408 125.         .         .         .         .         .         .OI       .         .    S    .         .         .         .
10410 126.         .         .         .         .         .         .OI       .         .    S    .         .         .         .
10412 127.         .         .         .         .         .         . I       .         .    S    .         .         .         .
10414 128.         .         .         .         .         .         . I       .         .    S    .         .         .         .
10416 129.         .         .         .         .         .         . I       .         .    S    .         .         .         .
10418 130.         .         .         .         .         .         . I       .         .    S    .         .         .         .
10420 131. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . I . . . . . . . . . . .S. . . . . . . . . . . . . . . . .
10422 132.         .         .         .         .         .         . I       .         .    S    .         .         .         .
10424 133.         .         .         .         .         .         . I       .         .    S    .         .         .         .
10426 134.         .         .         .         .         .         . I       .         .    S    .         .         .         .
10428 135.         .         .         .         .         .         .IO       .         .    S    .         .         .         .
10430 136.         .         .         .         .         .         .IO       .         .    S    .         .         .         .
10432 137.         .         .         .         .         .         .I        .         .    S    .         .         .         .
10434 138.         .         .         .         .         .         IO        .         .    S    .         .         .         .
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10436 139.         .         .         .         .         .         IO        .         .    S    .         .         .         .
10438 140.         .         .         .         .         .         IO        .         .    S    .         .         .         .
10440 141. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . I . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
10442 142.         .         .         .         .         .        IO         .         .    S    .         .         .         .
10444 143.         .         .         .         .         .        IO         .         .   S     .         .         .         .
10446 144.         .         .         .         .         .        I.         .         .   S     .         .         .         .
10448 145.         .         .         .         .         .       IO.         .         .   S     .         .         .         .
10450 146.         .         .         .         .         .       IO.         .         .   S     .         .         .         .
10452 147.         .         .         .         .         .      IO .         .         .   S     .         .         .         .
10454 148.         .         .         .         .         .      IO .         .         .   S     .         .         .         .
10456 149.         .         .         .         .         .      IO .         .         .   S     .         .         .         .
10458 150.         .         .         .         .         .     IO  .         .         . S       .         .         .         .
10500 151. . . . . . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
10502 152.         .         .         .         .         .     IO  .         .         . S       .         .         .         .
10504 153.         .         .         .         .         .    IO   .         .         . S       .         .         .         .
10506 154.         .         .         .         .         .    IO   .         .         . S       .         .         .         .
10508 155.         .         .         .         .         .   IO    .         .         . S       .         .         .         .
10510 156.         .         .         .         .         .   IO    .         .         .S        .         .         .         .
10512 157.         .         .         .         .         .   IO    .         .         .S        .         .         .         .
10514 158.         .         .         .         .         .  IO     .         .         .S        .         .         .         .
10516 159.         .         .         .         .         .  IO     .         .         .S        .         .         .         .
10518 160.         .         .         .         .         . I O     .         .         .S        .         .         .         .
10520 161. . . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
10522 162.         .         .         .         .         . IO      .         .         .S        .         .         .         .
10524 163.         .         .         .         .         .I O      .         .         .S        .         .         .         .
10526 164.         .         .         .         .         .IO       .         .         .S        .         .         .         .
10528 165.         .         .         .         .         .IO       .         .         .S        .         .         .         .
10530 166.         .         .         .         .         .I        .         .         .S        .         .         .         .
10532 167.         .         .         .         .         IO        .         .         .S        .         .         .         .
10534 168.         .         .         .         .         IO        .         .         .S        .         .         .         .
10536 169.         .         .         .         .         IO        .         .         .S        .         .         .         .
10538 170.         .         .         .         .        IO         .         .         .S        .         .         .         .
10540 171. . . . . . . . . . . . . . . . . . . . . . . . .IO . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . .
10542 172.         .         .         .         .        IO         .         .         S         .         .         .         .
10544 173.         .         .         .         .        IO         .         .         S         .         .         .         .
10546 174.         .         .         .         .        I.         .         .         S         .         .         .         .
10548 175.         .         .         .         .       IO.         .         .         S         .         .         .         .
10550 176.         .         .         .         .       IO.         .         .         S         .         .         .         .
10552 177.         .         .         .         .       IO.         .         .         S         .         .         .         .
10554 178.         .         .         .         .       I .         .         .         S         .         .         .         .
10556 179.         .         .         .         .       I .         .         .         S         .         .         .         .
10558 180.         .         .         .         .       I .         .         .         S         .         .         .         .
10600 181. . . . . . . . . . . . . . . . . . . . . . . . I . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . .
10602 182.         .         .         .         .       I .         .         .         S         .         .         .         .
10604 183.         .         .         .         .      IO .         .         .        S.         .         .         .         .
10606 184.         .         .         .         .      IO .         .         .        S.         .         .         .         .
10608 185.         .         .         .         .      IO .         .         .        S.         .         .         .         .
10610 186.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10612 187.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10614 188.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10616 189.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10618 190.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10620 191. . . . . . . . . . . . . . . . . . . . . . . .I. . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
10622 192.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10624 193.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10626 194.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10628 195.         .         .         .         .      I  .         .         .        S.         .         .         .         .
10630 196.         .         .         .         .     IO  .         .         .        S.         .         .         .         .
10632 197.         .         .         .         .     IO  .         .         .        S.         .         .         .         .
10634 198.         .         .         .         .     I   .         .         .        S.         .         .         .         .
10636 199.         .         .         .         .    IO   .         .         .        S.         .         .         .         .
10638 200.         .         .         .         .    IO   .         .         .        S.         .         .         .         .
10640 201. . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
10642 202.         .         .         .         .   IO    .         .         .       S .         .         .         .         .
10644 203.         .         .         .         .  IO     .         .         .       S .         .         .         .         .
10646 204.         .         .         .         . I O     .         .         .       S .         .         .         .         .
10648 205.         .         .         .         .I O      .         .         .       S .         .         .         .         .
10650 206.         .         .         .         I O       .         .         .      S  .         .         .         .         .
10652 207.         .         .         .        I. O       .         .         .      S  .         .         .         .         .
10654 208.         .         .         .       I .O        .         .         .      S  .         .         .         .         .
10656 209.         .         .         .      I  O         .         .         .     S   .         .         .         .         .
10658 210.         .         .         .     I  O.         .         .         .     S   .         .         .         .         .
10700 211. . . . . . . . . . . . . . . .I. O . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
10702 212.         .         .         .  I  O  .         .         .         .    S    .         .         .         .         .
10704 213.         .         .         . I  O   .         .         .         .    S    .         .         .         .         .
10706 214.         .         .         . I  O   .         .         .         .   S     .         .         .         .         .
10708 215.         .         .         .I  O    .         .         .         .   S     .         .         .         .         .
10710 216.         .         .        I.  O     .         .         .         .  S      .         .         .         .         .
10712 217.         .         .       I . O      .         .         .         .  S      .         .         .         .         .
10714 218.         .         .      I  O        .         .         .         . S       .         .         .         .         .
10716 219.         .         .     I  O.        .         .         .         . S       .         .         .         .         .
10718 220.         .         .    I  O .        .         .         .         . S       .         .         .         .         .
10720 221. . . . . . . . . . . I .O. . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
10722 222.         .         .  I  O  .         .         .         .         .S        .         .         .         .         .
10724 223.         .         . I  O   .         .         .         .         S         .         .         .         .         .
10726 224.         .         .I  O    .         .         .         .         S         .         .         .         .         .
10728 225.         .         I  O     .         .         .         .        S.         .         .         .         .         .
10730 226.         .        I. O      .         .         .         .        S.         .         .         .         .         .
10732 227.         .       I .O       .         .         .         .        S.         .         .         .         .         .
10734 228.         .      I  O        .         .         .         .       S .         .         .         .         .         .
10736 229.         .     I  O.        .         .         .         .       S .         .         .         .         .         .
10738 230.         .     I O .        .         .         .         .      S  .         .         .         .         .         .
10740 231. . . . . . . .I.O. . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
10742 232.         .   I  O  .        .         .         .         .      S  .         .         .         .         .
10744 233.         .  I  O   .        .         .         .         .     S   .         .         .         .         .
10746 234.         .  I O    .        .         .         .         .     S   .         .         .         .         .
10748 235.         . I O     .        .         .         .         .     S   .         .         .         .         .
10750 236.         .I O      .        .         .         .         .    S    .         .         .         .         .
10752 237.         .I O      .        .         .         .         .    S    .         .         .         .         .
10754 238.         I O       .        .         .         .         .    S    .         .         .         .         .
10756 239.         IO        .        .         .         .         .    S    .         .         .         .         .
10758 240.        I.O        .        .         .         .         .   S     .         .         .         .         .
10800 241. . . . .IO . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10802 242.       I O         .        .         .         .         .   S     .         .         .         .         .
10804 243.       IO.         .        .         .         .         .   S     .         .         .         .         .
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  10806 244.      I O.         .         .         .         .         .   S     .         .         .         .         .         .
  10808 245.      IO .         .         .         .         .         .  S      .         .         .         .         .         .
  10810 246.      IO .         .         .         .         .         .  S      .         .         .         .         .         .
  10812 247.     IO  .         .         .         .         .         .  S      .         .         .         .         .         .
  10814 248.     IO  .         .         .         .         .         .  S      .         .         .         .         .         .
  10816 249.     IO  .         .         .         .         .         .  S      .         .         .         .         .         .
  10818 250.    IO   .         .         .         .         .         .  S      .         .         .         .         .         .
  10820 251. . .IO . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10822 252.    IO   .         .         .         .         .         . S       .         .         .         .         .         .
  10824 253.    I    .         .         .         .         .         . S       .         .         .         .         .         .
  10826 254.   IO    .         .         .         .         .         . S       .         .         .         .         .         .
  10828 255.   IO    .         .         .         .         .         . S       .         .         .         .         .         .
  10830 256.   IO    .         .         .         .         .         . S       .         .         .         .         .         .
  10832 257.   I     .         .         .         .         .         . S       .         .         .         .         .         .
  10834 258.  IO     .         .         .         .         .         . S       .         .         .         .         .         .
  10836 259.  IO     .         .         .         .         .         . S       .         .         .         .         .         .
  10838 260.  IO     .         .         .         .         .         . S       .         .         .         .         .         .
  10840 261. .IO . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10842 262.  I      .         .         .         .         .         .S        .         .         .         .         .         .
  10844 263.  I      .         .         .         .         .         .S        .         .         .         .         .         .
  10846 264.  I      .         .         .         .         .         .S        .         .         .         .         .         .
  10848 265. IO      .         .         .         .         .         .S        .         .         .         .         .         .
  10850 266. IO      .         .         .         .         .         .S        .         .         .         .         .         .
  10852 267. IO      .         .         .         .         .         .S        .         .         .         .         .         .
  10854 268. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10856 269. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10858 270. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10900 271. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10902 272. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10904 273. I       .         .         .         .         .         .S        .         .         .         .         .         .
  10906 274.IO       .         .         .         .         .         .S        .         .         .         .         .         .
  10908 275.IO       .         .         .         .         .         .S        .         .         .         .         .         .
  10910 276.IO       .         .         .         .         .         .S        .         .         .         .         .         .
  10912 277.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10914 278.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10916 279.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10918 280.I        .         .         .         .         .         .S        .         .         .         .         .         .
  10920 281.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10922 282.I        .         .         .         .         .         S         .         .         .         .         .         .
  10924 283.I        .         .         .         .         .         S         .         .         .         .         .         .
  10926 284.I        .         .         .         .         .         S         .         .         .         .         .         .
  10928 285.I        .         .         .         .         .         S         .         .         .         .         .         .
  10930 286.I        .         .         .         .         .         S         .         .         .         .         .         .
  10932 287.I        .         .         .         .         .         S         .         .         .         .         .         .
  10934 288.I        .         .         .         .         .         S         .         .         .         .         .         .
  10936 289.I        .         .         .         .         .         S         .         .         .         .         .         .
  10938 290.I        .         .         .         .         .         S         .         .         .         .         .         .
  10940 291.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292.I        .         .         .         .         .         S         .         .         .         .         .         .
  10944 293IO        .         .         .         .         .         S         .         .         .         .         .         .
  10946 294IO        .         .         .         .         .         S         .         .         .         .         .         .
  10948 295IO        .         .         .         .         .         S         .         .         .         .         .         .
  10950 296IO        .         .         .         .         .         S         .         .         .         .         .         .
  10952 297I         .         .         .         .         .         S         .         .         .         .         .         .
  10954 298I         .         .         .         .         .         S         .         .         .         .         .         .
  10956 299I         .         .         .         .         .         S         .         .         .         .         .         .
  10958 300I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
1
1                                                          STATION      600

                          (O) OUTFLOW
          0.        1.        2.        3.        4.        5.        0.        0.        0.        0.        0.        0.        0.
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .04       .03       .02       .01       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
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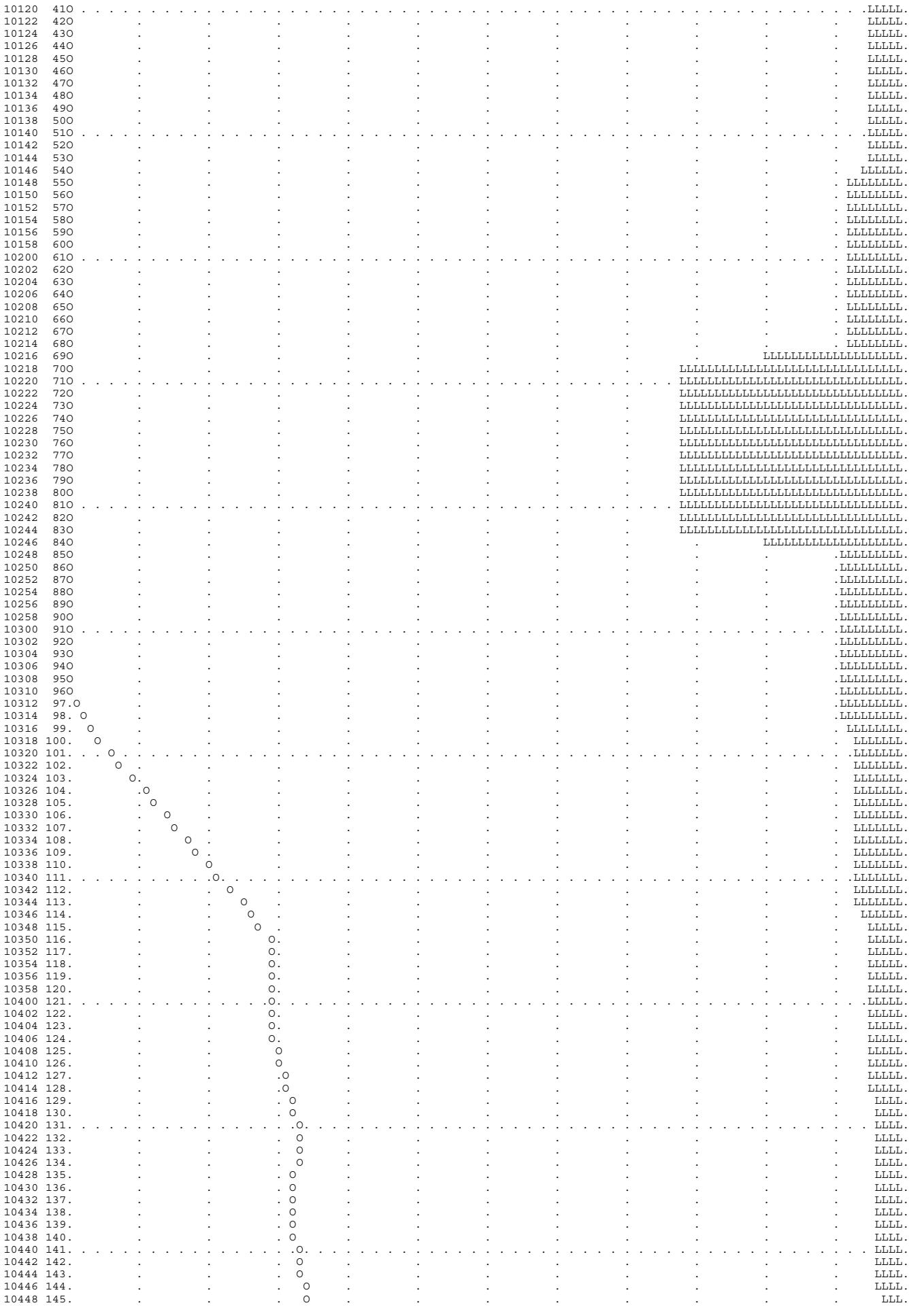

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10450 146.         .         .         .  O     .         .         .         .         .         .         .         .      LLL.
10452 147.         .         .         .  O     .         .         .         .         .         .         .         .      LLL.
10454 148.         .         .         .  O     .         .         .         .         .         .         .         .      LLL.
10456 149.         .         .         .  O     .         .         .         .         .         .         .         .      LLL.
10458 150.         .         .         .  O     .         .         .         .         .         .         .         .      LLL.
10500 151. . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10502 152.         .         .         .  O     .         .         .         .         .         .         .         .      LLL.
10504 153.         .         .         .  O     .         .         .         .         .         .         .         .      LLL.
10506 154.         .         .         .  O     .         .         .         .         .         .         .         .      LLL.
10508 155.         .         .         .   O    .         .         .         .         .         .         .         .      LLL.
10510 156.         .         .         .   O    .         .         .         .         .         .         .         .      LLL.
10512 157.         .         .         .   O    .         .         .         .         .         .         .         .      LLL.
10514 158.         .         .         .   O    .         .         .         .         .         .         .         .      LLL.
10516 159.         .         .         .    O   .         .         .         .         .         .         .         .      LLL.
10518 160.         .         .         .    O   .         .         .         .         .         .         .         .      LLL.
10520 161. . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10522 162.         .         .         .     O  .         .         .         .         .         .         .         .      LLX.
10524 163.         .         .         .     O  .         .         .         .         .         .         .         .      LLX.
10526 164.         .         .         .     O  .         .         .         .         .         .         .         .      LLX.
10528 165.         .         .         .      O .         .         .         .         .         .         .         .      LLX.
10530 166.         .         .         .      O .         .         .         .         .         .         .         .      LLX.
10532 167.         .         .         .      O .         .         .         .         .         .         .         .      LLX.
10534 168.         .         .         .       O.         .         .         .         .         .         .         .      LLX.
10536 169.         .         .         .       O.         .         .         .         .         .         .         .      LLX.
10538 170.         .         .         .       O.         .         .         .         .         .         .         .      LLX.
10540 171. . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
10542 172.         .         .         .        O         .         .         .         .         .         .         .      LLX.
10544 173.         .         .         .        O         .         .         .         .         .         .         .      LLX.
10546 174.         .         .         .        .O        .         .         .         .         .         .         .      LLX.
10548 175.         .         .         .        .O        .         .         .         .         .         .         .      LLX.
10550 176.         .         .         .        .O        .         .         .         .         .         .         .      LLX.
10552 177.         .         .         .        . O       .         .         .         .         .         .         .      LLX.
10554 178.         .         .         .        . O       .         .         .         .         .         .         .      LLX.
10556 179.         .         .         .        . O       .         .         .         .         .         .         .      LLX.
10558 180.         .         .         .        .  O      .         .         .         .         .         .         .      LLX.
10600 181. . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
10602 182.         .         .         .        .  O      .         .         .         .         .         .         .      LLX.
10604 183.         .         .         .        .   O     .         .         .         .         .         .         .      LLX.
10606 184.         .         .         .        .   O     .         .         .         .         .         .         .      LLX.
10608 185.         .         .         .        .   O     .         .         .         .         .         .         .      LLX.
10610 186.         .         .         .        .    O    .         .         .         .         .         .         .      LLX.
10612 187.         .         .         .        .    O    .         .         .         .         .         .         .      LLX.
10614 188.         .         .         .        .    O    .         .         .         .         .         .         .      LLX.
10616 189.         .         .         .        .    O    .         .         .         .         .         .         .       LL.
10618 190.         .         .         .        .    O    .         .         .         .         .         .         .        .
10620 191. . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10622 192.         .         .         .        O         .         .         .         .         .         .         .        .
10624 193.         .         .         .    O   .         .         .         .         .         .         .         .        .
10626 194.         .         .       O         .         .         .         .         .         .         .         .         .
10628 195.         .         .    O    .         .         .         .         .         .         .         .         .        .
10630 196.         .       O         .         .         .         .         .         .         .         .         .         .
10632 197.         .    O    .         .         .         .         .         .         .         .         .         .        .
10634 198.         . O       .         .         .         .         .         .         .         .         .         .        .
10636 199.       O.         .         .         .         .         .         .         .         .         .         .         .
10638 200.     O  .         .         .         .         .         .         .         .         .         .         .        .
10640 201. . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10642 202.   O     .         .         .         .         .         .         .         .         .         .         .        .
10644 203.  O      .         .         .         .         .         .         .         .         .         .         .        .
10646 204. O       .         .         .         .         .         .         .         .         .         .         .        .
10648 205. O       .         .         .         .         .         .         .         .         .         .         .        .
10650 206.O        .         .         .         .         .         .         .         .         .         .         .        .
10652 207.O        .         .         .         .         .         .         .         .         .         .         .        .
10654 208.O        .         .         .         .         .         .         .         .         .         .         .        .
10656 209.O        .         .         .         .         .         .         .         .         .         .         .        .
10658 210O         .         .         .         .         .         .         .         .         .         .         .        .
10700 211O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10702 212O         .         .         .         .         .         .         .         .         .         .         .        .
10704 213O         .         .         .         .         .         .         .         .         .         .         .        .
10706 214O         .         .         .         .         .         .         .         .         .         .         .        .
10708 215O         .         .         .         .         .         .         .         .         .         .         .        .
10710 216O         .         .         .         .         .         .         .         .         .         .         .        .
10712 217O         .         .         .         .         .         .         .         .         .         .         .        .
10714 218O         .         .         .         .         .         .         .         .         .         .         .        .
10716 219O         .         .         .         .         .         .         .         .         .         .         .        .
10718 220O         .         .         .         .         .         .         .         .         .         .         .        .
10720 221O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10722 222O         .         .         .         .         .         .         .         .         .         .         .        .
10724 223O         .         .         .         .         .         .         .         .         .         .         .        .
10726 224O         .         .         .         .         .         .         .         .         .         .         .        .
10728 225O         .         .         .         .         .         .         .         .         .         .         .        .
10730 226O         .         .         .         .         .         .         .         .         .         .         .        .
10732 227O         .         .         .         .         .         .         .         .         .         .         .        .
10734 228O         .         .         .         .         .         .         .         .         .         .         .        .
10736 229O         .         .         .         .         .         .         .         .         .         .         .        .
10738 230O         .         .         .         .         .         .         .         .         .         .         .        .
10740 231O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10742 232O         .         .         .         .         .         .         .         .         .         .         .        .
10744 233O         .         .         .         .         .         .         .         .         .         .         .        .
10746 234O         .         .         .         .         .         .         .         .         .         .         .        .
10748 235O         .         .         .         .         .         .         .         .         .         .         .        .
10750 236O         .         .         .         .         .         .         .         .         .         .         .        .
10752 237O         .         .         .         .         .         .         .         .         .         .         .        .
10754 238O         .         .         .         .         .         .         .         .         .         .         .        .
10756 239O         .         .         .         .         .         .         .         .         .         .         .        .
10758 240O         .         .         .         .         .         .         .         .         .         .         .        .
10800 241O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10802 242O         .         .         .         .         .         .         .         .         .         .         .        .
10804 243O         .         .         .         .         .         .         .         .         .         .         .        .
10806 244O         .         .         .         .         .         .         .         .         .         .         .        .
10808 245O         .         .         .         .         .         .         .         .         .         .         .        .
10810 246O         .         .         .         .         .         .         .         .         .         .         .        .
10812 247O         .         .         .         .         .         .         .         .         .         .         .        .
10814 248O         .         .         .         .         .         .         .         .         .         .         .        .
10816 249O         .         .         .         .         .         .         .         .         .         .         .        .
10818 250O         .         .         .         .         .         .         .         .         .         .         .        .
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 10820 251O . . .
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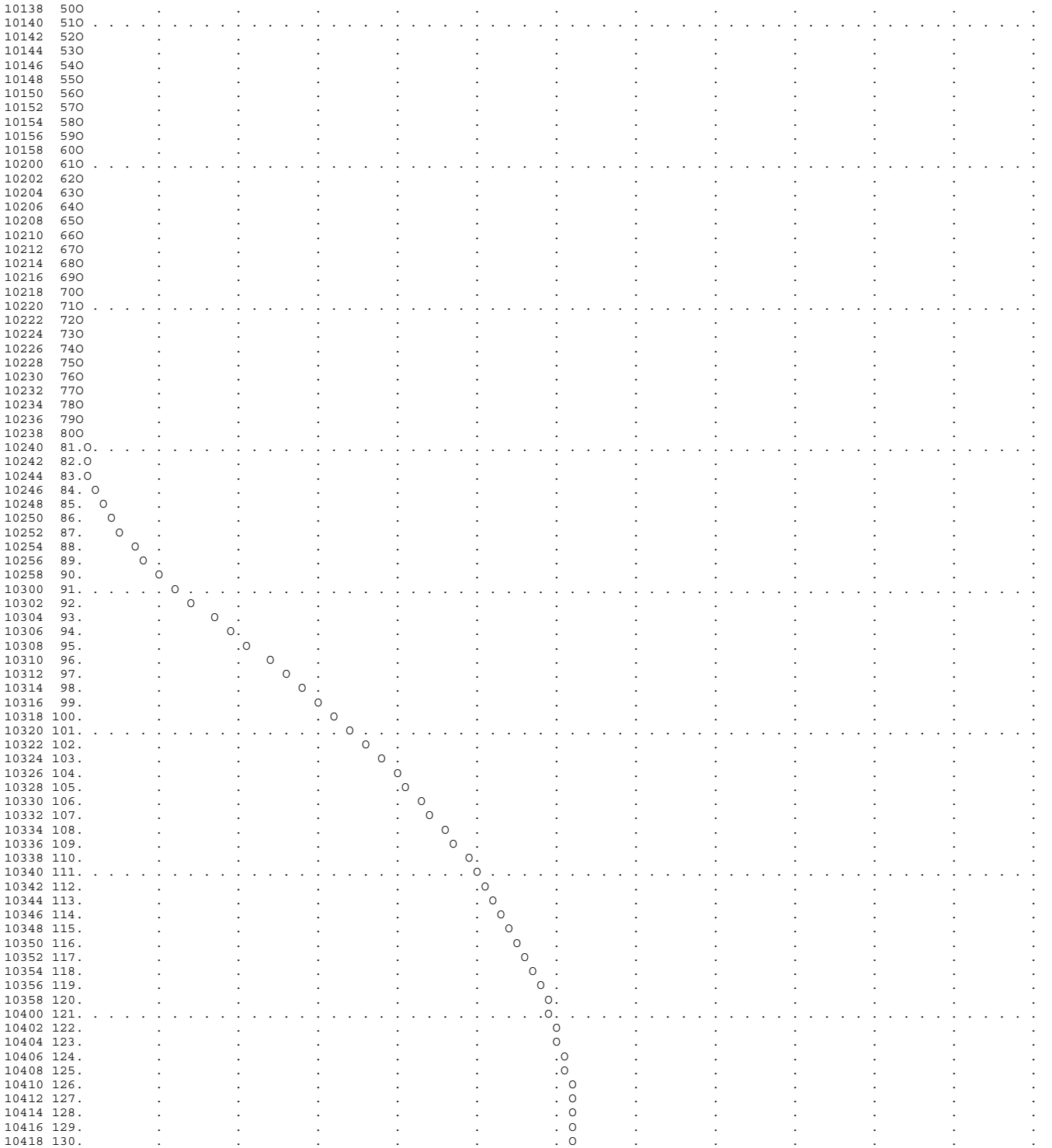

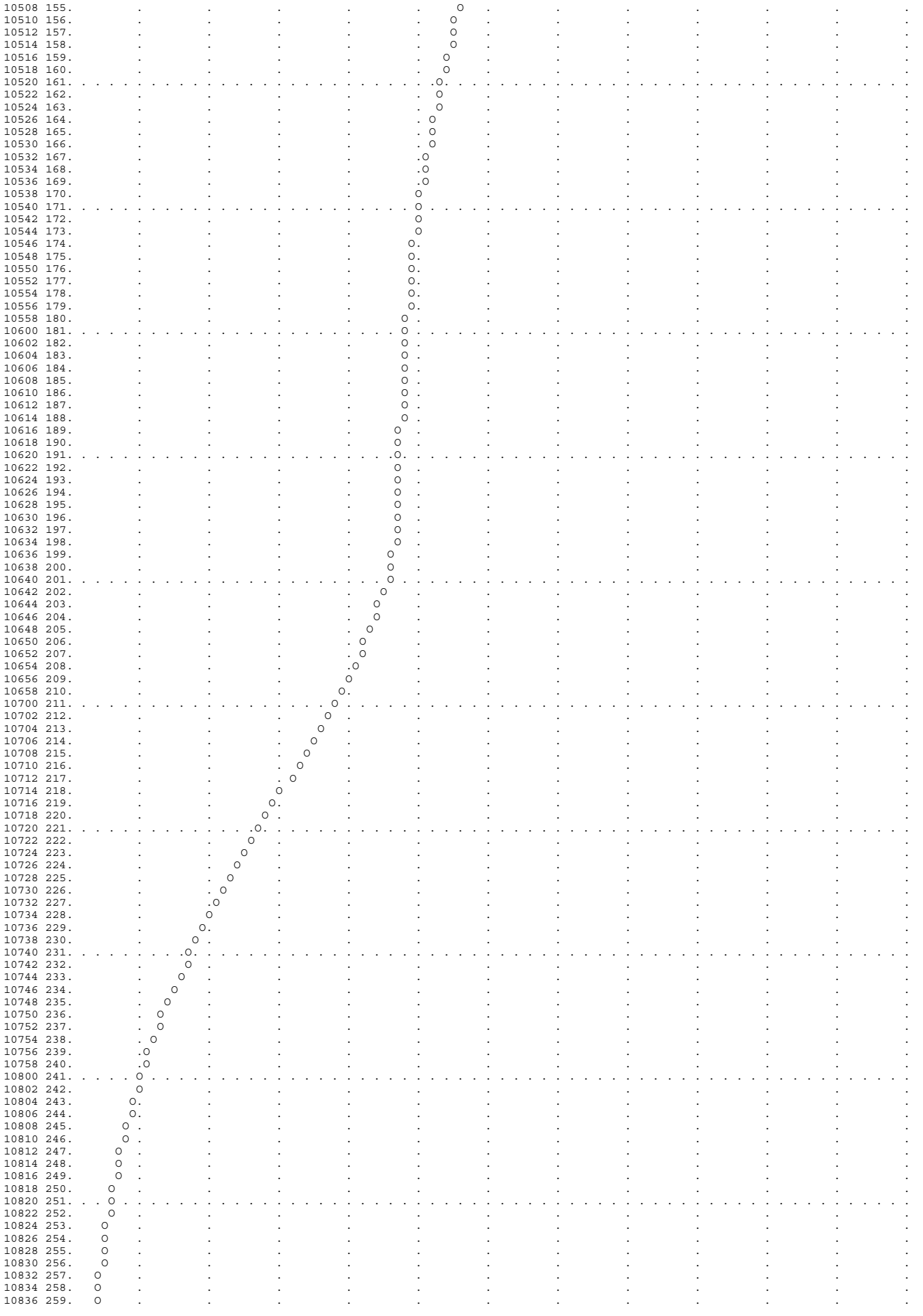

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10838 260.   O     .         .         .         .         .         .         .         .         .         .         .         .
10840 261. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10842 262.  O      .         .         .         .         .         .         .         .         .         .         .         .
10844 263.  O      .         .         .         .         .         .         .         .         .         .         .         .
10846 264.  O      .         .         .         .         .         .         .         .         .         .         .         .
10848 265.  O      .         .         .         .         .         .         .         .         .         .         .         .
10850 266.  O      .         .         .         .         .         .         .         .         .         .         .         .
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10854 268. O       .         .         .         .         .         .         .         .         .         .         .         .
10856 269. O       .         .         .         .         .         .         .         .         .         .         .         .
10858 270. O       .         .         .         .         .         .         .         .         .         .         .         .
10900 271. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10902 272. O       .         .         .         .         .         .         .         .         .         .         .         .
10904 273. O       .         .         .         .         .         .         .         .         .         .         .         .
10906 274. O       .         .         .         .         .         .         .         .         .         .         .         .
10908 275. O       .         .         .         .         .         .         .         .         .         .         .         .
10910 276. O       .         .         .         .         .         .         .         .         .         .         .         .
10912 277.O        .         .         .         .         .         .         .         .         .         .         .         .
10914 278.O        .         .         .         .         .         .         .         .         .         .         .         .
10916 279.O        .         .         .         .         .         .         .         .         .         .         .         .
10918 280.O        .         .         .         .         .         .         .         .         .         .         .         .
10920 281.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10922 282.O        .         .         .         .         .         .         .         .         .         .         .         .
10924 283.O        .         .         .         .         .         .         .         .         .         .         .         .
10926 284.O        .         .         .         .         .         .         .         .         .         .         .         .
10928 285.O        .         .         .         .         .         .         .         .         .         .         .         .
10930 286.O        .         .         .         .         .         .         .         .         .         .         .         .
10932 287.O        .         .         .         .         .         .         .         .         .         .         .         .
10934 288.O        .         .         .         .         .         .         .         .         .         .         .         .
10936 289.O        .         .         .         .         .         .         .         .         .         .         .         .
10938 290.O        .         .         .         .         .         .         .         .         .         .         .         .
10940 291.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10942 292.O        .         .         .         .         .         .         .         .         .         .         .         .
10944 293.O        .         .         .         .         .         .         .         .         .         .         .         .
10946 294.O        .         .         .         .         .         .         .         .         .         .         .         .
10948 295.O        .         .         .         .         .         .         .         .         .         .         .         .
10950 296.O        .         .         .         .         .         .         .         .         .         .         .         .
10952 297O         .         .         .         .         .         .         .         .         .         .         .         .
10954 298O         .         .         .         .         .         .         .         .         .         .         .         .
10956 299O         .         .         .         .         .         .         .         .         .         .         .         .
10958 300O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	100(A)	397.	2.97	125.	75.	75.	3.50		
+	HYDROGRAPH AT	200(A)	185.	4.00	102.	62.	62.	4.90		
+	2 COMBINED AT	A	461.	3.03	227.	136.	136.	8.40		
+	ROUTED TO	RTA-B	367.	4.13	225.	136.	136.	8.40		
+									80.26	4.13
+	HYDROGRAPH AT	300	229.	3.23	99.	59.	59.	3.40		
+	2 COMBINED AT	B	542.	3.97	323.	196.	196.	11.80		
+	HYDROGRAPH AT	400	555.	4.07	303.	184.	184.	8.60		
+	2 COMBINED AT	B	1095.	4.03	626.	380.	380.	20.40		
+	ROUTED TO	RTB-C	1093.	4.10	626.	380.	380.	20.40		
+									30.07	4.10
+	HYDROGRAPH AT	500	222.	6.47	131.	79.	79.	14.10		
+	2 COMBINED AT	C	1249.	4.20	757.	459.	459.	34.50		
+	ROUTED TO	RTC-D	1243.	4.33	756.	459.	459.	34.50		
+									10.36	4.33
+	HYDROGRAPH AT	600	5.	6.27	2.	1.	1.	.40		
+	2 COMBINED AT	D	1246.	4.33	758.	460.	460.	34.90		

*** NORMAL END OF HEC-1 ***

2-YEAR STORM EVENT
24 – hour Precipitation

```
1****************************************                                                    ****************************************
 *                                      *                                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                *                                                    *          609 SECOND STREET           *
 *                                      *                                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   26APR13  TIME  11:08:57  *                                                    *           (916) 756-1104             *
 *                                      *                                                    *                                      *
 ****************************************                                                    ****************************************


                                                X     X  XXXXXXX   XXXXX           X
                                                X     X  X        X     X         XX
                                                X     X  X        X               X
                                                XXXXXXX  XXXX     X        XXXXX   X
                                                X     X  X        X               X
                                                X     X  X        X     X         X
                                                X     X  XXXXXXX   XXXXX         XXX


          THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

          THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                   HEC-1 INPUT                                                   PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                        *DIAGRAM
            1           ID   El Camino Real Bridge Construction Project
            2           ID   2-YEAR, 24-HR STORM EVENT
            3           ID   ECR24H_B.HC1, 4/26/2012
 *** FREE ***
            4           IT       2       0       0     300
            5           IO       5       2

            6           KK  100(A)  BASIN 100
            7           IN      15
            8           PB     2.0
            9           PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
           10           PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
           11           PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
           12           PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
           13           PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
           14           BA     3.5
           15           LS       0      85
           16           UD    .306
                        *

           17           KK  200(A)  BASIN 200
           18           IN      15
           19           PB     2.0
           20           PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
           21           PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
           22           PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
           23           PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
           24           PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
           25           BA     4.9
           26           LS       0      80
           27           UD    .645
                        *

           28           KK       A    100+200
           29           HC       2
                        *

           30           KK   RTA-B
           31           KM   ROUTE BASIN 100 AND 200 THROUGH BASIN 300
           32           RS       1    STOR      -1
           33           RC    0.04   0.035    0.04 12081.5   0.003     160
           34           RX       0   156.5   365.2   533.8   754.0   856.5  1123.8  1316.9
           35           RY     160     140     100      80      80     100     140     144
                        *

           36           KK     300  BASIN 300
           37           IN      15
           38           PB     2.0
           39           PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
           40           PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
           41           PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
           42           PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
           43           PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
           44           BA     3.4
1                                                   HEC-1 INPUT                                                   PAGE  2

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

           45           LS       0      83
           46           UD    .466
                        *

           47           KK       B    100+200+300
           48           HC       2
                        *
```

```
 49          KK     400  BASIN 400
 50          IN      15
 51          PB     2.0
 52          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 53          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 54          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 55          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 56          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 57          BA     8.6
 58          LS       0      85
 59          UD    1.02
             *

 60          KK       B    100+200+300+400
 61          HC       2
             *

 62          KK   RTB-C
 63          KM   ROUTE BASIN 100, 200, 300 AND 400 THROUGH BASIN 500
 64          RS       1    STOR      -1
 65          RC   0.035   0.030   0.035    2575   0.020      85
 66          RX       0   278.5   449.2  2891.2  3704.9    4382  4468.6  4602.3
 67          RY      85      80      40      30      30      35      40      80
             *

 68          KK     500  BASIN 500
 69          IN      15
 70          PB     2.0
 71          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 72          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 73          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 74          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 75          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 76          BA    14.1
 77          LS       0      74
 78          UD   0.937
             *

 79          KK       C    100+200+300+400+500
 80          HC       2
             *
```

1 HEC-1 INPUT PAGE 3

```
        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 81          KK   RTC-D
 82          KM   ROUTE BASIN 100, 200, 300, 400 AND 500 THROUGH BASIN 600
 83          RS       1    STOR      -1
 84          RC    0.04   0.035    0.04  1682.3   0.001     220
 85          RX       0   484.1   726.3  2184.9  2424.5  3660.5  3767.9  4120.6
 86          RY     107      80      40      10      10      40      80     220
             *

 87          KK     600  BASIN 600
 88          IN      15
 89          PB     2.0
 90          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 91          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 92          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 93          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 94          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 95          BA     0.4
 96          LS       0      70
 97          UD   0.190
             *

 98          KK       D
 99          HC       2
100          ZZ
```

1

```
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6      100(A)
                .
                .
    17          .      200(A)
                .           .
                .           .
    28          A............
                V
                V
    30       RTA-B
                .
                .
    36          .         300
                .           .
                .           .
    47          B............
                .
                .
    49          .         400
                .           .
                .           .
    60          B............
                V
                V
    62       RTB-C
                .
                .
    68          .         500
```

```
                .          .
                .          .
   79           C...........
                V
                V
   81        RTC-D
                .
                .
   87           .         600
                .          .
                .          .
   98           D...........

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                                    ****************************************
 *                                      *                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                    *          609 SECOND STREET           *
 *                                      *                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   26APR13  TIME  11:08:57  *                                    *           (916) 756-1104             *
 *                                      *                                    *                                      *
 ****************************************                                    ****************************************


                          El Camino Real Bridge Construction Project
                          2-YEAR, 24-HR STORM EVENT
                          ECR24H_B.HC1, 4/26/2012

   5 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           5  PRINT CONTROL
                       IPLOT           2  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN           2  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1    0  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1    0  ENDING DATE
                      NDTIME        0958  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .03 HOURS
                       TOTAL TIME BASE    9.97 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT
1                                                   STATION   100(A)

                        (O) OUTFLOW
          0.      100.      200.      300.      400.      500.      600.      700.      800.      900.        0.        0.        0.
                                                                                                      (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .00       .03       .02       .01       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         L.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
```

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10122  42O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10124  43O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10126  44O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10128  45O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10130  46O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10132  47O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10134  48O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10136  49O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLX.
10352 117O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLX.
10354 118.O        .         .         .         .         .         .         .         .         .         .         .LLLLLLLLX.
10356 119.O        .         .         .         .         .         .         .         .         .         .         .LLLLLLLLX.
10358 120.O        .         .         .         .         .         .         .         .         .         .         .LLLLLLLLX.
10400 121.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLX.
10402 122. O       .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLXX.
10404 123. O       .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLXX.
10406 124.  O      .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLXX.
10408 125.  O      .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLXX.
10410 126.   O     .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLXX.
10412 127.   O     .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLXX.
10414 128.    O    .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLXX.
10416 129.     O   .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLXXX.
10418 130.      O  .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLXXXX.
10420 131. . . . O . . . . . . . . . . . . . . . . . . .
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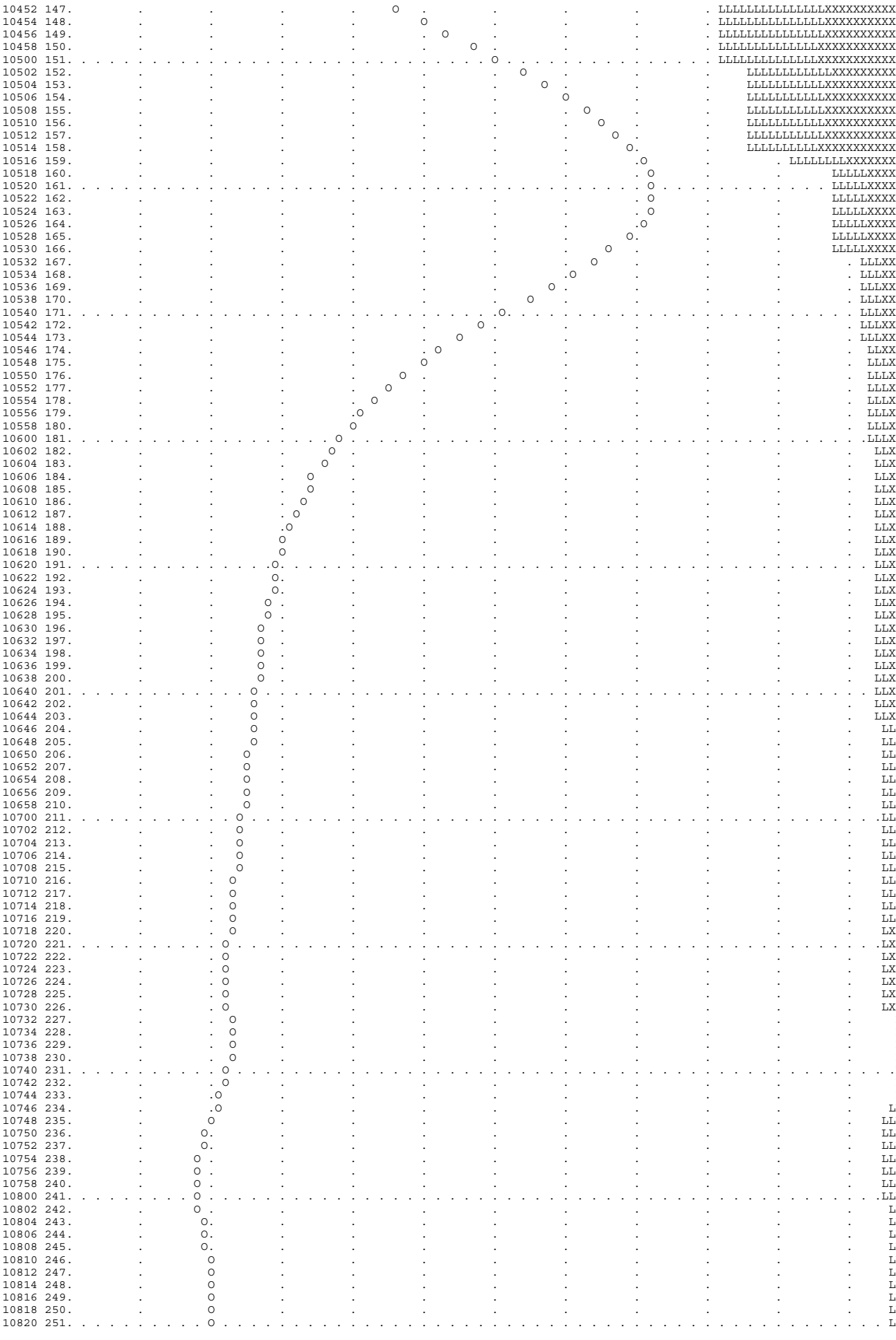

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  10824 253.         .         .         O        .         .         .         .         .         .         .         .     LXXX.
  10826 254.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10828 255.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10830 256.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10832 257.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10834 258.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10836 259.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10838 260.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10840 261. . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LXXX.
  10842 262.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10844 263.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10846 264.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10848 265.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10850 266.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10852 267.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10854 268.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10856 269.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10858 270.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10900 271. . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LXXX.
  10902 272.         .         O         .         .         .         .         .         .         .         .     LXXX.
  10904 273.         .        O.         .         .         .         .         .         .         .         .     LXXX.
  10906 274.         .        O.         .         .         .         .         .         .         .         .     LXXX.
  10908 275.         .        O.         .         .         .         .         .         .         .         .     LXXX.
  10910 276.         .        O.         .         .         .         .         .         .         .         .     LXXX.
  10912 277.         .       O .         .         .         .         .         .         .         .         .     LXXX.
  10914 278.         .       O .         .         .         .         .         .         .         .         .     LXXX.
  10916 279.         .       O .         .         .         .         .         .         .         .         .      LXX.
  10918 280.         .       O .         .         .         .         .         .         .         .         .      LXX.
  10920 281. . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
  10922 282.         .       O .         .         .         .         .         .         .         .         .      LXX.
  10924 283.         .       O .         .         .         .         .         .         .         .         .      LXX.
  10926 284.         .       O .         .         .         .         .         .         .         .         .      LXX.
  10928 285.         .       O .         .         .         .         .         .         .         .         .      LXX.
  10930 286.         .      O  .         .         .         .         .         .         .         .         .      LXX.
  10932 287.         .      O  .         .         .         .         .         .         .         .         .      LXX.
  10934 288.         .      O  .         .         .         .         .         .         .         .         .      LXX.
  10936 289.         .     O   .         .         .         .         .         .         .         .         .      LXX.
  10938 290.         .     O   .         .         .         .         .         .         .         .         .      LXX.
  10940 291. . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
  10942 292.         .     O   .         .         .         .         .         .         .         .         .      LXX.
  10944 293.         .    O    .         .         .         .         .         .         .         .         .      LXX.
  10946 294.         .    O    .         .         .         .         .         .         .         .         .      LXX.
  10948 295.         .    O    .         .         .         .         .         .         .         .         .      LXX.
  10950 296.         .    O    .         .         .         .         .         .         .         .         .      LXX.
  10952 297.         .    O    .         .         .         .         .         .         .         .         .      LXX.
  10954 298.         .    O    .         .         .         .         .         .         .         .         .      LXX.
  10956 299.         .    O    .         .         .         .         .         .         .         .         .      LXX.
  10958 300.---------.---O-----.---------.---------.---------.---------.---------.---------.---------.---------.---------.------LXX.
1
1                                                            STATION   200(A)

                            (O) OUTFLOW
           0.       100.       200.       300.       400.       500.       600.       700.         0.         0.         0.         0.         0.
                                                                                                              (L) PRECIP,   (X) EXCESS
          .00        .00        .00        .00        .00        .00        .00        .00        .00        .03        .02        .01        .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .        L.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10122  42O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10124  43O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10126  44O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10128  45O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10130  46O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10132  47O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10134  48O         .         .         .         .         .         .         .         .         .         .         .      LLL.
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10136  49O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
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10212  67O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
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10254  88O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
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10258  90O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
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10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLL.
10404 123O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLL.
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10410 126O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLL.
10412 127O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLL.
10414 128O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLL.
10416 129O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLX.
10418 130O         .         .         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLX.
10420 131O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLX.
10422 132O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLXX.
10424 133O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLXX.
10426 134O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLXX.
10428 135.O        .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLXX.
10430 136.O        .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLXXX.
10432 137.O        .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLXXXX.
10434 138.O        .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLXXXX.
10436 139. O       .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLXXXX.
10438 140. O       .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLXXXXX.
10440 141. .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLXXXXXX.
10442 142.   O     .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLXXXXXX.
10444 143.    O    .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLXXXXXX.
10446 144.     O   .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLLLLXXXXXXX.
10448 145.      O  .         .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
10450 146.       O .         .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
10452 147.        O.         .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
10454 148.         .O        .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
10456 149.         .  O      .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
10458 150.         .    O    .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
10500 151. . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLXXXXXXXX.
10502 152.         .       O.        .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLXXXXXXXX.
10504 153.         .        .O       .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLXXXXXXXX.
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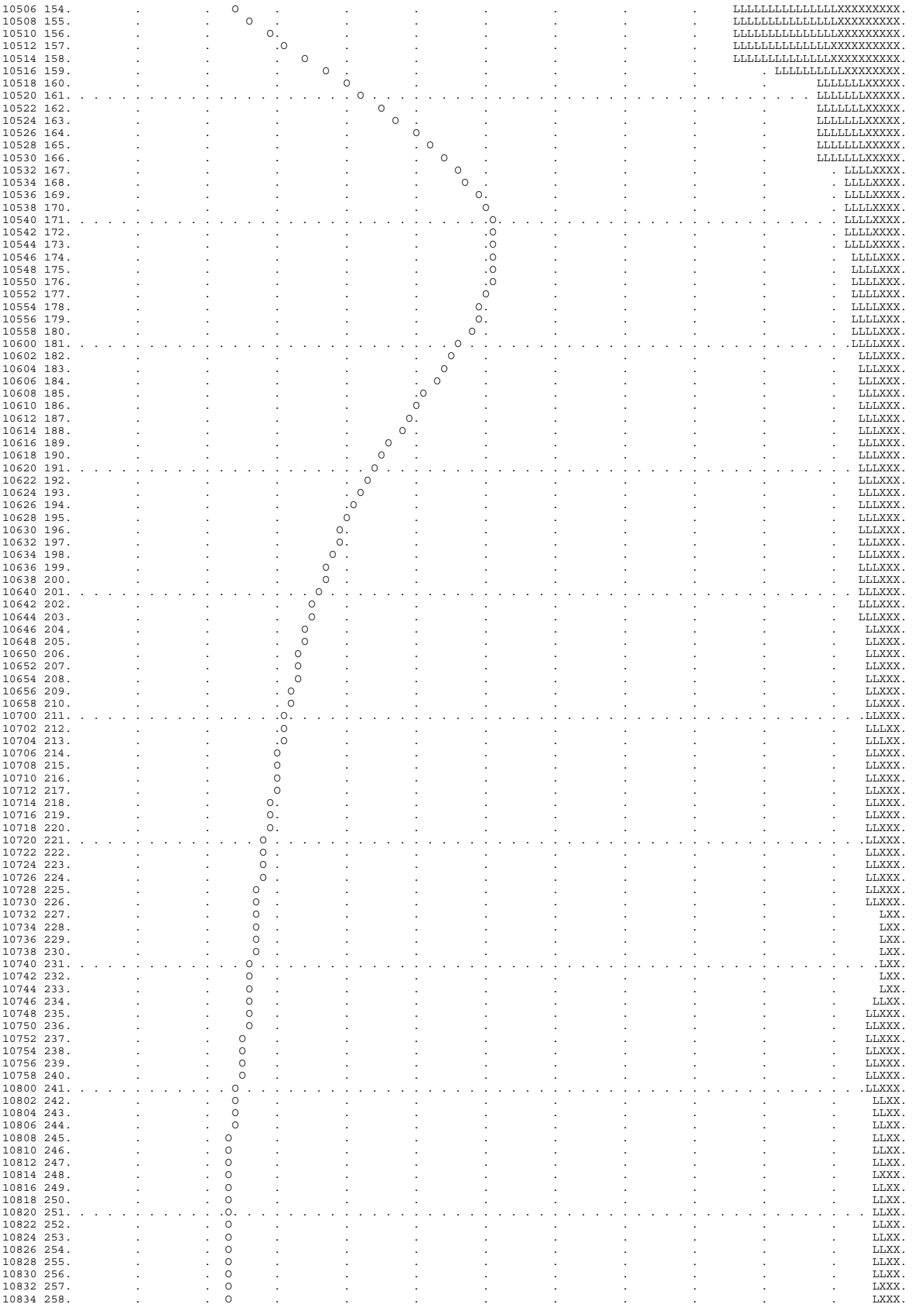

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  10842 262.         .         .  O      .         .         .         .         .         .         .         .         .     LXXX.
  10844 263.         .         .  O      .         .         .         .         .         .         .         .         .     LXXX.
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  10848 265.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
  10850 266.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
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  10854 268.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
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  10902 272.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
  10904 273.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
  10906 274.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
  10908 275.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
  10910 276.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
  10912 277.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
  10914 278.         .         .  O      .         .         .         .         .         .         .         .         .     LLXX.
  10916 279.         .         .  O      .         .         .         .         .         .         .         .         .      LXX.
  10918 280.         .         . O       .         .         .         .         .         .         .         .         .      LXX.
  10920 281. . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
  10922 282.         .         . O       .         .         .         .         .         .         .         .         .      LXX.
  10924 283.         .         . O       .         .         .         .         .         .         .         .         .      LXX.
  10926 284.         .         . O       .         .         .         .         .         .         .         .         .      LXX.
  10928 285.         .         . O       .         .         .         .         .         .         .         .         .      LXX.
  10930 286.         .         . O       .         .         .         .         .         .         .         .         .      LXX.
  10932 287.         .         . O       .         .         .         .         .         .         .         .         .      LXX.
  10934 288.         .         .O        .         .         .         .         .         .         .         .         .      LXX.
  10936 289.         .         .O        .         .         .         .         .         .         .         .         .      LXX.
  10938 290.         .         .O        .         .         .         .         .         .         .         .         .      LXX.
  10940 291. . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
  10942 292.         .         .O        .         .         .         .         .         .         .         .         .      LXX.
  10944 293.         .         .O        .         .         .         .         .         .         .         .         .      LXX.
  10946 294.         .         O         .         .         .         .         .         .         .         .         .      LXX.
  10948 295.         .         O         .         .         .         .         .         .         .         .         .      LXX.
  10950 296.         .         O         .         .         .         .         .         .         .         .         .      LXX.
  10952 297.         .         O         .         .         .         .         .         .         .         .         .      LXX.
  10954 298.         .         O         .         .         .         .         .         .         .         .         .      LXX.
  10956 299.         .        O.         .         .         .         .         .         .         .         .         .      LXX.
  10958 300.---------.--------O.---------.---------.---------.---------.---------.---------.---------.---------.---------.------LXX.
1
1                                                          STATION        A

                          (O) OUTFLOW
          0.      200.      400.      600.      800.     1000.     1200.     1400.        0.        0.        0.        0.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
  10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
  10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
  10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
  10132  47O         .         .         .         .         .         .         .         .         .         .         .         .
  10134  48O         .         .         .         .         .         .         .         .         .         .         .         .
  10136  49O         .         .         .         .         .         .         .         .         .         .         .         .
  10138  50O         .         .         .         .         .         .         .         .         .         .         .         .
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142  52O         .         .         .         .         .         .         .         .         .         .         .         .
  10144  53O         .         .         .         .         .         .         .         .         .         .         .         .
  10146  54O         .         .         .         .         .         .         .         .         .         .         .         .
  10148  55O         .         .         .         .         .         .         .         .         .         .         .         .
  10150  56O         .         .         .         .         .         .         .         .         .         .         .         .
  10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
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10154  58O        .        .        .        .        .        .        .        .        .        .        .        .
10156  59O        .        .        .        .        .        .        .        .        .        .        .        .
10158  60O        .        .        .        .        .        .        .        .        .        .        .        .
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62O        .        .        .        .        .        .        .        .        .        .        .        .
10204  63O        .        .        .        .        .        .        .        .        .        .        .        .
10206  64O        .        .        .        .        .        .        .        .        .        .        .        .
10208  65O        .        .        .        .        .        .        .        .        .        .        .        .
10210  66O        .        .        .        .        .        .        .        .        .        .        .        .
10212  67O        .        .        .        .        .        .        .        .        .        .        .        .
10214  68O        .        .        .        .        .        .        .        .        .        .        .        .
10216  69O        .        .        .        .        .        .        .        .        .        .        .        .
10218  70O        .        .        .        .        .        .        .        .        .        .        .        .
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72O        .        .        .        .        .        .        .        .        .        .        .        .
10224  73O        .        .        .        .        .        .        .        .        .        .        .        .
10226  74O        .        .        .        .        .        .        .        .        .        .        .        .
10228  75O        .        .        .        .        .        .        .        .        .        .        .        .
10230  76O        .        .        .        .        .        .        .        .        .        .        .        .
10232  77O        .        .        .        .        .        .        .        .        .        .        .        .
10234  78O        .        .        .        .        .        .        .        .        .        .        .        .
10236  79O        .        .        .        .        .        .        .        .        .        .        .        .
10238  80O        .        .        .        .        .        .        .        .        .        .        .        .
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82O        .        .        .        .        .        .        .        .        .        .        .        .
10244  83O        .        .        .        .        .        .        .        .        .        .        .        .
10246  84O        .        .        .        .        .        .        .        .        .        .        .        .
10248  85O        .        .        .        .        .        .        .        .        .        .        .        .
10250  86O        .        .        .        .        .        .        .        .        .        .        .        .
10252  87O        .        .        .        .        .        .        .        .        .        .        .        .
10254  88O        .        .        .        .        .        .        .        .        .        .        .        .
10256  89O        .        .        .        .        .        .        .        .        .        .        .        .
10258  90O        .        .        .        .        .        .        .        .        .        .        .        .
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92O        .        .        .        .        .        .        .        .        .        .        .        .
10304  93O        .        .        .        .        .        .        .        .        .        .        .        .
10306  94O        .        .        .        .        .        .        .        .        .        .        .        .
10308  95O        .        .        .        .        .        .        .        .        .        .        .        .
10310  96O        .        .        .        .        .        .        .        .        .        .        .        .
10312  97O        .        .        .        .        .        .        .        .        .        .        .        .
10314  98O        .        .        .        .        .        .        .        .        .        .        .        .
10316  99O        .        .        .        .        .        .        .        .        .        .        .        .
10318 100O        .        .        .        .        .        .        .        .        .        .        .        .
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102O        .        .        .        .        .        .        .        .        .        .        .        .
10324 103O        .        .        .        .        .        .        .        .        .        .        .        .
10326 104O        .        .        .        .        .        .        .        .        .        .        .        .
10328 105O        .        .        .        .        .        .        .        .        .        .        .        .
10330 106O        .        .        .        .        .        .        .        .        .        .        .        .
10332 107O        .        .        .        .        .        .        .        .        .        .        .        .
10334 108O        .        .        .        .        .        .        .        .        .        .        .        .
10336 109O        .        .        .        .        .        .        .        .        .        .        .        .
10338 110O        .        .        .        .        .        .        .        .        .        .        .        .
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112O        .        .        .        .        .        .        .        .        .        .        .        .
10344 113O        .        .        .        .        .        .        .        .        .        .        .        .
10346 114O        .        .        .        .        .        .        .        .        .        .        .        .
10348 115O        .        .        .        .        .        .        .        .        .        .        .        .
10350 116O        .        .        .        .        .        .        .        .        .        .        .        .
10352 117O        .        .        .        .        .        .        .        .        .        .        .        .
10354 118O        .        .        .        .        .        .        .        .        .        .        .        .
10356 119O        .        .        .        .        .        .        .        .        .        .        .        .
10358 120.O       .        .        .        .        .        .        .        .        .        .        .        .
10400 121.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122.O       .        .        .        .        .        .        .        .        .        .        .        .
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10406 124.O       .        .        .        .        .        .        .        .        .        .        .        .
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10410 126. O      .        .        .        .        .        .        .        .        .        .        .        .
10412 127. O      .        .        .        .        .        .        .        .        .        .        .        .
10414 128.  O     .        .        .        .        .        .        .        .        .        .        .        .
10416 129.  O     .        .        .        .        .        .        .        .        .        .        .        .
10418 130.   O    .        .        .        .        .        .        .        .        .        .        .        .
10420 131. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132.    O   .        .        .        .        .        .        .        .        .        .        .        .
10424 133.    O   .        .        .        .        .        .        .        .        .        .        .        .
10426 134.     O  .        .        .        .        .        .        .        .        .        .        .        .
10428 135.      O .        .        .        .        .        .        .        .        .        .        .        .
10430 136.       O.        .        .        .        .        .        .        .        .        .        .        .
10432 137.        O        .        .        .        .        .        .        .        .        .        .        .
10434 138.        .O       .        .        .        .        .        .        .        .        .        .        .
10436 139.        . O      .        .        .        .        .        .        .        .        .        .        .
10438 140.        .  O     .        .        .        .        .        .        .        .        .        .        .
10440 141. . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142.        .     O  .        .        .        .        .        .        .        .        .        .        .
10444 143.        .       O.        .        .        .        .        .        .        .        .        .        .
10446 144.        .        .O       .        .        .        .        .        .        .        .        .        .
10448 145.        .        .  O     .        .        .        .        .        .        .        .        .        .
10450 146.        .        .   O    .        .        .        .        .        .        .        .        .        .
10452 147.        .        .      O .        .        .        .        .        .        .        .        .        .
10454 148.        .        .        O        .        .        .        .        .        .        .        .        .
10456 149.        .        .         . O     .        .        .        .        .        .        .        .        .
10458 150.        .        .         .    O  .        .        .        .        .        .        .        .        .
10500 151. . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.        .        .        .        .O       .        .        .        .        .        .        .        .
10504 153.        .        .        .        .   O    .        .        .        .        .        .        .        .
10506 154.        .        .        .        .     O  .        .        .        .        .        .        .        .
10508 155.        .        .        .        .       O.        .        .        .        .        .        .        .
10510 156.        .        .        .        .        . O      .        .        .        .        .        .        .
10512 157.        .        .        .        .        .   O    .        .        .        .        .        .        .
10514 158.        .        .        .        .        .     O  .        .        .        .        .        .        .
10516 159.        .        .        .        .        .       O.        .        .        .        .        .        .
10518 160.        .        .        .        .        .        .O       .        .        .        .        .        .
10520 161. . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.        .        .        .        .        .        .  O     .        .        .        .        .        .
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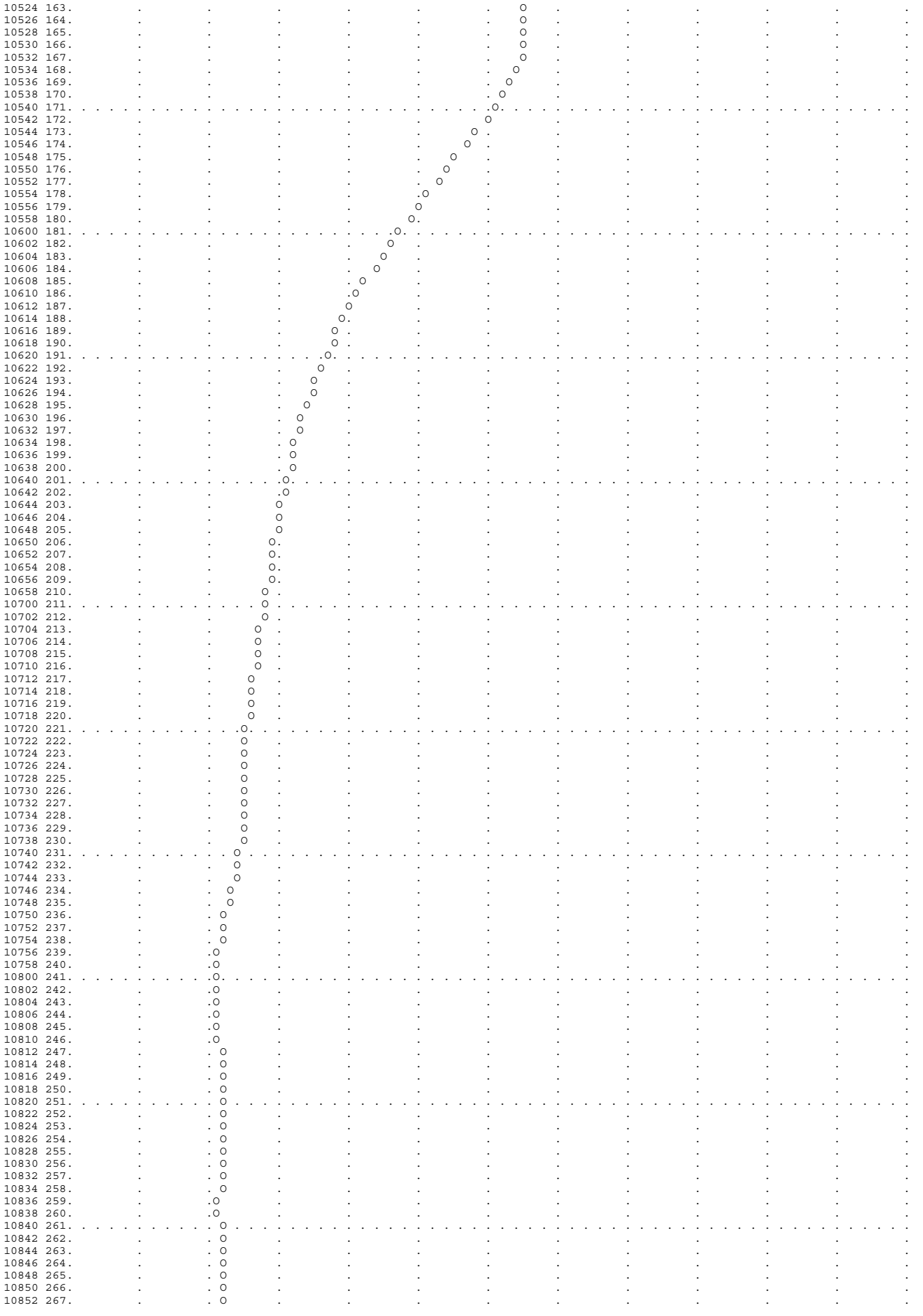

```
 10854 268.         .         . O       .         .         .         .         .         .         .         .         .         .
 10856 269.         .         . O       .         .         .         .         .         .         .         .         .         .
 10858 270.         .         . O       .         .         .         .         .         .         .         .         .         .
 10900 271. . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10902 272.         .         .O        .         .         .         .         .         .         .         .         .         .
 10904 273.         .         .O        .         .         .         .         .         .         .         .         .         .
 10906 274.         .         .O        .         .         .         .         .         .         .         .         .         .
 10908 275.         .         .O        .         .         .         .         .         .         .         .         .         .
 10910 276.         .         .O        .         .         .         .         .         .         .         .         .         .
 10912 277.         .         .O        .         .         .         .         .         .         .         .         .         .
 10914 278.         .         O         .         .         .         .         .         .         .         .         .         .
 10916 279.         .         O         .         .         .         .         .         .         .         .         .         .
 10918 280.         .         O         .         .         .         .         .         .         .         .         .         .
 10920 281. . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10922 282.         .         O         .         .         .         .         .         .         .         .         .         .
 10924 283.         .         O         .         .         .         .         .         .         .         .         .         .
 10926 284.         .         O         .         .         .         .         .         .         .         .         .         .
 10928 285.         .         O         .         .         .         .         .         .         .         .         .         .
 10930 286.         .         O         .         .         .         .         .         .         .         .         .         .
 10932 287.         .        O.         .         .         .         .         .         .         .         .         .         .
 10934 288.         .        O.         .         .         .         .         .         .         .         .         .         .
 10936 289.         .        O.         .         .         .         .         .         .         .         .         .         .
 10938 290.         .        O.         .         .         .         .         .         .         .         .         .         .
 10940 291. . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10942 292.         .       O .         .         .         .         .         .         .         .         .         .         .
 10944 293.         .       O .         .         .         .         .         .         .         .         .         .         .
 10946 294.         .       O .         .         .         .         .         .         .         .         .         .         .
 10948 295.         .       O .         .         .         .         .         .         .         .         .         .         .
 10950 296.         .       O .         .         .         .         .         .         .         .         .         .         .
 10952 297.         .      O  .         .         .         .         .         .         .         .         .         .         .
 10954 298.         .      O  .         .         .         .         .         .         .         .         .         .         .
 10956 299.         .      O  .         .         .         .         .         .         .         .         .         .         .
 10958 300.---------.------O--.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                        STATION    RTA-B

                        (I) INFLOW,   (O) OUTFLOW
          0.      200.      400.      600.      800.     1000.     1200.     1400.        0.        0.        0.        0.        0.
                                                                                (S) STORAGE
          0.        0.        0.        0.        0.        0.        0.       20.       40.       60.        0.        0.        0.
 DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
 10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
 10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
 10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  12I         .         .         .         .         .         S         .         .         .         .         .         .
 10024  13I         .         .         .         .         .         S         .         .         .         .         .         .
 10026  14I         .         .         .         .         .         S         .         .         .         .         .         .
 10028  15I         .         .         .         .         .         S         .         .         .         .         .         .
 10030  16I         .         .         .         .         .         S         .         .         .         .         .         .
 10032  17I         .         .         .         .         .         S         .         .         .         .         .         .
 10034  18I         .         .         .         .         .         S         .         .         .         .         .         .
 10036  19I         .         .         .         .         .         S         .         .         .         .         .         .
 10038  20I         .         .         .         .         .         S         .         .         .         .         .         .
 10040  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10042  22I         .         .         .         .         .         S         .         .         .         .         .         .
 10044  23I         .         .         .         .         .         S         .         .         .         .         .         .
 10046  24I         .         .         .         .         .         S         .         .         .         .         .         .
 10048  25I         .         .         .         .         .         S         .         .         .         .         .         .
 10050  26I         .         .         .         .         .         S         .         .         .         .         .         .
 10052  27I         .         .         .         .         .         S         .         .         .         .         .         .
 10054  28I         .         .         .         .         .         S         .         .         .         .         .         .
 10056  29I         .         .         .         .         .         S         .         .         .         .         .         .
 10058  30I         .         .         .         .         .         S         .         .         .         .         .         .
 10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10102  32I         .         .         .         .         .         S         .         .         .         .         .         .
 10104  33I         .         .         .         .         .         S         .         .         .         .         .         .
 10106  34I         .         .         .         .         .         S         .         .         .         .         .         .
 10108  35I         .         .         .         .         .         S         .         .         .         .         .         .
 10110  36I         .         .         .         .         .         S         .         .         .         .         .         .
 10112  37I         .         .         .         .         .         S         .         .         .         .         .         .
 10114  38I         .         .         .         .         .         S         .         .         .         .         .         .
 10116  39I         .         .         .         .         .         S         .         .         .         .         .         .
 10118  40I         .         .         .         .         .         S         .         .         .         .         .         .
 10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10122  42I         .         .         .         .         .         S         .         .         .         .         .         .
 10124  43I         .         .         .         .         .         S         .         .         .         .         .         .
 10126  44I         .         .         .         .         .         S         .         .         .         .         .         .
 10128  45I         .         .         .         .         .         S         .         .         .         .         .         .
 10130  46I         .         .         .         .         .         S         .         .         .         .         .         .
 10132  47I         .         .         .         .         .         S         .         .         .         .         .         .
 10134  48I         .         .         .         .         .         S         .         .         .         .         .         .
 10136  49I         .         .         .         .         .         S         .         .         .         .         .         .
 10138  50I         .         .         .         .         .         S         .         .         .         .         .         .
 10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10142  52I         .         .         .         .         .         S         .         .         .         .         .         .
 10144  53I         .         .         .         .         .         S         .         .         .         .         .         .
 10146  54I         .         .         .         .         .         S         .         .         .         .         .         .
 10148  55I         .         .         .         .         .         S         .         .         .         .         .         .
 10150  56I         .         .         .         .         .         S         .         .         .         .         .         .
 10152  57I         .         .         .         .         .         S         .         .         .         .         .         .
 10154  58I         .         .         .         .         .         S         .         .         .         .         .         .
 10156  59I         .         .         .         .         .         S         .         .         .         .         .         .
 10158  60I         .         .         .         .         .         S         .         .         .         .         .         .
 10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10202  62I         .         .         .         .         .         S         .         .         .         .         .         .
 10204  63I         .         .         .         .         .         S         .         .         .         .         .         .
 10206  64I         .         .         .         .         .         S         .         .         .         .         .         .
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10208  65I         .         .         .         .         .         S         .         .         .         .         .         .
10210  66I         .         .         .         .         .         S         .         .         .         .         .         .
10212  67I         .         .         .         .         .         S         .         .         .         .         .         .
10214  68I         .         .         .         .         .         S         .         .         .         .         .         .
10216  69I         .         .         .         .         .         S         .         .         .         .         .         .
10218  70I         .         .         .         .         .         S         .         .         .         .         .         .
10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72I         .         .         .         .         .         S         .         .         .         .         .         .
10224  73I         .         .         .         .         .         S         .         .         .         .         .         .
10226  74I         .         .         .         .         .         S         .         .         .         .         .         .
10228  75I         .         .         .         .         .         S         .         .         .         .         .         .
10230  76I         .         .         .         .         .         S         .         .         .         .         .         .
10232  77I         .         .         .         .         .         S         .         .         .         .         .         .
10234  78I         .         .         .         .         .         S         .         .         .         .         .         .
10236  79I         .         .         .         .         .         S         .         .         .         .         .         .
10238  80I         .         .         .         .         .         S         .         .         .         .         .         .
10240  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82I         .         .         .         .         .         S         .         .         .         .         .         .
10244  83I         .         .         .         .         .         S         .         .         .         .         .         .
10246  84I         .         .         .         .         .         S         .         .         .         .         .         .
10248  85I         .         .         .         .         .         S         .         .         .         .         .         .
10250  86I         .         .         .         .         .         S         .         .         .         .         .         .
10252  87I         .         .         .         .         .         S         .         .         .         .         .         .
10254  88I         .         .         .         .         .         S         .         .         .         .         .         .
10256  89I         .         .         .         .         .         S         .         .         .         .         .         .
10258  90I         .         .         .         .         .         S         .         .         .         .         .         .
10300  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92I         .         .         .         .         .         S         .         .         .         .         .         .
10304  93I         .         .         .         .         .         S         .         .         .         .         .         .
10306  94I         .         .         .         .         .         S         .         .         .         .         .         .
10308  95I         .         .         .         .         .         S         .         .         .         .         .         .
10310  96I         .         .         .         .         .         S         .         .         .         .         .         .
10312  97I         .         .         .         .         .         S         .         .         .         .         .         .
10314  98I         .         .         .         .         .         S         .         .         .         .         .         .
10316  99I         .         .         .         .         .         S         .         .         .         .         .         .
10318 100I         .         .         .         .         .         S         .         .         .         .         .         .
10320 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102I         .         .         .         .         .         S         .         .         .         .         .         .
10324 103I         .         .         .         .         .         S         .         .         .         .         .         .
10326 104I         .         .         .         .         .         S         .         .         .         .         .         .
10328 105I         .         .         .         .         .         S         .         .         .         .         .         .
10330 106I         .         .         .         .         .         S         .         .         .         .         .         .
10332 107I         .         .         .         .         .         S         .         .         .         .         .         .
10334 108I         .         .         .         .         .         S         .         .         .         .         .         .
10336 109I         .         .         .         .         .         S         .         .         .         .         .         .
10338 110I         .         .         .         .         .         S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I         .         .         .         .         .         S         .         .         .         .         .         .
10344 113I         .         .         .         .         .         S         .         .         .         .         .         .
10346 114I         .         .         .         .         .         S         .         .         .         .         .         .
10348 115I         .         .         .         .         .         S         .         .         .         .         .         .
10350 116I         .         .         .         .         .         S         .         .         .         .         .         .
10352 117I         .         .         .         .         .         S         .         .         .         .         .         .
10354 118I         .         .         .         .         .         S         .         .         .         .         .         .
10356 119I         .         .         .         .         .         S         .         .         .         .         .         .
10358 120OI        .         .         .         .         .         S         .         .         .         .         .         .
10400 121OI. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122OI        .         .         .         .         .         S         .         .         .         .         .         .
10404 123OI        .         .         .         .         .         S         .         .         .         .         .         .
10406 124OI        .         .         .         .         .         S         .         .         .         .         .         .
10408 125O I       .         .         .         .         .         S         .         .         .         .         .         .
10410 126O I       .         .         .         .         .         S         .         .         .         .         .         .
10412 127O I       .         .         .         .         .         S         .         .         .         .         .         .
10414 128.O I      .         .         .         .         .         S         .         .         .         .         .         .
10416 129.O I      .         .         .         .         .         S         .         .         .         .         .         .
10418 130.O  I     .         .         .         .         .         S         .         .         .         .         .         .
10420 131.O. I . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132.O   I    .         .         .         .         .         .S        .         .         .         .         .         .
10424 133.O   I    .         .         .         .         .         .S        .         .         .         .         .         .
10426 134. O   I   .         .         .         .         .         .S        .         .         .         .         .         .
10428 135. O    I  .         .         .         .         .         .S        .         .         .         .         .         .
10430 136. O     I .         .         .         .         .         .S        .         .         .         .         .         .
10432 137.  O     I.         .         .         .         .         .S        .         .         .         .         .         .
10434 138.  O      .I        .         .         .         .         .S        .         .         .         .         .         .
10436 139.  O      . I       .         .         .         .         . S       .         .         .         .         .         .
10438 140.   O     .  I      .         .         .         .         . S       .         .         .         .         .         .
10440 141. . .O. . . . .I. . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142.    O    .      I  .         .         .         .         .  S      .         .         .         .         .         .
10444 143.     O   .        I.         .         .         .         .  S      .         .         .         .         .         .
10446 144.      O  .         .I        .         .         .         .  S      .         .         .         .         .         .
10448 145.      O  .         .  I      .         .         .         .   S     .         .         .         .         .         .
10450 146.       O .         .    I    .         .         .         .   S     .         .         .         .         .         .
10452 147.        O.         .       I .         .         .         .    S    .         .         .         .         .         .
10454 148.         O         .         I         .         .         .    S    .         .         .         .         .         .
10456 149.         . O       .         .  I      .         .         .     S   .         .         .         .         .         .
10458 150.         .  O      .         .     I   .         .         .     S   .         .         .         .         .         .
10500 151. . . . . . . O . . . . . . . . . . . . I . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.         .     O   .         .         .I        .         .       S .         .         .         .         .         .
10504 153.         .      O  .         .         .   I     .         .       S .         .         .         .         .         .
10506 154.         .        O.         .         .      I  .         .        S.         .         .         .         .         .
10508 155.         .         O         .         .        I.         .         S         .         .         .         .         .
10510 156.         .         . O       .         .         . I       .         .S        .         .         .         .         .
10512 157.         .         .   O     .         .         .   I     .         . S       .         .         .         .         .
10514 158.         .         .    O    .         .         .      I  .         . S       .         .         .         .         .
10516 159.         .         .      O  .         .         .        I.         .  S      .         .         .         .         .
10518 160.         .         .        O.         .         .         .I        .   S     .         .         .         .         .
10520 161. . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . I . . . . . .S. . . . . . . . . . . . . . . . . . . . . .
10522 162.         .         .         . O       .         .         .   I     .     S   .         .         .         .         .
10524 163.         .         .         .   O     .         .         .    I    .      S  .         .         .         .         .
10526 164.         .         .         .     O   .         .         .    I    .       S .         .         .         .         .
10528 165.         .         .         .      O  .         .         .    I    .       S .         .         .         .         .
10530 166.         .         .         .        O.         .         .    I    .        S.         .         .         .         .
10532 167.         .         .         .         O         .         .    I    .         S         .         .         .         .
10534 168.         .         .         .         . O       .         .   I     .         S         .         .         .         .
10536 169.         .         .         .         .  O      .         .  I      .         .S        .         .         .         .
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10538 170.        .        .        .   O    .        . I      .        . S      .        .        .        .
10540 171. . . . . . . . . . . . . . . . . . . . . .O. . . . . . . .I. . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . .
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  10908 275.         .         .IO       .         .         .         .         .S        .         .         .         .         .
  10910 276.         .         .IO       .         .         .         .         .S        .         .         .         .         .
  10912 277.         .         .IO       .         .         .         .         .S        .         .         .         .         .
  10914 278.         .         I O       .         .         .         .         .S        .         .         .         .         .
  10916 279.         .         I O       .         .         .         .         .S        .         .         .         .         .
  10918 280.         .         I O       .         .         .         .         .S        .         .         .         .         .
  10920 281. . . . . . . . . . I O . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
  10922 282.         .         I O       .         .         .         .         .S        .         .         .         .         .
  10924 283.         .         I O       .         .         .         .         .S        .         .         .         .         .
  10926 284.         .         IO        .         .         .         .         .S        .         .         .         .         .
  10928 285.         .         IO        .         .         .         .         S         .         .         .         .         .
  10930 286.         .         IO        .         .         .         .         S         .         .         .         .         .
  10932 287.         .        I.O        .         .         .         .         S         .         .         .         .         .
  10934 288.         .        I.O        .         .         .         .         S         .         .         .         .         .
  10936 289.         .        I.O        .         .         .         .         S         .         .         .         .         .
  10938 290.         .        I.O        .         .         .         .         S         .         .         .         .         .
  10940 291. . . . . . . . . I .O. . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292.         .       I .O        .         .         .         .         S         .         .         .         .         .
  10944 293.         .       I O         .         .         .         .         S         .         .         .         .         .
  10946 294.         .       I O         .         .         .         .         S         .         .         .         .         .
  10948 295.         .       I O         .         .         .         .         S         .         .         .         .         .
  10950 296.         .       I O         .         .         .         .         S         .         .         .         .         .
  10952 297.         .      I  O         .         .         .         .         S         .         .         .         .         .
  10954 298.         .      I  O         .         .         .         .         S         .         .         .         .         .
  10956 299.         .      I  O         .         .         .         .         S         .         .         .         .         .
  10958 300.---------.------I-O.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.
1
1                                                          STATION      300

                          (O) OUTFLOW
          0.      100.      200.      300.      400.      500.      600.      700.        0.        0.        0.        0.        0.
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .00       .03       .02       .01       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .        L.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10122  42O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10124  43O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10126  44O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10128  45O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10130  46O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10132  47O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10134  48O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10136  49O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10138  50O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10142  52O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10144  53O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10146  54O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10148  55O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10150  56O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10152  57O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10154  58O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10156  59O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10158  60O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10202  62O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10204  63O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10206  64O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10208  65O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10210  66O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10212  67O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10214  68O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10216  69O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10218  70O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
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10222  72O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLL.
10352 117O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLL.
10354 118O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLL.
10356 119O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLL.
10358 120O         .         .         .         .         .         .         .         .         .         .         .LLLLLLLLL.
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLX.
10404 123O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLX.
10406 124O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLX.
10408 125O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLX.
10410 126O         .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLX.
10412 127.O        .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLX.
10414 128.O        .         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLXX.
10416 129.O        .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLXX.
10418 130.O        .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLXXX.
10420 131. O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLXXX.
10422 132. O       .         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLXXX.
10424 133.  O      .         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLXXXX.
10426 134.  O      .         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLXXXX.
10428 135.   O     .         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLXXXX.
10430 136.    O    .         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLXXXX.
10432 137.     O   .         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLLLXXXXXX.
10434 138.      O  .         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLLLXXXXXXX.
10436 139.       O .         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLLLXXXXXXX.
10438 140.        O.         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLLLXXXXXXX.
10440 141. . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLXXXXXXX.
10442 142.         . O       .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLLXXXXXXX.
10444 143.         .  O      .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLXXXXXXXX.
10446 144.         .    O    .         .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLXXXXXXXX.
10448 145.         .      O  .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLXXXXXXXXX.
10450 146.         .       O         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLXXXXXXXXXX.
10452 147.         .        . O      .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLXXXXXXXXXX.
10454 148.         .         .  O     .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLXXXXXXXXXX.
10456 149.         .         .     O  .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLXXXXXXXXXXX.
10458 150.         .         .       O.         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLXXXXXXXXXXX.
10500 151. . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLXXXXXXXXXXX.
10502 152.         .         .         .  O      .         .         .         .         .         .         .    LLLLLLLLLLLLLXXXXXXXXXXX.
10504 153.         .         .         .     O  .         .         .         .         .         .         .    LLLLLLLLLLLLLXXXXXXXXXXX.
10506 154.         .         .         .        O         .         .         .         .         .         .    LLLLLLLLLLLLLXXXXXXXXXXX.
10508 155.         .         .         .         .  O      .         .         .         .         .         .    LLLLLLLLLLLLLXXXXXXXXXXX.
10510 156.         .         .         .         .   O     .         .         .         .         .         .    LLLLLLLLLLLLLXXXXXXXXXXX.
10512 157.         .         .         .         .      O .         .         .         .         .         .    LLLLLLLLLLLLLXXXXXXXXXXX.
10514 158.         .         .         .         .        O         .         .         .         .         .    LLLLLLLLLLLLLXXXXXXXXXXX.
10516 159.         .         .         .         .         .  O      .         .         .         .         .         . LLLLLLLLLLXXXXXXXXX.
10518 160.         .         .         .         .         .   O     .         .         .         .         .       LLLLLLXXXXXX.
10520 161. . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . .
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10552 177.         .         .         .         .        O.         .         .         .         .         .         . LLLXXXX.
10554 178.         .         .         .         .       O .         .         .         .         .         .         . LLLXXXX.
10556 179.         .         .         .         .     O   .         .         .         .         .         .         . LLLXXXX.
10558 180.         .         .         .         .   O     .         .         .         .         .         .         . LLLXXXX.
10600 181. . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLXXXX.
10602 182.         .         .         .         .O        .         .         .         .         .         .         .  LLXXXX.
10604 183.         .         .         .         O         .         .         .         .         .         .         .  LLXXXX.
10606 184.         .         .         .       O .         .         .         .         .         .         .         .  LLXXXX.
10608 185.         .         .         .      O  .         .         .         .         .         .         .         .  LLXXXX.
10610 186.         .         .         .     O   .         .         .         .         .         .         .         .  LLXXXX.
10612 187.         .         .         .    O    .         .         .         .         .         .         .         .  LLXXXX.
10614 188.         .         .         .   O     .         .         .         .         .         .         .         .  LLXXXX.
10616 189.         .         .         .  O      .         .         .         .         .         .         .         .  LLLXXX.
10618 190.         .         .         . O       .         .         .         .         .         .         .         .  LLLXXX.
10620 191. . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLXXX.
10622 192.         .         .        O         .         .         .         .         .         .         .         .  LLLXXX.
10624 193.         .         .        O         .         .         .         .         .         .         .         .  LLLXXX.
10626 194.         .         .       O.         .         .         .         .         .         .         .         .  LLLXXX.
10628 195.         .         .      O .         .         .         .         .         .         .         .         .  LLLXXX.
10630 196.         .         .      O .         .         .         .         .         .         .         .         .  LLLXXX.
10632 197.         .         .     O  .         .         .         .         .         .         .         .         .  LLLXXX.
10634 198.         .         .     O  .         .         .         .         .         .         .         .         .  LLLXXX.
10636 199.         .         .    O   .         .         .         .         .         .         .         .         .  LLLXXX.
10638 200.         .         .    O   .         .         .         .         .         .         .         .         .  LLLXXX.
10640 201. . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLXXX.
10642 202.         .         .   O    .         .         .         .         .         .         .         .         .  LLLXXX.
10644 203.         .         .   O    .         .         .         .         .         .         .         .         .  LLLXXX.
10646 204.         .         .   O    .         .         .         .         .         .         .         .         .   LLXXX.
10648 205.         .         .   O    .         .         .         .         .         .         .         .         .   LLXXX.
10650 206.         .         .  O     .         .         .         .         .         .         .         .         .   LLXXX.
10652 207.         .         .  O     .         .         .         .         .         .         .         .         .   LLXXX.
10654 208.         .         .  O     .         .         .         .         .         .         .         .         .   LLXXX.
10656 209.         .         .  O     .         .         .         .         .         .         .         .         .   LLXXX.
10658 210.         .         . O      .         .         .         .         .         .         .         .         .   LLXXX.
10700 211. . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLXXX.
10702 212.         .         . O      .         .         .         .         .         .         .         .         .   LLXXX.
10704 213.         .         . O      .         .         .         .         .         .         .         .         .   LLXXX.
10706 214.         .         . O      .         .         .         .         .         .         .         .         .   LLXXX.
10708 215.         .         .O       .         .         .         .         .         .         .         .         .   LLXXX.
10710 216.         .         .O       .         .         .         .         .         .         .         .         .   LLXXX.
10712 217.         .         .O       .         .         .         .         .         .         .         .         .   LLXXX.
10714 218.         .         .O       .         .         .         .         .         .         .         .         .   LLXXX.
10716 219.         .         O        .         .         .         .         .         .         .         .         .   LLXXX.
10718 220.         .         O        .         .         .         .         .         .         .         .         .   LLXXX.
10720 221. . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLXXX.
10722 222.         .         O        .         .         .         .         .         .         .         .         .   LLXXX.
10724 223.         .         O        .         .         .         .         .         .         .         .         .   LLXXX.
10726 224.         .         O        .         .         .         .         .         .         .         .         .   LLXXX.
10728 225.         .         O        .         .         .         .         .         .         .         .         .   LLXXX.
10730 226.         .         O        .         .         .         .         .         .         .         .         .   LLXXX.
10732 227.         .         O        .         .         .         .         .         .         .         .         .     LXX.
10734 228.         .         O        .         .         .         .         .         .         .         .         .     LXX.
10736 229.         .         O        .         .         .         .         .         .         .         .         .     LXX.
10738 230.         .         O        .         .         .         .         .         .         .         .         .     LXX.
10740 231. . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
10742 232.         .         O        .         .         .         .         .         .         .         .         .     LXX.
10744 233.         .         O        .         .         .         .         .         .         .         .         .     LXX.
10746 234.         .         O        .         .         .         .         .         .         .         .         .    LLXX.
10748 235.         .         O        .         .         .         .         .         .         .         .         .   LLXXX.
10750 236.         .        O.        .         .         .         .         .         .         .         .         .   LLXXX.
10752 237.         .        O.        .         .         .         .         .         .         .         .         .   LLXXX.
10754 238.         .        O.        .         .         .         .         .         .         .         .         .   LLXXX.
10756 239.         .       O .        .         .         .         .         .         .         .         .         .   LLXXX.
10758 240.         .       O .        .         .         .         .         .         .         .         .         .   LLXXX.
10800 241. . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLXXX.
10802 242.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10804 243.         .      O  .        .         .         .         .         .         .         .         .         .    LXXX.
10806 244.         .      O  .        .         .         .         .         .         .         .         .         .    LXXX.
10808 245.         .      O  .        .         .         .         .         .         .         .         .         .    LXXX.
10810 246.         .      O  .        .         .         .         .         .         .         .         .         .    LXXX.
10812 247.         .      O  .        .         .         .         .         .         .         .         .         .    LXXX.
10814 248.         .      O  .        .         .         .         .         .         .         .         .         .    LXXX.
10816 249.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10818 250.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10820 251. . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LXXX.
10822 252.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10824 253.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10826 254.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10828 255.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10830 256.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10832 257.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10834 258.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10836 259.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10838 260.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10840 261. . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LXXX.
10842 262.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10844 263.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10846 264.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10848 265.         .       O .        .         .         .         .         .         .         .         .         .    LLXX.
10850 266.         .       O .        .         .         .         .         .         .         .         .         .    LLXX.
10852 267.         .       O .        .         .         .         .         .         .         .         .         .    LLXX.
10854 268.         .       O .        .         .         .         .         .         .         .         .         .    LLXX.
10856 269.         .       O .        .         .         .         .         .         .         .         .         .    LLXX.
10858 270.         .       O .        .         .         .         .         .         .         .         .         .    LLXX.
10900 271. . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
10902 272.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10904 273.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10906 274.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10908 275.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10910 276.         .       O .        .         .         .         .         .         .         .         .         .    LXXX.
10912 277.         .      O  .        .         .         .         .         .         .         .         .         .    LXXX.
10914 278.         .      O  .        .         .         .         .         .         .         .         .         .    LXXX.
10916 279.         .      O  .        .         .         .         .         .         .         .         .         .     LXX.
10918 280.         .      O  .        .         .         .         .         .         .         .         .         .     LXX.
10920 281. . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
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  10922 282.         .      O  .         .         .         .         .         .         .         .         .         .      LXX.
  10924 283.         .      O  .         .         .         .         .         .         .         .         .         .      LXX.
  10926 284.         .      O  .         .         .         .         .         .         .         .         .         .      LXX.
  10928 285.         .      O  .         .         .         .         .         .         .         .         .         .      LXX.
  10930 286.         .     O   .         .         .         .         .         .         .         .         .         .      LXX.
  10932 287.         .     O   .         .         .         .         .         .         .         .         .         .      LXX.
  10934 288.         .     O   .         .         .         .         .         .         .         .         .         .      LXX.
  10936 289.         .     O   .         .         .         .         .         .         .         .         .         .      LXX.
  10938 290.         .     O   .         .         .         .         .         .         .         .         .         .      LXX.
  10940 291. . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
  10942 292.         .    O    .         .         .         .         .         .         .         .         .         .      LXX.
  10944 293.         .    O    .         .         .         .         .         .         .         .         .         .      LXX.
  10946 294.         .    O    .         .         .         .         .         .         .         .         .         .      LXX.
  10948 295.         .    O    .         .         .         .         .         .         .         .         .         .      LXX.
  10950 296.         .    O    .         .         .         .         .         .         .         .         .         .      LXX.
  10952 297.         .   O     .         .         .         .         .         .         .         .         .         .      LXX.
  10954 298.         .   O     .         .         .         .         .         .         .         .         .         .      LXX.
  10956 299.         .   O     .         .         .         .         .         .         .         .         .         .      LXX.
  10958 300.---------.---O-----.---------.---------.---------.---------.---------.---------.---------.---------.---------.------LXX.
1
1                                                          STATION         B

                          (O) OUTFLOW
          0.      200.      400.      600.      800.     1000.     1200.     1400.     1600.        0.        0.        0.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
  10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
  10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
  10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
  10132  47O         .         .         .         .         .         .         .         .         .         .         .         .
  10134  48O         .         .         .         .         .         .         .         .         .         .         .         .
  10136  49O         .         .         .         .         .         .         .         .         .         .         .         .
  10138  50O         .         .         .         .         .         .         .         .         .         .         .         .
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142  52O         .         .         .         .         .         .         .         .         .         .         .         .
  10144  53O         .         .         .         .         .         .         .         .         .         .         .         .
  10146  54O         .         .         .         .         .         .         .         .         .         .         .         .
  10148  55O         .         .         .         .         .         .         .         .         .         .         .         .
  10150  56O         .         .         .         .         .         .         .         .         .         .         .         .
  10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
  10154  58O         .         .         .         .         .         .         .         .         .         .         .         .
  10156  59O         .         .         .         .         .         .         .         .         .         .         .         .
  10158  60O         .         .         .         .         .         .         .         .         .         .         .         .
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10202  62O         .         .         .         .         .         .         .         .         .         .         .         .
  10204  63O         .         .         .         .         .         .         .         .         .         .         .         .
  10206  64O         .         .         .         .         .         .         .         .         .         .         .         .
  10208  65O         .         .         .         .         .         .         .         .         .         .         .         .
  10210  66O         .         .         .         .         .         .         .         .         .         .         .         .
  10212  67O         .         .         .         .         .         .         .         .         .         .         .         .
  10214  68O         .         .         .         .         .         .         .         .         .         .         .         .
  10216  69O         .         .         .         .         .         .         .         .         .         .         .         .
  10218  70O         .         .         .         .         .         .         .         .         .         .         .         .
  10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10222  72O         .         .         .         .         .         .         .         .         .         .         .         .
  10224  73O         .         .         .         .         .         .         .         .         .         .         .         .
  10226  74O         .         .         .         .         .         .         .         .         .         .         .         .
  10228  75O         .         .         .         .         .         .         .         .         .         .         .         .
  10230  76O         .         .         .         .         .         .         .         .         .         .         .         .
  10232  77O         .         .         .         .         .         .         .         .         .         .         .         .
  10234  78O         .         .         .         .         .         .         .         .         .         .         .         .
  10236  79O         .         .         .         .         .         .         .         .         .         .         .         .
  10238  80O         .         .         .         .         .         .         .         .         .         .         .         .
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10240  81O . . .
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10610 186.        .        .        .        .        .   O    .        .        .        .        .        .
10612 187.        .        .        .        .        .  O     .        .        .        .        .        .
10614 188.        .        .        .        .        .  O     .        .        .        .        .        .
10616 189.        .        .        .        .        . O      .        .        .        .        .        .
10618 190.        .        .        .        .        . O      .        .        .        .        .        .
10620 191. . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . .
10622 192.        .        .        .        .        O        .        .        .        .        .        .
10624 193.        .        .        .        .       O.        .        .        .        .        .        .
10626 194.        .        .        .        .      O .        .        .        .        .        .        .
10628 195.        .        .        .        .      O .        .        .        .        .        .        .
10630 196.        .        .        .        .     O  .        .        .        .        .        .        .
10632 197.        .        .        .        .    O   .        .        .        .        .        .        .
10634 198.        .        .        .        .   O    .        .        .        .        .        .        .
10636 199.        .        .        .        .  O     .        .        .        .        .        .        .
10638 200.        .        .        .        .  O     .        .        .        .        .        .        .
10640 201. . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10642 202.        .        .        .        . O      .        .        .        .        .        .        .
10644 203.        .        .        .        . O      .        .        .        .        .        .        .
10646 204.        .        .        .        .O       .        .        .        .        .        .        .
10648 205.        .        .        .        .O       .        .        .        .        .        .        .
10650 206.        .        .        .        O        .        .        .        .        .        .        .
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10654 208.        .        .        .       O.        .        .        .        .        .        .        .
10656 209.        .        .        .      O .        .        .        .        .        .        .        .
10658 210.        .        .        .      O .        .        .        .        .        .        .        .
10700 211. . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10702 212.        .        .        .     O  .        .        .        .        .        .        .        .
10704 213.        .        .        .    O   .        .        .        .        .        .        .        .
10706 214.        .        .        .    O   .        .        .        .        .        .        .        .
10708 215.        .        .        .   O    .        .        .        .        .        .        .        .
10710 216.        .        .        .   O    .        .        .        .        .        .        .        .
10712 217.        .        .        .  O     .        .        .        .        .        .        .        .
10714 218.        .        .        .  O     .        .        .        .        .        .        .        .
10716 219.        .        .        . O      .        .        .        .        .        .        .        .
10718 220.        .        .        . O      .        .        .        .        .        .        .        .
10720 221. . . . . . . . . . . . . . O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10722 222.        .        .        . O      .        .        .        .        .        .        .        .
10724 223.        .        .        .O       .        .        .        .        .        .        .        .
10726 224.        .        .        .O       .        .        .        .        .        .        .        .
10728 225.        .        .        .O       .        .        .        .        .        .        .        .
10730 226.        .        .        O        .        .        .        .        .        .        .        .
10732 227.        .        .        O        .        .        .        .        .        .        .        .
10734 228.        .        .        O        .        .        .        .        .        .        .        .
10736 229.        .        .       O.        .        .        .        .        .        .        .        .
10738 230.        .        .       O.        .        .        .        .        .        .        .        .
10740 231. . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10742 232.        .        .       O.        .        .        .        .        .        .        .        .
10744 233.        .        .      O .        .        .        .        .        .        .        .        .
10746 234.        .        .      O .        .        .        .        .        .        .        .        .
10748 235.        .        .     O  .        .        .        .        .        .        .        .        .
10750 236.        .        .     O  .        .        .        .        .        .        .        .        .
10752 237.        .        .     O  .        .        .        .        .        .        .        .        .
10754 238.        .        .    O   .        .        .        .        .        .        .        .        .
10756 239.        .        .    O   .        .        .        .        .        .        .        .        .
10758 240.        .        .   O    .        .        .        .        .        .        .        .        .
10800 241. . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10802 242.        .        .   O    .        .        .        .        .        .        .        .        .
10804 243.        .        .  O     .        .        .        .        .        .        .        .        .
10806 244.        .        .  O     .        .        .        .        .        .        .        .        .
10808 245.        .        .  O     .        .        .        .        .        .        .        .        .
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10812 247.        .        . O      .        .        .        .        .        .        .        .        .
10814 248.        .        . O      .        .        .        .        .        .        .        .        .
10816 249.        .        . O      .        .        .        .        .        .        .        .        .
10818 250.        .        . O      .        .        .        .        .        .        .        .        .
10820 251. . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10822 252.        .        . O      .        .        .        .        .        .        .        .        .
10824 253.        .        . O      .        .        .        .        .        .        .        .        .
10826 254.        .        . O      .        .        .        .        .        .        .        .        .
10828 255.        .        . O      .        .        .        .        .        .        .        .        .
10830 256.        .        . O      .        .        .        .        .        .        .        .        .
10832 257.        .        .O       .        .        .        .        .        .        .        .        .
10834 258.        .        .O       .        .        .        .        .        .        .        .        .
10836 259.        .        .O       .        .        .        .        .        .        .        .        .
10838 260.        .        .O       .        .        .        .        .        .        .        .        .
10840 261. . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10842 262.        .        .O       .        .        .        .        .        .        .        .        .
10844 263.        .        .O       .        .        .        .        .        .        .        .        .
10846 264.        .        .O       .        .        .        .        .        .        .        .        .
10848 265.        .        .O       .        .        .        .        .        .        .        .        .
10850 266.        .        .O       .        .        .        .        .        .        .        .        .
10852 267.        .        .O       .        .        .        .        .        .        .        .        .
10854 268.        .        .O       .        .        .        .        .        .        .        .        .
10856 269.        .        .O       .        .        .        .        .        .        .        .        .
10858 270.        .        .O       .        .        .        .        .        .        .        .        .
10900 271. . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10902 272.        .        .O       .        .        .        .        .        .        .        .        .
10904 273.        .        .O       .        .        .        .        .        .        .        .        .
10906 274.        .        .O       .        .        .        .        .        .        .        .        .
10908 275.        .        .O       .        .        .        .        .        .        .        .        .
10910 276.        .        .O       .        .        .        .        .        .        .        .        .
10912 277.        .        .O       .        .        .        .        .        .        .        .        .
10914 278.        .        .O       .        .        .        .        .        .        .        .        .
10916 279.        .        O        .        .        .        .        .        .        .        .        .
10918 280.        .        O        .        .        .        .        .        .        .        .        .
10920 281. . . . . . . . . . . . . O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10922 282.        .        O        .        .        .        .        .        .        .        .        .
10924 283.        .        O        .        .        .        .        .        .        .        .        .
10926 284.        .        O        .        .        .        .        .        .        .        .        .
10928 285.        .        O        .        .        .        .        .        .        .        .        .
10930 286.        .       O.        .        .        .        .        .        .        .        .        .
10932 287.        .       O.        .        .        .        .        .        .        .        .        .
10934 288.        .       O.        .        .        .        .        .        .        .        .        .
10936 289.        .       O.        .        .        .        .        .        .        .        .        .
10938 290.        .       O.        .        .        .        .        .        .        .        .        .
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 10940 291. . . . . O . . . . . .
 10942 292.         .         .      O .         .         .         
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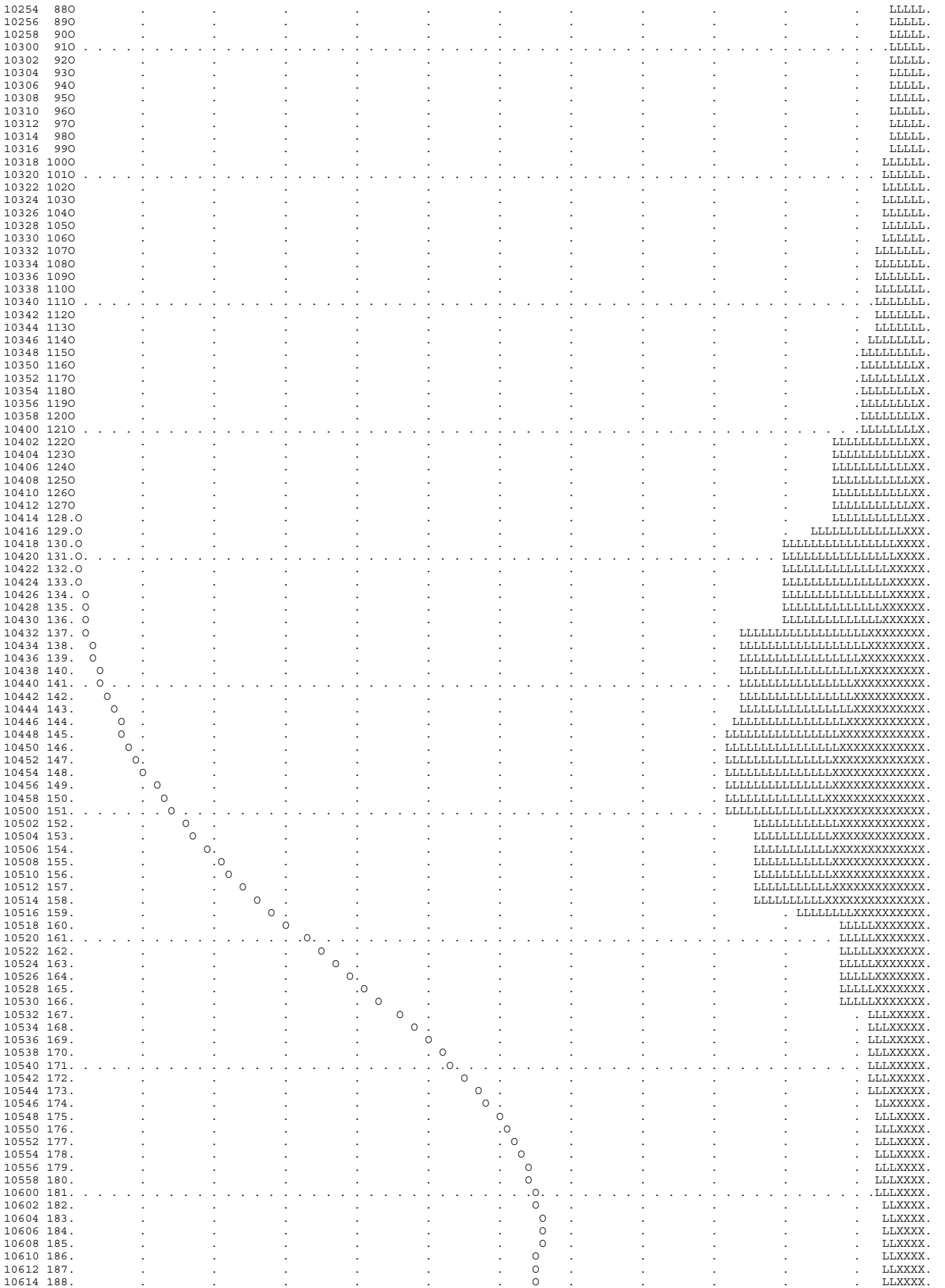

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10624 193.         .         .         .         .         .         . O       .         .         .         .         .   LLXXXX.
10626 194.         .         .         .         .         .         .O        .         .         .         .         .   LLXXXX.
10628 195.         .         .         .         .         .        O          .         .         .         .         .   LLXXXX.
10630 196.         .         .         .         .         .       O.          .         .         .         .         .   LLXXXX.
10632 197.         .         .         .         .         .      O .          .         .         .         .         .   LLXXXX.
10634 198.         .         .         .         .         .     O  .          .         .         .         .         .   LLXXXX.
10636 199.         .         .         .         .         .    O   .          .         .         .         .         .   LLXXXX.
10638 200.         .         .         .         .         .   O    .          .         .         .         .         .   LLXXXX.
10640 201. . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . .
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  10954 298.         .         .  O      .         .         .         .         .         .         .         .         .      LXX.
  10956 299.         .         .  O      .         .         .         .         .         .         .         .         .      LXX.
  10958 300.---------.---------.--O------.---------.---------.---------.---------.---------.---------.---------.---------.------LXX.
1
1                                                                       STATION         B

                             (O) OUTFLOW
            0.       400.      800.     1200.     1600.     2000.     2400.     2800.        0.        0.        0.        0.        0.
 DAHRMN PER
  10000    1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002    2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004    3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006    4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008    5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010    6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012    7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014    8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016    9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018   10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020   11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022   12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024   13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026   14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028   15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030   16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032   17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034   18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036   19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038   20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040   21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042   22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044   23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046   24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048   25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050   26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052   27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054   28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056   29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058   30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100   31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102   32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104   33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106   34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108   35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110   36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112   37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114   38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116   39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118   40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120   41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122   42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124   43O         .         .         .         .         .         .         .         .         .         .         .         .
  10126   44O         .         .         .         .         .         .         .         .         .         .         .         .
  10128   45O         .         .         .         .         .         .         .         .         .         .         .         .
  10130   46O         .         .         .         .         .         .         .         .         .         .         .         .
  10132   47O         .         .         .         .         .         .         .         .         .         .         .         .
  10134   48O         .         .         .         .         .         .         .         .         .         .         .         .
  10136   49O         .         .         .         .         .         .         .         .         .         .         .         .
  10138   50O         .         .         .         .         .         .         .         .         .         .         .         .
  10140   51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142   52O         .         .         .         .         .         .         .         .         .         .         .         .
  10144   53O         .         .         .         .         .         .         .         .         .         .         .         .
  10146   54O         .         .         .         .         .         .         .         .         .         .         .         .
  10148   55O         .         .         .         .         .         .         .         .         .         .         .         .
  10150   56O         .         .         .         .         .         .         .         .         .         .         .         .
  10152   57O         .         .         .         .         .         .         .         .         .         .         .         .
  10154   58O         .         .         .         .         .         .         .         .         .         .         .         .
  10156   59O         .         .         .         .         .         .         .         .         .         .         .         .
  10158   60O         .         .         .         .         .         .         .         .         .         .         .         .
  10200   61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10202   62O         .         .         .         .         .         .         .         .         .         .         .         .
  10204   63O         .         .         .         .         .         .         .         .         .         .         .         .
  10206   64O         .         .         .         .         .         .         .         .         .         .         .         .
  10208   65O         .         .         .         .         .         .         .         .         .         .         .         .
  10210   66O         .         .         .         .         .         .         .         .         .         .         .         .
  10212   67O         .         .         .         .         .         .         .         .         .         .         .         .
  10214   68O         .         .         .         .         .         .         .         .         .         .         .         .
  10216   69O         .         .         .         .         .         .         .         .         .         .         .         .
  10218   70O         .         .         .         .         .         .         .         .         .         .         .         .
  10220   71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10222   72O         .         .         .         .         .         .         .         .         .         .         .         .
  10224   73O         .         .         .         .         .         .         .         .         .         .         .         .
  10226   74O         .         .         .         .         .         .         .         .         .         .         .         .
  10228   75O         .         .         .         .         .         .         .         .         .         .         .         .
  10230   76O         .         .         .         .         .         .         .         .         .         .         .         .
  10232   77O         .         .         .         .         .         .         .         .         .         .         .         .
  10234   78O         .         .         .         .         .         .         .         .         .         .         .         .
  10236   79O         .         .         .         .         .         .         .         .         .         .         .         .
  10238   80O         .         .         .         .         .         .         .         .         .         .         .         .
  10240   81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10242   82O         .         .         .         .         .         .         .         .         .         .         .         .
  10244   83O         .         .         .         .         .         .         .         .         .         .         .         .
  10246   84O         .         .         .         .         .         .         .         .         .         .         .         .
  10248   85O         .         .         .         .         .         .         .         .         .         .         .         .
  10250   86O         .         .         .         .         .         .         .         .         .         .         .         .
  10252   87O         .         .         .         .         .         .         .         .         .         .         .         .
  10254   88O         .         .         .         .         .         .         .         .         .         .         .         .
  10256   89O         .         .         .         .         .         .         .         .         .         .         .         .
  10258   90O         .         .         .         .         .         .         .         .         .         .         .         .
  10300   91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10302   92O         .         .         .         .         .         .         .         .         .         .         .         .
  10304   93O         .         .         .         .         .         .         .         .         .         .         .         .
  10306   94O         .         .         .         .         .         .         .         .         .         .         .         .
  10308   95O         .         .         .         .         .         .         .         .         .         .         .         .
  10310   96O         .         .         .         .         .         .         .         .         .         .         .         .
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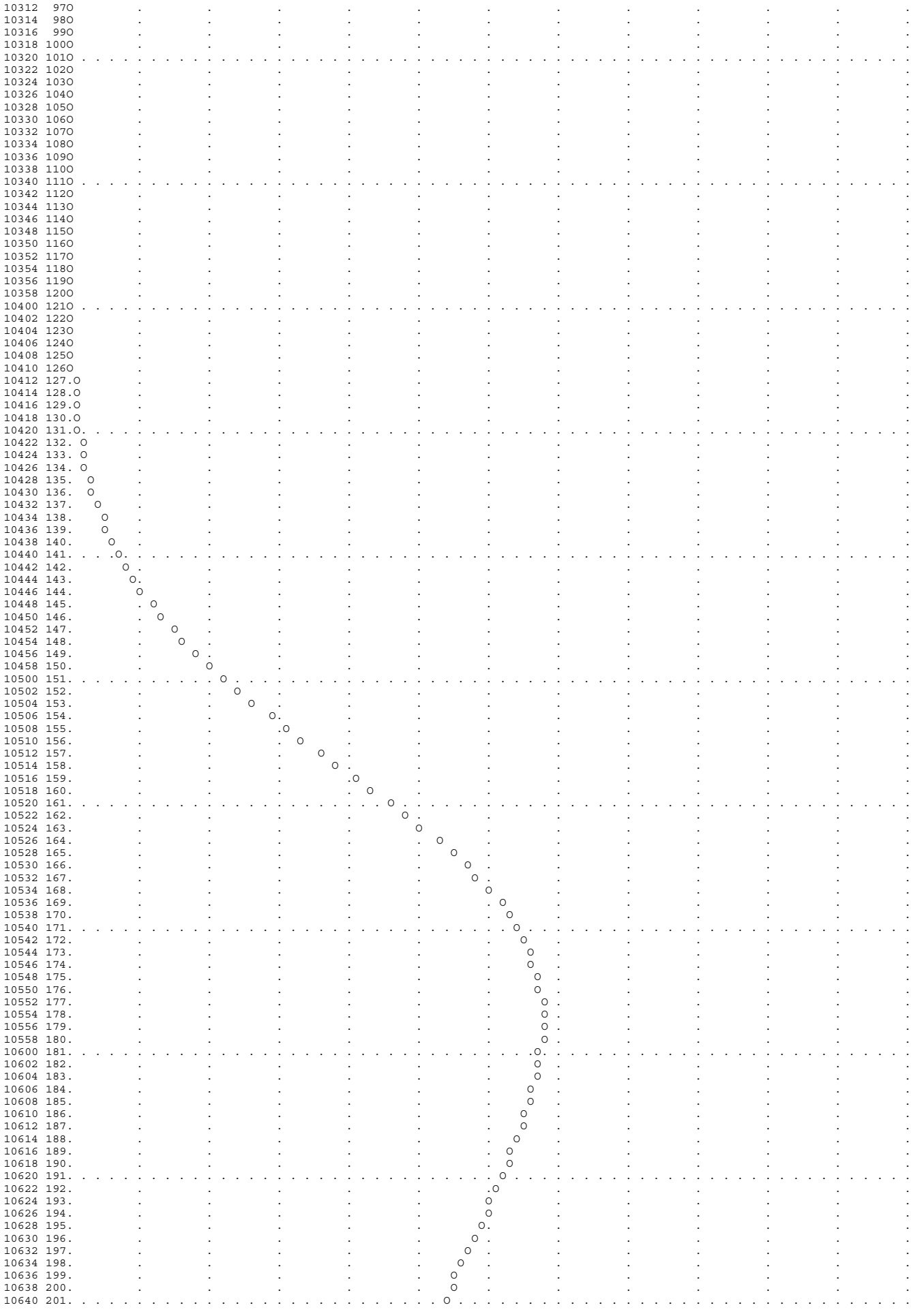

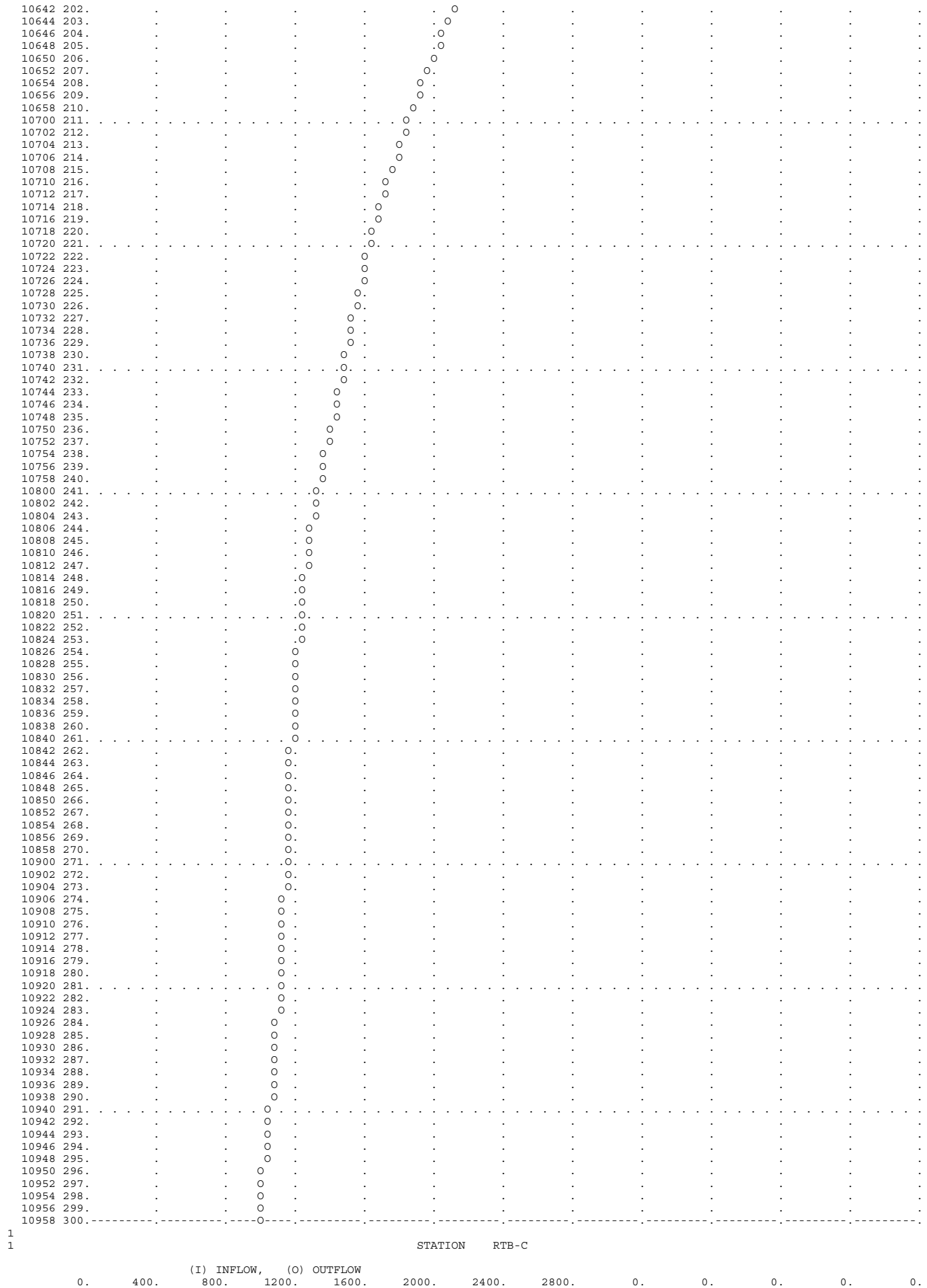
10642 202.
10644 203.
10646 204.
10648 205.
10650 206.
10652 207.
10654 208.
10656 209.
10658 210.
10700 211.
10702 212.
10704 213.
10706 214.
10708 215.
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10712 217.
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10750 236.
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10902 272.
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10906 274.
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10914 278.
10916 279.
10918 280.
10920 281.
10922 282.
10924 283.
10926 284.
10928 285.
10930 286.
10932 287.
10934 288.
10936 289.
10938 290.
10940 291.
10942 292.
10944 293.
10946 294.
10948 295.
10950 296.
10952 297.
10954 298.
10956 299.
10958 300.
1
1
STATION RTB-C
(I) INFLOW, (O) OUTFLOW
0. 400. 800. 1200. 1600. 2000. 2400. 2800. 0. 0. 0. 0. 0.
(S) STORAGE

```
         0.        0.        0.        0.        0.        0.        0.        4.        8.       12.       16.        0.        0.
DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
 10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
 10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
 10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  12I         .         .         .         .         .         S         .         .         .         .         .         .
 10024  13I         .         .         .         .         .         S         .         .         .         .         .         .
 10026  14I         .         .         .         .         .         S         .         .         .         .         .         .
 10028  15I         .         .         .         .         .         S         .         .         .         .         .         .
 10030  16I         .         .         .         .         .         S         .         .         .         .         .         .
 10032  17I         .         .         .         .         .         S         .         .         .         .         .         .
 10034  18I         .         .         .         .         .         S         .         .         .         .         .         .
 10036  19I         .         .         .         .         .         S         .         .         .         .         .         .
 10038  20I         .         .         .         .         .         S         .         .         .         .         .         .
 10040  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10042  22I         .         .         .         .         .         S         .         .         .         .         .         .
 10044  23I         .         .         .         .         .         S         .         .         .         .         .         .
 10046  24I         .         .         .         .         .         S         .         .         .         .         .         .
 10048  25I         .         .         .         .         .         S         .         .         .         .         .         .
 10050  26I         .         .         .         .         .         S         .         .         .         .         .         .
 10052  27I         .         .         .         .         .         S         .         .         .         .         .         .
 10054  28I         .         .         .         .         .         S         .         .         .         .         .         .
 10056  29I         .         .         .         .         .         S         .         .         .         .         .         .
 10058  30I         .         .         .         .         .         S         .         .         .         .         .         .
 10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10102  32I         .         .         .         .         .         S         .         .         .         .         .         .
 10104  33I         .         .         .         .         .         S         .         .         .         .         .         .
 10106  34I         .         .         .         .         .         S         .         .         .         .         .         .
 10108  35I         .         .         .         .         .         S         .         .         .         .         .         .
 10110  36I         .         .         .         .         .         S         .         .         .         .         .         .
 10112  37I         .         .         .         .         .         S         .         .         .         .         .         .
 10114  38I         .         .         .         .         .         S         .         .         .         .         .         .
 10116  39I         .         .         .         .         .         S         .         .         .         .         .         .
 10118  40I         .         .         .         .         .         S         .         .         .         .         .         .
 10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10122  42I         .         .         .         .         .         S         .         .         .         .         .         .
 10124  43I         .         .         .         .         .         S         .         .         .         .         .         .
 10126  44I         .         .         .         .         .         S         .         .         .         .         .         .
 10128  45I         .         .         .         .         .         S         .         .         .         .         .         .
 10130  46I         .         .         .         .         .         S         .         .         .         .         .         .
 10132  47I         .         .         .         .         .         S         .         .         .         .         .         .
 10134  48I         .         .         .         .         .         S         .         .         .         .         .         .
 10136  49I         .         .         .         .         .         S         .         .         .         .         .         .
 10138  50I         .         .         .         .         .         S         .         .         .         .         .         .
 10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10142  52I         .         .         .         .         .         S         .         .         .         .         .         .
 10144  53I         .         .         .         .         .         S         .         .         .         .         .         .
 10146  54I         .         .         .         .         .         S         .         .         .         .         .         .
 10148  55I         .         .         .         .         .         S         .         .         .         .         .         .
 10150  56I         .         .         .         .         .         S         .         .         .         .         .         .
 10152  57I         .         .         .         .         .         S         .         .         .         .         .         .
 10154  58I         .         .         .         .         .         S         .         .         .         .         .         .
 10156  59I         .         .         .         .         .         S         .         .         .         .         .         .
 10158  60I         .         .         .         .         .         S         .         .         .         .         .         .
 10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10202  62I         .         .         .         .         .         S         .         .         .         .         .         .
 10204  63I         .         .         .         .         .         S         .         .         .         .         .         .
 10206  64I         .         .         .         .         .         S         .         .         .         .         .         .
 10208  65I         .         .         .         .         .         S         .         .         .         .         .         .
 10210  66I         .         .         .         .         .         S         .         .         .         .         .         .
 10212  67I         .         .         .         .         .         S         .         .         .         .         .         .
 10214  68I         .         .         .         .         .         S         .         .         .         .         .         .
 10216  69I         .         .         .         .         .         S         .         .         .         .         .         .
 10218  70I         .         .         .         .         .         S         .         .         .         .         .         .
 10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10222  72I         .         .         .         .         .         S         .         .         .         .         .         .
 10224  73I         .         .         .         .         .         S         .         .         .         .         .         .
 10226  74I         .         .         .         .         .         S         .         .         .         .         .         .
 10228  75I         .         .         .         .         .         S         .         .         .         .         .         .
 10230  76I         .         .         .         .         .         S         .         .         .         .         .         .
 10232  77I         .         .         .         .         .         S         .         .         .         .         .         .
 10234  78I         .         .         .         .         .         S         .         .         .         .         .         .
 10236  79I         .         .         .         .         .         S         .         .         .         .         .         .
 10238  80I         .         .         .         .         .         S         .         .         .         .         .         .
 10240  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10242  82I         .         .         .         .         .         S         .         .         .         .         .         .
 10244  83I         .         .         .         .         .         S         .         .         .         .         .         .
 10246  84I         .         .         .         .         .         S         .         .         .         .         .         .
 10248  85I         .         .         .         .         .         S         .         .         .         .         .         .
 10250  86I         .         .         .         .         .         S         .         .         .         .         .         .
 10252  87I         .         .         .         .         .         S         .         .         .         .         .         .
 10254  88I         .         .         .         .         .         S         .         .         .         .         .         .
 10256  89I         .         .         .         .         .         S         .         .         .         .         .         .
 10258  90I         .         .         .         .         .         S         .         .         .         .         .         .
 10300  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10302  92I         .         .         .         .         .         S         .         .         .         .         .         .
 10304  93I         .         .         .         .         .         S         .         .         .         .         .         .
 10306  94I         .         .         .         .         .         S         .         .         .         .         .         .
 10308  95I         .         .         .         .         .         S         .         .         .         .         .         .
 10310  96I         .         .         .         .         .         S         .         .         .         .         .         .
 10312  97I         .         .         .         .         .         S         .         .         .         .         .         .
 10314  98I         .         .         .         .         .         S         .         .         .         .         .         .
 10316  99I         .         .         .         .         .         S         .         .         .         .         .         .
 10318 100I         .         .         .         .         .         S         .         .         .         .         .         .
 10320 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10322 102I         .         .         .         .         .         S         .         .         .         .         .         .
 10324 103I         .         .         .         .         .         S         .         .         .         .         .         .
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10326 104I         .         .         .         .         .         S         .         .         .         .         .         .
10328 105I         .         .         .         .         .         S         .         .         .         .         .         .
10330 106I         .         .         .         .         .         S         .         .         .         .         .         .
10332 107I         .         .         .         .         .         S         .         .         .         .         .         .
10334 108I         .         .         .         .         .         S         .         .         .         .         .         .
10336 109I         .         .         .         .         .         S         .         .         .         .         .         .
10338 110I         .         .         .         .         .         S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I         .         .         .         .         .         S         .         .         .         .         .         .
10344 113I         .         .         .         .         .         S         .         .         .         .         .         .
10346 114I         .         .         .         .         .         S         .         .         .         .         .         .
10348 115I         .         .         .         .         .         S         .         .         .         .         .         .
10350 116I         .         .         .         .         .         S         .         .         .         .         .         .
10352 117I         .         .         .         .         .         S         .         .         .         .         .         .
10354 118I         .         .         .         .         .         S         .         .         .         .         .         .
10356 119I         .         .         .         .         .         S         .         .         .         .         .         .
10358 120I         .         .         .         .         .         S         .         .         .         .         .         .
10400 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122I         .         .         .         .         .         S         .         .         .         .         .         .
10404 123I         .         .         .         .         .         S         .         .         .         .         .         .
10406 124I         .         .         .         .         .         S         .         .         .         .         .         .
10408 125I         .         .         .         .         .         S         .         .         .         .         .         .
10410 126I         .         .         .         .         .         S         .         .         .         .         .         .
10412 127OI        .         .         .         .         .         S         .         .         .         .         .         .
10414 128.I        .         .         .         .         .         S         .         .         .         .         .         .
10416 129.I        .         .         .         .         .         S         .         .         .         .         .         .
10418 130.I        .         .         .         .         .         S         .         .         .         .         .         .
10420 131.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132.OI       .         .         .         .         .         .S        .         .         .         .         .         .
10424 133.OI       .         .         .         .         .         .S        .         .         .         .         .         .
10426 134. I       .         .         .         .         .         .S        .         .         .         .         .         .
10428 135. OI      .         .         .         .         .         .S        .         .         .         .         .         .
10430 136.  I      .         .         .         .         .         .S        .         .         .         .         .         .
10432 137.  OI     .         .         .         .         .         . S       .         .         .         .         .         .
10434 138.   OI    .         .         .         .         .         . S       .         .         .         .         .         .
10436 139.   OI    .         .         .         .         .         . S       .         .         .         .         .         .
10438 140.    OI   .         .         .         .         .         .  S      .         .         .         .         .         .
10440 141. . . OI. . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142.     O I .         .         .         .         .         .  S      .         .         .         .         .         .
10444 143.      O I.         .         .         .         .         .   S     .         .         .         .         .         .
10446 144.       O I         .         .         .         .         .   S     .         .         .         .         .         .
10448 145.         O I       .         .         .         .         .    S    .         .         .         .         .         .
10450 146.         .O I      .         .         .         .         .     S   .         .         .         .         .         .
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10454 148.         .   O I   .         .         .         .         .      S  .         .         .         .         .         .
10456 149.         .    O  I .         .         .         .         .       S .         .         .         .         .         .
10458 150.         .      O  I         .         .         .         .        S.         .         .         .         .         .
10500 151. . . . . . . . . .O. I . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.         .         .O  I     .         .         .         .         .S        .         .         .         .         .
10504 153.         .         .  O  I   .         .         .         .         . S       .         .         .         .         .
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10510 156.         .         .        O.  I      .         .         .         .    S    .         .         .         .         .
10512 157.         .         .         .O    I   .         .         .         .     S   .         .         .         .         .
10514 158.         .         .         .   O   I .         .         .         .       S .         .         .         .         .
10516 159.         .         .         .     O   .I        .         .         .        S.         .         .         .         .
10518 160.         .         .         .        O.  I      .         .         .         S         .         .         .         .
10520 161. . . . . . . . . . . . . . . . . . . .O. . I . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . .
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10524 163.         .         .         .         .     O   I         .         .         .   S     .         .         .         .
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10532 167.         .         .         .         .         .    O  I .         .         .       S .         .         .         .
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10536 169.         .         .         .         .         .       O . I       .         .         S         .         .         .
10538 170.         .         .         .         .         .         O  I      .         .         .S        .         .         .
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. I . . . . . . . . . . . . . . . S . . . . . . . . . . . .
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10544 173.         .         .         .         .         .         .   O I   .         .         .  S      .         .         .
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10556 179.         .         .         .         .         .         .      OI .         .         .    S    .         .         .
10558 180.         .         .         .         .         .         .      OI .         .         .    S    .         .         .
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .I. . . . . . . . . . . . . .S. . . . . . . . . . . . .
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10610 186.         .         .         .         .         .         .    IO   .         .         .   S     .         .         .
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10616 189.         .         .         .         .         .         .  I O    .         .         .   S     .         .         .
10618 190.         .         .         .         .         .         .  IO     .         .         .  S      .         .         .
10620 191. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . . .S. . . . . . . . . . . . . .
10622 192.         .         .         .         .         .         .I O      .         .         .  S      .         .         .
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10626 194.         .         .         .         .         .         IO        .         .         . S       .         .         .
10628 195.         .         .         .         .         .        IO         .         .         .S        .         .         .
10630 196.         .         .         .         .         .       IO.         .         .         .S        .         .         .
10632 197.         .         .         .         .         .      I O.         .         .         S         .         .         .
10634 198.         .         .         .         .         .     I O .         .         .         S         .         .         .
10636 199.         .         .         .         .         .    I O  .         .         .         S         .         .         .
10638 200.         .         .         .         .         .    IO   .         .         .        S.         .         .         .
10640 201. . . . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . .
10642 202.         .         .         .         .         .  IO     .         .         .       S .         .         .         .
10644 203.         .         .         .         .         . I O     .         .         .       S .         .         .         .
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10650 206.         .         .         .         .         IO        .         .         .      S  .         .         .         .
10652 207.         .         .         .         .        I.O        .         .         .     S   .         .         .         .
10654 208.         .         .         .         .       I O         .         .         .     S   .         .         .         .
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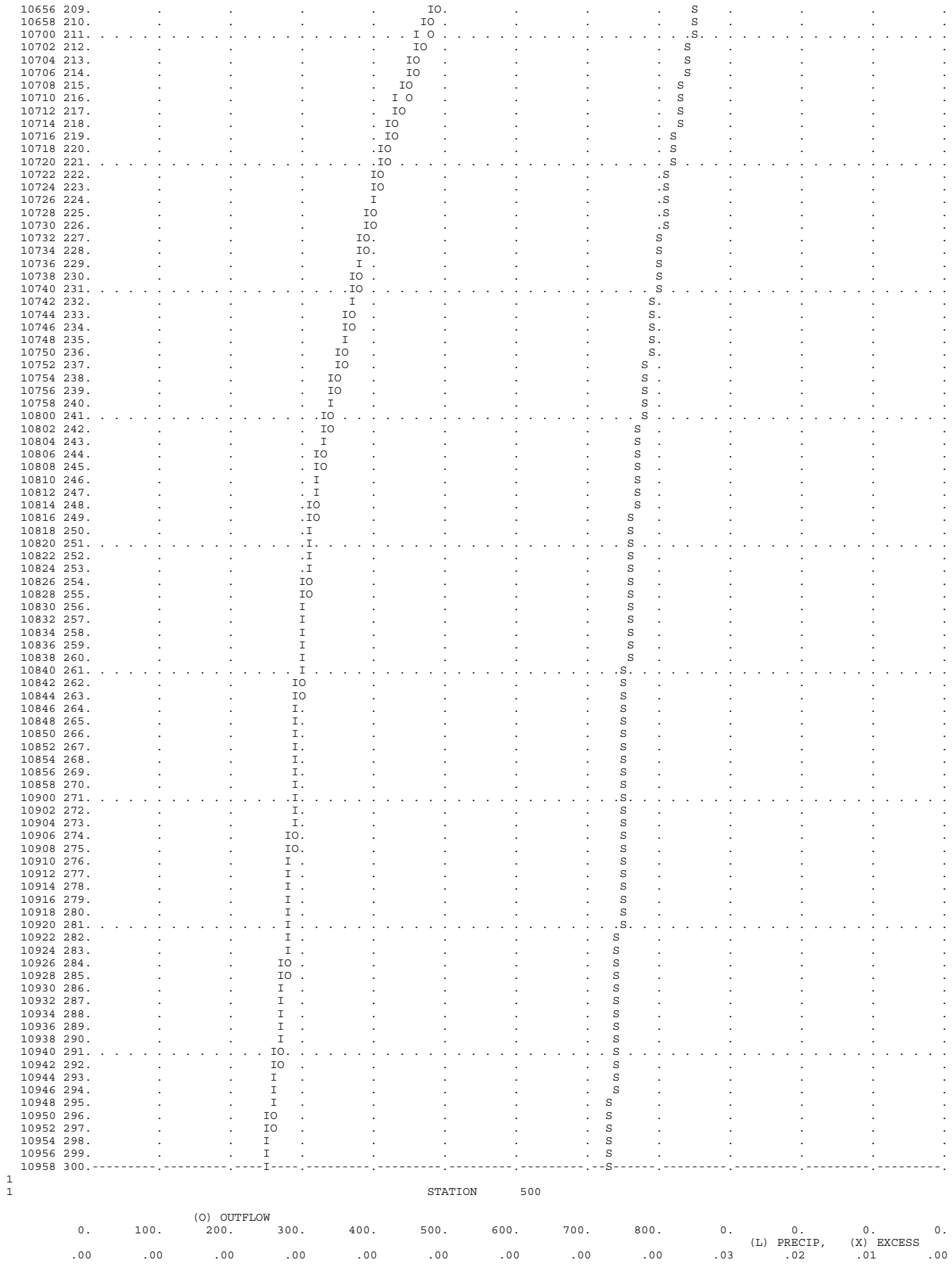
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STATION 500
(O) OUTFLOW
0. 100. 200. 300. 400. 500. 600. 700. 800. 0. 0. 0. 0.
(L) PRECIP, (X) EXCESS
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DAHRMN PER
10000 1O
10002 2O
10004 3O
10006 4O
10008 5O

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10016   9O         .         .         .         .         .         .         .         .         .         .         .         L.
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10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10022  12O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10024  13O         .         .         .         .         .         .         .         .         .         .         .       LLL.
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10028  15O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10030  16O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10032  17O         .         .         .         .         .         .         .         .         .         .         .        LL.
10034  18O         .         .         .         .         .         .         .         .         .         .         .        LL.
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10038  20O         .         .         .         .         .         .         .         .         .         .         .        LL.
10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10042  22O         .         .         .         .         .         .         .         .         .         .         .        LL.
10044  23O         .         .         .         .         .         .         .         .         .         .         .        LL.
10046  24O         .         .         .         .         .         .         .         .         .         .         .        LL.
10048  25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10050  26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10052  27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10054  28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10102  32O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10104  33O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10106  34O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10108  35O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10110  36O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10112  37O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10114  38O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10116  39O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10118  40O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10122  42O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10124  43O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10126  44O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10128  45O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10130  46O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10132  47O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10134  48O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10136  49O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
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10340 111O . . . . . .LLLLLLL.
10342 112O        .        .        .        .        .        .        .        .        .         .  LLLLLLL.
10344 113O        .        .        .        .        .        .        .        .        .         .  LLLLLLL.
10346 114O        .        .        .        .        .        .        .        .        .         . LLLLLLLL.
10348 115O        .        .        .        .        .        .        .        .        .         .LLLLLLLL.
10350 116O        .        .        .        .        .        .        .        .        .         .LLLLLLLL.
10352 117O        .        .        .        .        .        .        .        .        .         .LLLLLLLL.
10354 118O        .        .        .        .        .        .        .        .        .         .LLLLLLLL.
10356 119O        .        .        .        .        .        .        .        .        .         .LLLLLLLL.
10358 120O        .        .        .        .        .        .        .        .        .         .LLLLLLLL.
10400 121O . . . . . .LLLLLLLL.
10402 122O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLL.
10404 123O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLL.
10406 124O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLL.
10408 125O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLL.
10410 126O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLL.
10412 127O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLL.
10414 128O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLL.
10416 129O        .        .        .        .        .        .        .        .        .   LLLLLLLLLLLLLLLL.
10418 130O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLL.
10420 131O . . . . . LLLLLLLLLLLLLLLLLLL.
10422 132O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLL.
10424 133O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLL.
10426 134O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLL.
10428 135O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLL.
10430 136O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLL.
10432 137O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLLLLLLLL.
10434 138O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLLLLLLLX.
10436 139O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLLLLLLLLX.
10438 140O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLLLLLLLLX.
10440 141O . . . . . LLLLLLLLLLLLLLLLLLLLLLLLXX.
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10444 143O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLLLLLLLLXX.
10446 144O        .        .        .        .        .        .        .        .        . LLLLLLLLLLLLLLLLLLLLLLLLXXX.
10448 145.O       .        .        .        .        .        .        .        .        . LLLLLLLLLLLLLLLLLLLLLLLLLXXX.
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10456 149. O      .        .        .        .        .        .        .        .        . LLLLLLLLLLLLLLLLLLLLLLLXXXXX.
10458 150.  O     .        .        .        .        .        .        .        .        . LLLLLLLLLLLLLLLLLLLLLLLXXXXX.
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10502 152.   O    .        .        .        .        .        .        .        .        .    LLLLLLLLLLLLLLLLLLLXXXXX.
10504 153.    O   .        .        .        .        .        .        .        .        .    LLLLLLLLLLLLLLLLLLLXXXXX.
10506 154.      O .        .        .        .        .        .        .        .        .    LLLLLLLLLLLLLLLLLLLXXXXX.
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10512 157.        .O       .        .        .        .        .        .        .        .    LLLLLLLLLLLLLLLLLLLXXXXXX.
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10518 160.         .      O .        .        .        .        .        .        .        .        .       LLLLLLLLLXXX.
10520 161. . . . . .
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  10722 222.         .         .         .         .         .         .O        .         .         .         .         .    LLLXX.
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  10726 224.         .         .         .         .         .         O         .         .         .         .         .    LLLXX.
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  10800 241. . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLXX.
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  10812 247.         .         .         .         .         . O       .         .         .         .         .         .     LLXX.
  10814 248.         .         .         .         .         . O       .         .         .         .         .         .     LLXX.
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  10820 251. . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
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  10824 253.         .         .         .         .         .O        .         .         .         .         .         .     LLXX.
  10826 254.         .         .         .         .         O         .         .         .         .         .         .     LLXX.
  10828 255.         .         .         .         .         O         .         .         .         .         .         .     LLXX.
  10830 256.         .         .         .         .         O         .         .         .         .         .         .     LLXX.
  10832 257.         .         .         .         .         O         .         .         .         .         .         .     LLXX.
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  10836 259.         .         .         .         .         O         .         .         .         .         .         .     LLXX.
  10838 260.         .         .         .         .         O         .         .         .         .         .         .     LLXX.
  10840 261. . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
  10842 262.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10844 263.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10846 264.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10848 265.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10850 266.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10852 267.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10854 268.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10856 269.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10858 270.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10900 271. . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
  10902 272.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10904 273.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10906 274.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10908 275.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10910 276.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10912 277.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10914 278.         .         .         .         .        O.         .         .         .         .         .         .     LLXX.
  10916 279.         .         .         .         .        O.         .         .         .         .         .         .      LXX.
  10918 280.         .         .         .         .        O.         .         .         .         .         .         .      LLX.
  10920 281. . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
  10922 282.         .         .         .         .        O.         .         .         .         .         .         .      LLX.
  10924 283.         .         .         .         .        O.         .         .         .         .         .         .      LLX.
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  10932 287.         .         .         .         .       O .         .         .         .         .         .         .      LLX.
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  10936 289.         .         .         .         .       O .         .         .         .         .         .         .      LLX.
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  10940 291. . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
  10942 292.         .         .         .         .      O  .         .         .         .         .         .         .      LLX.
  10944 293.         .         .         .         .      O  .         .         .         .         .         .         .      LLX.
  10946 294.         .         .         .         .      O  .         .         .         .         .         .         .      LLX.
  10948 295.         .         .         .         .      O  .         .         .         .         .         .         .      LLX.
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  10952 297.         .         .         .         .     O   .         .         .         .         .         .         .      LLX.
  10954 298.         .         .         .         .     O   .         .         .         .         .         .         .      LLX.
  10956 299.         .         .         .         .    O    .         .         .         .         .         .         .      LLX.
  10958 300.---------.---------.---------.---------.----O----.---------.---------.---------.---------.---------.---------.------LLX.
1
1                                                          STATION        C

                          (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.     2800.     3200.     3600.        0.        0.        0.
 DAHRMN PER
  10000    1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002    2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004    3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006    4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008    5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010    6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012    7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014    8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016    9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018   10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020   11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022   12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024   13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026   14O         .         .         .         .         .         .         .         .         .         .         .         .
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10032 17O
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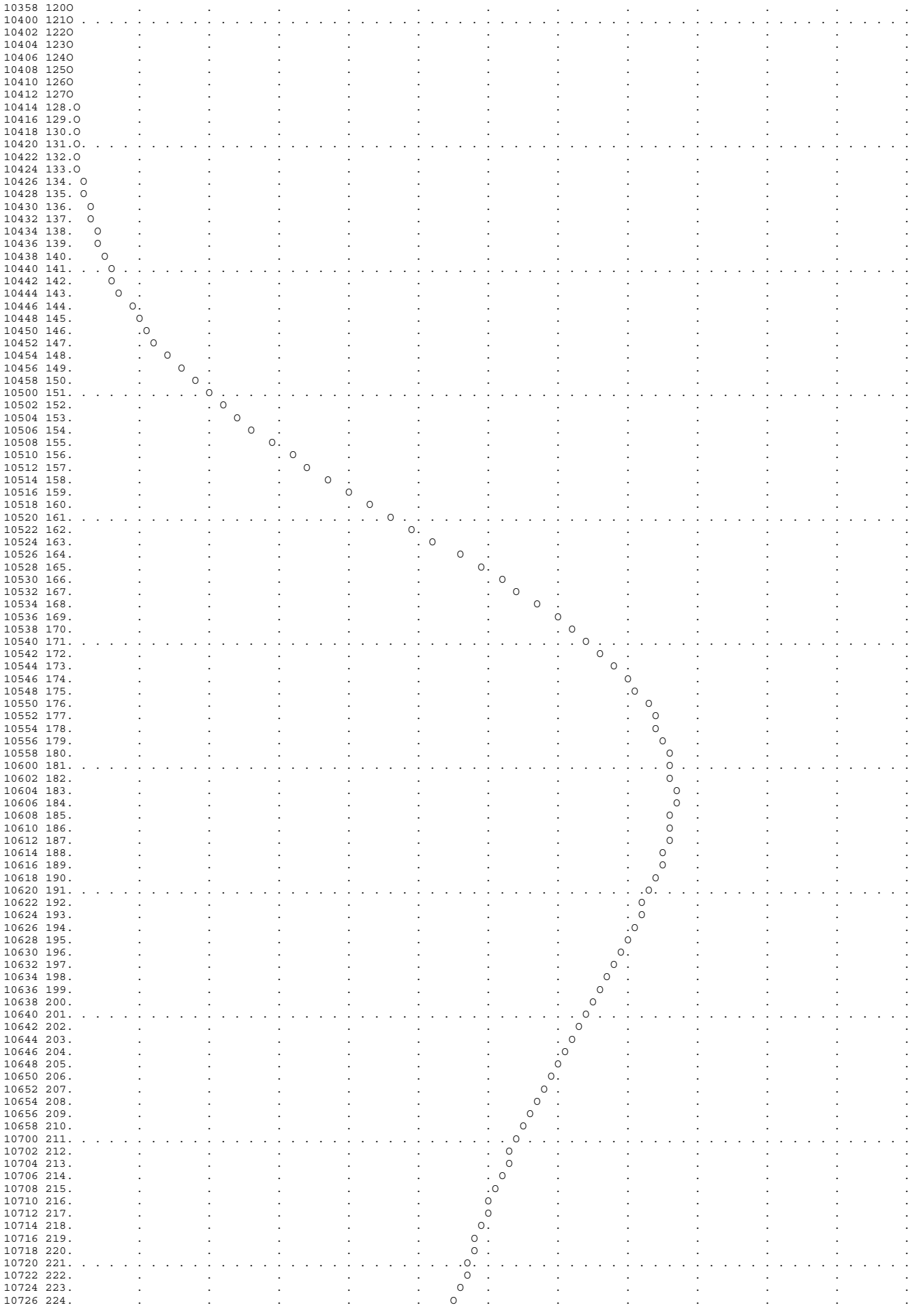
10346 114O
10348 115O
10350 116O
10352 117O
10354 118O
10356 119O



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 10728 225.         .         .         .         .         .    O    .         .         .         .         .         .         .
 10730 226.         .         .         .         .         .   O     .         .         .         .         .         .         .
 10732 227.         .         .         .         .         .   O     .         .         .         .         .         .         .
 10734 228.         .         .         .         .         .  O      .         .         .         .         .         .         .
 10736 229.         .         .         .         .         .  O      .         .         .         .         .         .         .
 10738 230.         .         .         .         .         . O       .         .         .         .         .         .         .
 10740 231. . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10742 232.         .         .         .         .         . O       .         .         .         .         .         .         .
 10744 233.         .         .         .         .         .O        .         .         .         .         .         .         .
 10746 234.         .         .         .         .         .O        .         .         .         .         .         .         .
 10748 235.         .         .         .         .         O         .         .         .         .         .         .         .
 10750 236.         .         .         .         .         O         .         .         .         .         .         .         .
 10752 237.         .         .         .         .        O.         .         .         .         .         .         .         .
 10754 238.         .         .         .         .        O.         .         .         .         .         .         .         .
 10756 239.         .         .         .         .       O .         .         .         .         .         .         .         .
 10758 240.         .         .         .         .       O .         .         .         .         .         .         .         .
 10800 241. . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10802 242.         .         .         .         .      O  .         .         .         .         .         .         .         .
 10804 243.         .         .         .         .      O  .         .         .         .         .         .         .         .
 10806 244.         .         .         .         .     O   .         .         .         .         .         .         .         .
 10808 245.         .         .         .         .     O   .         .         .         .         .         .         .         .
 10810 246.         .         .         .         .     O   .         .         .         .         .         .         .         .
 10812 247.         .         .         .         .    O    .         .         .         .         .         .         .         .
 10814 248.         .         .         .         .    O    .         .         .         .         .         .         .         .
 10816 249.         .         .         .         .    O    .         .         .         .         .         .         .         .
 10818 250.         .         .         .         .   O     .         .         .         .         .         .         .         .
 10820 251. . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10822 252.         .         .         .         .   O     .         .         .         .         .         .         .         .
 10824 253.         .         .         .         .   O     .         .         .         .         .         .         .         .
 10826 254.         .         .         .         .  O      .         .         .         .         .         .         .         .
 10828 255.         .         .         .         .  O      .         .         .         .         .         .         .         .
 10830 256.         .         .         .         .  O      .         .         .         .         .         .         .         .
 10832 257.         .         .         .         .  O      .         .         .         .         .         .         .         .
 10834 258.         .         .         .         .  O      .         .         .         .         .         .         .         .
 10836 259.         .         .         .         . O       .         .         .         .         .         .         .         .
 10838 260.         .         .         .         . O       .         .         .         .         .         .         .         .
 10840 261. . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10842 262.         .         .         .         . O       .         .         .         .         .         .         .         .
 10844 263.         .         .         .         . O       .         .         .         .         .         .         .         .
 10846 264.         .         .         .         . O       .         .         .         .         .         .         .         .
 10848 265.         .         .         .         . O       .         .         .         .         .         .         .         .
 10850 266.         .         .         .         . O       .         .         .         .         .         .         .         .
 10852 267.         .         .         .         . O       .         .         .         .         .         .         .         .
 10854 268.         .         .         .         .O        .         .         .         .         .         .         .         .
 10856 269.         .         .         .         .O        .         .         .         .         .         .         .         .
 10858 270.         .         .         .         .O        .         .         .         .         .         .         .         .
 10900 271. . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10902 272.         .         .         .         .O        .         .         .         .         .         .         .         .
 10904 273.         .         .         .         .O        .         .         .         .         .         .         .         .
 10906 274.         .         .         .         .O        .         .         .         .         .         .         .         .
 10908 275.         .         .         .         .O        .         .         .         .         .         .         .         .
 10910 276.         .         .         .         .O        .         .         .         .         .         .         .         .
 10912 277.         .         .         .         .O        .         .         .         .         .         .         .         .
 10914 278.         .         .         .         .O        .         .         .         .         .         .         .         .
 10916 279.         .         .         .         O         .         .         .         .         .         .         .         .
 10918 280.         .         .         .         O         .         .         .         .         .         .         .         .
 10920 281. . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10922 282.         .         .         .         O         .         .         .         .         .         .         .         .
 10924 283.         .         .         .         O         .         .         .         .         .         .         .         .
 10926 284.         .         .         .         O         .         .         .         .         .         .         .         .
 10928 285.         .         .         .         O         .         .         .         .         .         .         .         .
 10930 286.         .         .         .       O.         .         .         .         .         .         .         .         .
 10932 287.         .         .         .       O.         .         .         .         .         .         .         .         .
 10934 288.         .         .         .       O.         .         .         .         .         .         .         .         .
 10936 289.         .         .         .       O.         .         .         .         .         .         .         .         .
 10938 290.         .         .         .       O.         .         .         .         .         .         .         .         .
 10940 291. . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10942 292.         .         .         .      O .         .         .         .         .         .         .         .         .
 10944 293.         .         .         .      O .         .         .         .         .         .         .         .         .
 10946 294.         .         .         .      O .         .         .         .         .         .         .         .         .
 10948 295.         .         .         .      O .         .         .         .         .         .         .         .         .
 10950 296.         .         .         .     O  .         .         .         .         .         .         .         .         .
 10952 297.         .         .         .     O  .         .         .         .         .         .         .         .         .
 10954 298.         .         .         .     O  .         .         .         .         .         .         .         .         .
 10956 299.         .         .         .     O  .         .         .         .         .         .         .         .         .
 10958 300.---------.---------.---------.-----O---.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                    STATION    RTC-D

                        (I) INFLOW,   (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.     2800.     3200.     3600.        0.        0.        0.
                                                                                  (S) STORAGE
          0.        0.        0.        0.        0.        0.        0.       10.       20.       30.        0.        0.        0.
 DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
 10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
 10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
 10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  12I         .         .         .         .         .         S         .         .         .         .         .         .
 10024  13I         .         .         .         .         .         S         .         .         .         .         .         .
 10026  14I         .         .         .         .         .         S         .         .         .         .         .         .
 10028  15I         .         .         .         .         .         S         .         .         .         .         .         .
 10030  16I         .         .         .         .         .         S         .         .         .         .         .         .
 10032  17I         .         .         .         .         .         S         .         .         .         .         .         .
 10034  18I         .         .         .         .         .         S         .         .         .         .         .         .
 10036  19I         .         .         .         .         .         S         .         .         .         .         .         .
 10038  20I         .         .         .         .         .         S         .         .         .         .         .         .
 10040  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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10042  22I        .         .         .         .         .         S         .         .         .         .         .         .
10044  23I        .         .         .         .         .         S         .         .         .         .         .         .
10046  24I        .         .         .         .         .         S         .         .         .         .         .         .
10048  25I        .         .         .         .         .         S         .         .         .         .         .         .
10050  26I        .         .         .         .         .         S         .         .         .         .         .         .
10052  27I        .         .         .         .         .         S         .         .         .         .         .         .
10054  28I        .         .         .         .         .         S         .         .         .         .         .         .
10056  29I        .         .         .         .         .         S         .         .         .         .         .         .
10058  30I        .         .         .         .         .         S         .         .         .         .         .         .
10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10102  32I        .         .         .         .         .         S         .         .         .         .         .         .
10104  33I        .         .         .         .         .         S         .         .         .         .         .         .
10106  34I        .         .         .         .         .         S         .         .         .         .         .         .
10108  35I        .         .         .         .         .         S         .         .         .         .         .         .
10110  36I        .         .         .         .         .         S         .         .         .         .         .         .
10112  37I        .         .         .         .         .         S         .         .         .         .         .         .
10114  38I        .         .         .         .         .         S         .         .         .         .         .         .
10116  39I        .         .         .         .         .         S         .         .         .         .         .         .
10118  40I        .         .         .         .         .         S         .         .         .         .         .         .
10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10122  42I        .         .         .         .         .         S         .         .         .         .         .         .
10124  43I        .         .         .         .         .         S         .         .         .         .         .         .
10126  44I        .         .         .         .         .         S         .         .         .         .         .         .
10128  45I        .         .         .         .         .         S         .         .         .         .         .         .
10130  46I        .         .         .         .         .         S         .         .         .         .         .         .
10132  47I        .         .         .         .         .         S         .         .         .         .         .         .
10134  48I        .         .         .         .         .         S         .         .         .         .         .         .
10136  49I        .         .         .         .         .         S         .         .         .         .         .         .
10138  50I        .         .         .         .         .         S         .         .         .         .         .         .
10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10142  52I        .         .         .         .         .         S         .         .         .         .         .         .
10144  53I        .         .         .         .         .         S         .         .         .         .         .         .
10146  54I        .         .         .         .         .         S         .         .         .         .         .         .
10148  55I        .         .         .         .         .         S         .         .         .         .         .         .
10150  56I        .         .         .         .         .         S         .         .         .         .         .         .
10152  57I        .         .         .         .         .         S         .         .         .         .         .         .
10154  58I        .         .         .         .         .         S         .         .         .         .         .         .
10156  59I        .         .         .         .         .         S         .         .         .         .         .         .
10158  60I        .         .         .         .         .         S         .         .         .         .         .         .
10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62I        .         .         .         .         .         S         .         .         .         .         .         .
10204  63I        .         .         .         .         .         S         .         .         .         .         .         .
10206  64I        .         .         .         .         .         S         .         .         .         .         .         .
10208  65I        .         .         .         .         .         S         .         .         .         .         .         .
10210  66I        .         .         .         .         .         S         .         .         .         .         .         .
10212  67I        .         .         .         .         .         S         .         .         .         .         .         .
10214  68I        .         .         .         .         .         S         .         .         .         .         .         .
10216  69I        .         .         .         .         .         S         .         .         .         .         .         .
10218  70I        .         .         .         .         .         S         .         .         .         .         .         .
10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72I        .         .         .         .         .         S         .         .         .         .         .         .
10224  73I        .         .         .         .         .         S         .         .         .         .         .         .
10226  74I        .         .         .         .         .         S         .         .         .         .         .         .
10228  75I        .         .         .         .         .         S         .         .         .         .         .         .
10230  76I        .         .         .         .         .         S         .         .         .         .         .         .
10232  77I        .         .         .         .         .         S         .         .         .         .         .         .
10234  78I        .         .         .         .         .         S         .         .         .         .         .         .
10236  79I        .         .         .         .         .         S         .         .         .         .         .         .
10238  80I        .         .         .         .         .         S         .         .         .         .         .         .
10240  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82I        .         .         .         .         .         S         .         .         .         .         .         .
10244  83I        .         .         .         .         .         S         .         .         .         .         .         .
10246  84I        .         .         .         .         .         S         .         .         .         .         .         .
10248  85I        .         .         .         .         .         S         .         .         .         .         .         .
10250  86I        .         .         .         .         .         S         .         .         .         .         .         .
10252  87I        .         .         .         .         .         S         .         .         .         .         .         .
10254  88I        .         .         .         .         .         S         .         .         .         .         .         .
10256  89I        .         .         .         .         .         S         .         .         .         .         .         .
10258  90I        .         .         .         .         .         S         .         .         .         .         .         .
10300  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92I        .         .         .         .         .         S         .         .         .         .         .         .
10304  93I        .         .         .         .         .         S         .         .         .         .         .         .
10306  94I        .         .         .         .         .         S         .         .         .         .         .         .
10308  95I        .         .         .         .         .         S         .         .         .         .         .         .
10310  96I        .         .         .         .         .         S         .         .         .         .         .         .
10312  97I        .         .         .         .         .         S         .         .         .         .         .         .
10314  98I        .         .         .         .         .         S         .         .         .         .         .         .
10316  99I        .         .         .         .         .         S         .         .         .         .         .         .
10318 100I        .         .         .         .         .         S         .         .         .         .         .         .
10320 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102I        .         .         .         .         .         S         .         .         .         .         .         .
10324 103I        .         .         .         .         .         S         .         .         .         .         .         .
10326 104I        .         .         .         .         .         S         .         .         .         .         .         .
10328 105I        .         .         .         .         .         S         .         .         .         .         .         .
10330 106I        .         .         .         .         .         S         .         .         .         .         .         .
10332 107I        .         .         .         .         .         S         .         .         .         .         .         .
10334 108I        .         .         .         .         .         S         .         .         .         .         .         .
10336 109I        .         .         .         .         .         S         .         .         .         .         .         .
10338 110I        .         .         .         .         .         S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I        .         .         .         .         .         S         .         .         .         .         .         .
10344 113I        .         .         .         .         .         S         .         .         .         .         .         .
10346 114I        .         .         .         .         .         S         .         .         .         .         .         .
10348 115I        .         .         .         .         .         S         .         .         .         .         .         .
10350 116I        .         .         .         .         .         S         .         .         .         .         .         .
10352 117I        .         .         .         .         .         S         .         .         .         .         .         .
10354 118I        .         .         .         .         .         S         .         .         .         .         .         .
10356 119I        .         .         .         .         .         S         .         .         .         .         .         .
10358 120I        .         .         .         .         .         S         .         .         .         .         .         .
10400 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122I        .         .         .         .         .         S         .         .         .         .         .         .
10404 123I        .         .         .         .         .         S         .         .         .         .         .         .
10406 124I        .         .         .         .         .         S         .         .         .         .         .         .
10408 125I        .         .         .         .         .         S         .         .         .         .         .         .
10410 126I        .         .         .         .         .         S         .         .         .         .         .         .
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10412 127I         .         .         .         .         .        S         .         .         .         .         .         .
10414 128OI        .         .         .         .         .        S         .         .         .         .         .         .
10416 129OI        .         .         .         .         .        S         .         .         .         .         .         .
10418 130OI        .         .         .         .         .        S         .         .         .         .         .         .
10420 131.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132.I        .         .         .         .         .        S         .         .         .         .         .         .
10424 133.I        .         .         .         .         .        S         .         .         .         .         .         .
10426 134.OI       .         .         .         .         .        S         .         .         .         .         .         .
10428 135.OI       .         .         .         .         .        S         .         .         .         .         .         .
10430 136. OI      .         .         .         .         .        .S        .         .         .         .         .         .
10432 137. OI      .         .         .         .         .        .S        .         .         .         .         .         .
10434 138. O I     .         .         .         .         .        .S        .         .         .         .         .         .
10436 139.  OI     .         .         .         .         .        .S        .         .         .         .         .         .
10438 140.  O I    .         .         .         .         .        .S        .         .         .         .         .         .
10440 141. . O I . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142.   O I   .         .         .         .         .        .S        .         .         .         .         .         .
10444 143.    O I  .         .         .         .         .        . S       .         .         .         .         .         .
10446 144.     O  I.         .         .         .         .        . S       .         .         .         .         .         .
10448 145.      O  I         .         .         .         .        . S       .         .         .         .         .         .
10450 146.       O .I        .         .         .         .        .  S      .         .         .         .         .         .
10452 147.        O. I       .         .         .         .        .  S      .         .         .         .         .         .
10454 148.         O   I     .         .         .         .        .  S      .         .         .         .         .         .
10456 149.         . O   I   .         .         .         .        .   S     .         .         .         .         .         .
10458 150.         .  O   I .         .         .         .        .   S     .         .         .         .         .         .
10500 151. . . . . . . .O. . I . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.         .    O   . I       .         .         .        .    S    .         .         .         .         .         .
10504 153.         .      O .   I     .         .         .        .     S   .         .         .         .         .         .
10506 154.         .        O    I    .         .         .        .      S  .         .         .         .         .         .
10508 155.         .        . O     I.         .         .        .      S  .         .         .         .         .         .
10510 156.         .         .   O   . I        .         .        .       S .         .         .         .         .         .
10512 157.         .         .     O  .   I     .         .        .        S.         .         .         .         .         .
10514 158.         .         .        O     I  .         .        .         S         .         .         .         .         .
10516 159.         .         .         . O     I         .        .         S         .         .         .         .         .
10518 160.         .         .          .   O    .  I    .        .         .S        .         .         .         .         .
10520 161. . . . . . . . . . . . . . . . . . O . . . I . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.         .         .         .        .O      I.        .         .  S      .         .         .         .         .
10524 163.         .         .         .         .   O     . I     .         .   S     .         .         .         .         .
10526 164.         .         .         .         .     O  .    I   .         .    S    .         .         .         .         .
10528 165.         .         .         .         .        O       I.        .     S   .         .         .         .         .
10530 166.         .         .         .         .         .  O      . I      .      S .         .         .         .         .
10532 167.         .         .         .         .         .    O   .   I    .       S .         .         .         .         .
10534 168.         .         .         .         .         .       O.     I  .        S.         .         .         .         .
10536 169.         .         .         .         .         .        .O       I        S         .         .         .         .
10538 170.         .         .         .         .         .        .  O     . I      .S         .         .         .         .
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . I . . . . S . . . . . . . . . . . . . . . . . . . . . . .
10542 172.         .         .         .         .         .        .       O.     I    . S       .         .         .         .
10544 173.         .         .         .         .         .        .        .O      I .  S       .         .         .         .
10546 174.         .         .         .         .         .        .         .  O     I   S       .         .         .         .
10548 175.         .         .         .         .         .        .         .    O   .I   S       .         .         .         .
10550 176.         .         .         .         .         .        .         .     O  .  I S       .         .         .         .
10552 177.         .         .         .         .         .        .         .       O.   I S       .         .         .         .
10554 178.         .         .         .         .         .        .         .        O   I S       .         .         .         .
10556 179.         .         .         .         .         .        .         .        . O  I S       .         .         .         .
10558 180.         .         .         .         .         .        .         .         .  O  IS       .         .         .         .
10600 181. . . . . . . . . . . . . . . . . . . .
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  10742 232.         .         .         .         .         . IO      .         .      S  .         .         .         .         .
  10744 233.         .         .         .         .         .I O      .         .      S  .         .         .         .         .
  10746 234.         .         .         .         .         .IO       .         .      S  .         .         .         .         .
  10748 235.         .         .         .         .         I O       .         .      S  .         .         .         .         .
  10750 236.         .         .         .         .         IO        .         .      S  .         .         .         .         .
  10752 237.         .         .         .         .        I.O        .         .      S  .         .         .         .         .
  10754 238.         .         .         .         .        IO         .         .     S   .         .         .         .         .
  10756 239.         .         .         .         .       I O         .         .     S   .         .         .         .         .
  10758 240.         .         .         .         .       IO.         .         .     S   .         .         .         .         .
  10800 241. . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . .
  10802 242.         .         .         .         .      IO .         .         .     S   .         .         .         .         .
  10804 243.         .         .         .         .      IO .         .         .     S   .         .         .         .         .
  10806 244.         .         .         .         .     I O .         .         .     S   .         .         .         .         .
  10808 245.         .         .         .         .     IO  .         .         .    S    .         .         .         .         .
  10810 246.         .         .         .         .     IO  .         .         .    S    .         .         .         .         .
  10812 247.         .         .         .         .    IO   .         .         .    S    .         .         .         .         .
  10814 248.         .         .         .         .    IO   .         .         .    S    .         .         .         .         .
  10816 249.         .         .         .         .    IO   .         .         .    S    .         .         .         .         .
  10818 250.         .         .         .         .   IO    .         .         .    S    .         .         .         .         .
  10820 251. . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . .
  10822 252.         .         .         .         .   IO    .         .         .    S    .         .         .         .         .
  10824 253.         .         .         .         .   I     .         .         .   S     .         .         .         .         .
  10826 254.         .         .         .         .  IO     .         .         .   S     .         .         .         .         .
  10828 255.         .         .         .         .  IO     .         .         .   S     .         .         .         .         .
  10830 256.         .         .         .         .  IO     .         .         .   S     .         .         .         .         .
  10832 257.         .         .         .         .  I      .         .         .   S     .         .         .         .         .
  10834 258.         .         .         .         .  I      .         .         .   S     .         .         .         .         .
  10836 259.         .         .         .         . IO      .         .         .   S     .         .         .         .         .
  10838 260.         .         .         .         . IO      .         .         .   S     .         .         .         .         .
  10840 261. . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . .
  10842 262.         .         .         .         . IO      .         .         .   S     .         .         .         .         .
  10844 263.         .         .         .         . I       .         .         .   S     .         .         .         .         .
  10846 264.         .         .         .         . I       .         .         .   S     .         .         .         .         .
  10848 265.         .         .         .         . I       .         .         .   S     .         .         .         .         .
  10850 266.         .         .         .         . I       .         .         .   S     .         .         .         .         .
  10852 267.         .         .         .         . I       .         .         .   S     .         .         .         .         .
  10854 268.         .         .         .         .IO       .         .         .   S     .         .         .         .         .
  10856 269.         .         .         .         .IO       .         .         .   S     .         .         .         .         .
  10858 270.         .         .         .         .IO       .         .         .   S     .         .         .         .         .
  10900 271. . . . . . . . . . . . . . . . . . . . .I. . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . .
  10902 272.         .         .         .         .I        .         .         .  S      .         .         .         .         .
  10904 273.         .         .         .         .I        .         .         .  S      .         .         .         .         .
  10906 274.         .         .         .         .I        .         .         .  S      .         .         .         .         .
  10908 275.         .         .         .         .I        .         .         .  S      .         .         .         .         .
  10910 276.         .         .         .         .I        .         .         .  S      .         .         .         .         .
  10912 277.         .         .         .         .I        .         .         .  S      .         .         .         .         .
  10914 278.         .         .         .         .I        .         .         .  S      .         .         .         .         .
  10916 279.         .         .         .         IO        .         .         .  S      .         .         .         .         .
  10918 280.         .         .         .         IO        .         .         .  S      .         .         .         .         .
  10920 281. . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . .
  10922 282.         .         .         .         I         .         .         .  S      .         .         .         .         .
  10924 283.         .         .         .         I         .         .         .  S      .         .         .         .         .
  10926 284.         .         .         .         I         .         .         .  S      .         .         .         .         .
  10928 285.         .         .         .         I         .         .         .  S      .         .         .         .         .
  10930 286.         .         .         .        IO         .         .         .  S      .         .         .         .         .
  10932 287.         .         .         .        IO         .         .         .  S      .         .         .         .         .
  10934 288.         .         .         .        IO         .         .         .  S      .         .         .         .         .
  10936 289.         .         .         .        I.         .         .         .  S      .         .         .         .         .
  10938 290.         .         .         .        I.         .         .         .  S      .         .         .         .         .
  10940 291. . . . . . . . . . . . . . . . . . .I. . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . .
  10942 292.         .         .         .       IO.         .         .         .  S      .         .         .         .         .
  10944 293.         .         .         .       IO.         .         .         .  S      .         .         .         .         .
  10946 294.         .         .         .       I .         .         .         .  S      .         .         .         .         .
  10948 295.         .         .         .       I .         .         .         . S       .         .         .         .         .
  10950 296.         .         .         .      IO .         .         .         . S       .         .         .         .         .
  10952 297.         .         .         .      IO .         .         .         . S       .         .         .         .         .
  10954 298.         .         .         .      IO .         .         .         . S       .         .         .         .         .
  10956 299.         .         .         .      I  .         .         .         . S       .         .         .         .         .
  10958 300.---------.---------.---------.-----IO--.---------.---------.---------.-S-------.---------.---------.---------.---------.
1
1                                                          STATION      600

                          (O) OUTFLOW
          0.        4.        8.       12.       16.       20.       24.        0.        0.        0.        0.        0.        0.
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .00       .03       .02       .01       .00
 DAHRMN PER
  10000    1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002    2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004    3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006    4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008    5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010    6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012    7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014    8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016    9O         .         .         .         .         .         .         .         .         .         .         .        L.
  10018   10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020   11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022   12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024   13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026   14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028   15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030   16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032   17O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10034   18O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10036   19O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10038   20O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10040   21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10042   22O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10044   23O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10046   24O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10048   25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10050   26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10052   27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10054   28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
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10056  29O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10058  30O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10102  32O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10104  33O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10106  34O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10108  35O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10110  36O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10112  37O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10114  38O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10116  39O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10118  40O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10122  42O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10124  43O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10126  44O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10128  45O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10130  46O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10132  47O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10134  48O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10136  49O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10138  50O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10142  52O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10144  53O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10146  54O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10148  55O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10150  56O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10152  57O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10154  58O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10156  59O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10158  60O        .        .        .        .        .        .        .        .        .        .        .      LLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10202  62O        .        .        .        .        .        .        .        .        .        .       LLLL.
10204  63O        .        .        .        .        .        .        .        .        .        .       LLLL.
10206  64O        .        .        .        .        .        .        .        .        .        .       LLLL.
10208  65O        .        .        .        .        .        .        .        .        .        .       LLLL.
10210  66O        .        .        .        .        .        .        .        .        .        .       LLLL.
10212  67O        .        .        .        .        .        .        .        .        .        .       LLLL.
10214  68O        .        .        .        .        .        .        .        .        .        .       LLLL.
10216  69O        .        .        .        .        .        .        .        .        .        .       LLLL.
10218  70O        .        .        .        .        .        .        .        .        .        .       LLLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10222  72O        .        .        .        .        .        .        .        .        .        .       LLLL.
10224  73O        .        .        .        .        .        .        .        .        .        .       LLLL.
10226  74O        .        .        .        .        .        .        .        .        .        .       LLLL.
10228  75O        .        .        .        .        .        .        .        .        .        .       LLLL.
10230  76O        .        .        .        .        .        .        .        .        .        .       LLLL.
10232  77O        .        .        .        .        .        .        .        .        .        .       LLLL.
10234  78O        .        .        .        .        .        .        .        .        .        .       LLLL.
10236  79O        .        .        .        .        .        .        .        .        .        .       LLLL.
10238  80O        .        .        .        .        .        .        .        .        .        .       LLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10242  82O        .        .        .        .        .        .        .        .        .        .       LLLL.
10244  83O        .        .        .        .        .        .        .        .        .        .       LLLL.
10246  84O        .        .        .        .        .        .        .        .        .        .       LLLL.
10248  85O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10250  86O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10252  87O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10254  88O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10256  89O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10258  90O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10302  92O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10304  93O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10306  94O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10308  95O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10310  96O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10312  97O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10314  98O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10316  99O        .        .        .        .        .        .        .        .        .        .      LLLLL.
10318 100O        .        .        .        .        .        .        .        .        .        .     LLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10322 102O        .        .        .        .        .        .        .        .        .        .     LLLLLL.
10324 103O        .        .        .        .        .        .        .        .        .        .     LLLLLL.
10326 104O        .        .        .        .        .        .        .        .        .        .     LLLLLL.
10328 105O        .        .        .        .        .        .        .        .        .        .     LLLLLL.
10330 106O        .        .        .        .        .        .        .        .        .        .     LLLLLL.
10332 107O        .        .        .        .        .        .        .        .        .        .    LLLLLLL.
10334 108O        .        .        .        .        .        .        .        .        .        .    LLLLLLL.
10336 109O        .        .        .        .        .        .        .        .        .        .    LLLLLLL.
10338 110O        .        .        .        .        .        .        .        .        .        .    LLLLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10342 112O        .        .        .        .        .        .        .        .        .        .    LLLLLLL.
10344 113O        .        .        .        .        .        .        .        .        .        .    LLLLLLL.
10346 114O        .        .        .        .        .        .        .        .        .        .   LLLLLLLL.
10348 115O        .        .        .        .        .        .        .        .        .        .  .LLLLLLLL.
10350 116O        .        .        .        .        .        .        .        .        .        .  .LLLLLLLL.
10352 117O        .        .        .        .        .        .        .        .        .        .  .LLLLLLLL.
10354 118O        .        .        .        .        .        .        .        .        .        .  .LLLLLLLL.
10356 119O        .        .        .        .        .        .        .        .        .        .  .LLLLLLLL.
10358 120O        .        .        .        .        .        .        .        .        .        .  .LLLLLLLL.
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLL.
10402 122O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLLL.
10404 123O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLLL.
10406 124O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLLL.
10408 125O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLLL.
10410 126O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLLL.
10412 127O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLLL.
10414 128O        .        .        .        .        .        .        .        .        .     LLLLLLLLLLLLL.
10416 129O        .        .        .        .        .        .        .        .        .   LLLLLLLLLLLLLLLLL.
10418 130O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLLL.
10420 131O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLL.
10422 132O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLLL.
10424 133O        .        .        .        .        .        .        .        .        .  LLLLLLLLLLLLLLLLLLLL.
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10426 134O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLL.
10428 135O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLL.
10430 136O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLL.
10432 137O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLL.
10434 138O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLL.
10436 139O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLL.
10438 140O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLL.
10440 141O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLL.
10442 142O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLL.
10444 143O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLL.
10446 144O         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLLLLLLLLX.
10448 145.O        .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLLLLLLX.
10450 146. O       .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLLLLLLX.
10452 147.  O      .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10454 148.    O    .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10456 149.       O.         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10458 150.         .  O      .         .         .         .         .         .         .         . LLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10500 151. . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10502 152.         .         . O       .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLXXX.
10504 153.         .         .     O   .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLXXX.
10506 154.         .         .         . O       .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLXXX.
10508 155.         .         .         .     O   .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLXXX.
10510 156.         .         .         .         .O        .         .         .         .    LLLLLLLLLLLLLLLLLLLLLXXXX.
10512 157.         .         .         .         .   O     .         .         .         .    LLLLLLLLLLLLLLLLLLLLLXXXX.
10514 158.         .         .         .         .       O.         .         .         .    LLLLLLLLLLLLLLLLLLLLLXXXX.
10516 159.         .         .         .         .         .  O      .         .         .         . LLLLLLLLLLLLLLXXX.
10518 160.         .         .         .         .         .    O    .         .         .         .       LLLLLLLLLLXX.
10520 161. . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . .
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  10756 239.         .         .  O      .         .         .         .         .         .         .         .         .    LLLXX.
  10758 240.         .         .   O     .         .         .         .         .         .         .         .         .    LLLXX.
  10800 241. . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLXX.
  10802 242.         .         .     O   .         .         .         .         .         .         .         .         .     LLLX.
  10804 243.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10806 244.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10808 245.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10810 246.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10812 247.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10814 248.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10816 249.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10818 250.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10820 251. . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLX.
  10822 252.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10824 253.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10826 254.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10828 255.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10830 256.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10832 257.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10834 258.         .         .      O  .         .         .         .         .         .         .         .         .     LLXX.
  10836 259.         .         .      O  .         .         .         .         .         .         .         .         .     LLXX.
  10838 260.         .         .      O  .         .         .         .         .         .         .         .         .     LLXX.
  10840 261. . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
  10842 262.         .         .       O .         .         .         .         .         .         .         .         .     LLXX.
  10844 263.         .         .       O .         .         .         .         .         .         .         .         .     LLXX.
  10846 264.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10848 265.         .         .        O.         .         .         .         .         .         .         .         .     LLLX.
  10850 266.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10852 267.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10854 268.         .         .       O .         .         .         .         .         .         .         .         .     LLLX.
  10856 269.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10858 270.         .         .      O  .         .         .         .         .         .         .         .         .     LLLX.
  10900 271. . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLX.
  10902 272.         .         .     O   .         .         .         .         .         .         .         .         .     LLLX.
  10904 273.         .         .    O    .         .         .         .         .         .         .         .         .     LLLX.
  10906 274.         .         .    O    .         .         .         .         .         .         .         .         .     LLLX.
  10908 275.         .         .    O    .         .         .         .         .         .         .         .         .     LLLX.
  10910 276.         .         .    O    .         .         .         .         .         .         .         .         .     LLLX.
  10912 277.         .         .    O    .         .         .         .         .         .         .         .         .     LLLX.
  10914 278.         .         .     O   .         .         .         .         .         .         .         .         .     LLLX.
  10916 279.         .         .     O   .         .         .         .         .         .         .         .         .      LLX.
  10918 280.         .         .     O   .         .         .         .         .         .         .         .         .      LLX.
  10920 281. . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
  10922 282.         .         .    O    .         .         .         .         .         .         .         .         .      LLX.
  10924 283.         .         .    O    .         .         .         .         .         .         .         .         .      LLX.
  10926 284.         .         .   O     .         .         .         .         .         .         .         .         .      LLX.
  10928 285.         .         .   O     .         .         .         .         .         .         .         .         .      LLX.
  10930 286.         .         .  O      .         .         .         .         .         .         .         .         .      LLX.
  10932 287.         .         . O       .         .         .         .         .         .         .         .         .      LLX.
  10934 288.         .         . O       .         .         .         .         .         .         .         .         .      LLX.
  10936 289.         .         . O       .         .         .         .         .         .         .         .         .      LLX.
  10938 290.         .         . O       .         .         .         .         .         .         .         .         .      LLX.
  10940 291. . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
  10942 292.         .         .O        .         .         .         .         .         .         .         .         .      LLX.
  10944 293.         .         .O        .         .         .         .         .         .         .         .         .      LLX.
  10946 294.         .         .O        .         .         .         .         .         .         .         .         .      LLX.
  10948 295.         .         .O        .         .         .         .         .         .         .         .         .      LLX.
  10950 296.         .         .O        .         .         .         .         .         .         .         .         .      LLX.
  10952 297.         .         .O        .         .         .         .         .         .         .         .         .      LLX.
  10954 298.         .         .O        .         .         .         .         .         .         .         .         .      LLX.
  10956 299.         .         O         .         .         .         .         .         .         .         .         .      LLX.
  10958 300.---------.---------O---------.---------.---------.---------.---------.---------.---------.---------.---------.------LLX.
1
1                                                          STATION              D

                          (O) OUTFLOW
          0.      400.      800.     1200.     1600.     2000.     2400.     2800.     3200.     3600.        0.        0.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
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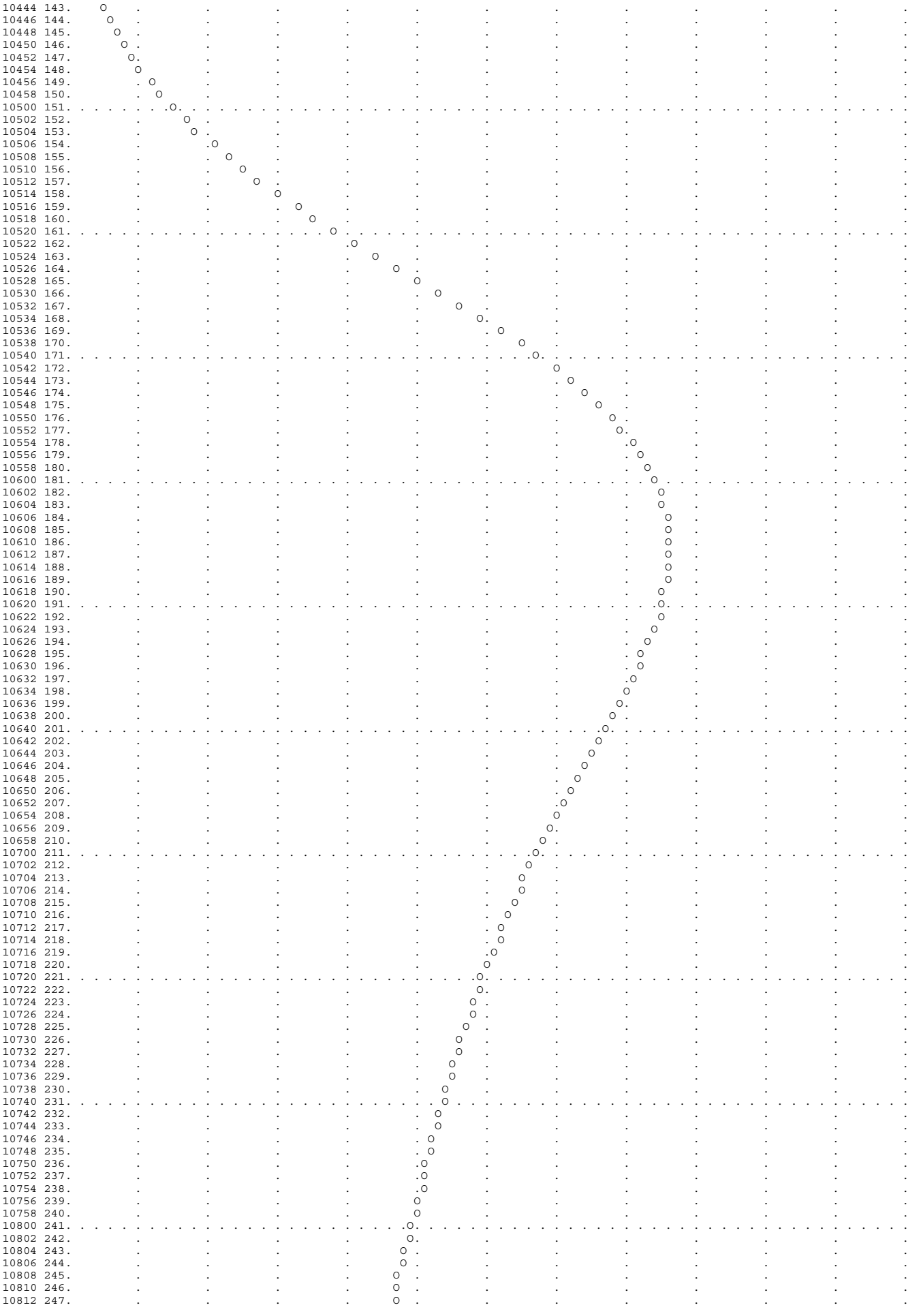
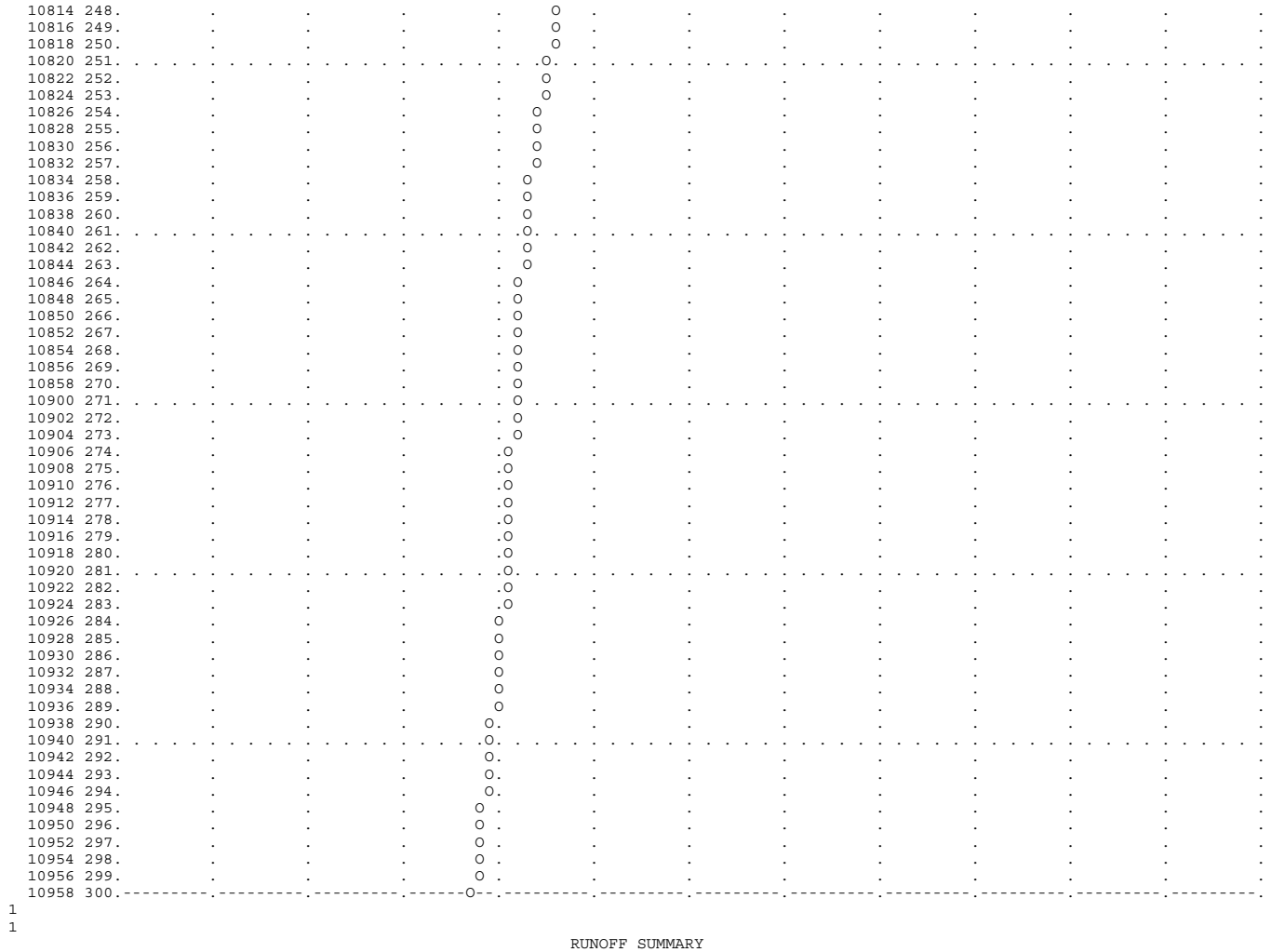
10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
10132  47O         .         .         .         .         .         .         .         .         .         .         .         .
10134  48O         .         .         .         .         .         .         .         .         .         .         .         .
10136  49O         .         .         .         .         .         .         .         .         .         .         .         .
10138  50O         .         .         .         .         .         .         .         .         .         .         .         .
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10142  52O         .         .         .         .         .         .         .         .         .         .         .         .
10144  53O         .         .         .         .         .         .         .         .         .         .         .         .
10146  54O         .         .         .         .         .         .         .         .         .         .         .         .
10148  55O         .         .         .         .         .         .         .         .         .         .         .         .
10150  56O         .         .         .         .         .         .         .         .         .         .         .         .
10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
10154  58O         .         .         .         .         .         .         .         .         .         .         .         .
10156  59O         .         .         .         .         .         .         .         .         .         .         .         .
10158  60O         .         .         .         .         .         .         .         .         .         .         .         .
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62O         .         .         .         .         .         .         .         .         .         .         .         .
10204  63O         .         .         .         .         .         .         .         .         .         .         .         .
10206  64O         .         .         .         .         .         .         .         .         .         .         .         .
10208  65O         .         .         .         .         .         .         .         .         .         .         .         .
10210  66O         .         .         .         .         .         .         .         .         .         .         .         .
10212  67O         .         .         .         .         .         .         .         .         .         .         .         .
10214  68O         .         .         .         .         .         .         .         .         .         .         .         .
10216  69O         .         .         .         .         .         .         .         .         .         .         .         .
10218  70O         .         .         .         .         .         .         .         .         .         .         .         .
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72O         .         .         .         .         .         .         .         .         .         .         .         .
10224  73O         .         .         .         .         .         .         .         .         .         .         .         .
10226  74O         .         .         .         .         .         .         .         .         .         .         .         .
10228  75O         .         .         .         .         .         .         .         .         .         .         .         .
10230  76O         .         .         .         .         .         .         .         .         .         .         .         .
10232  77O         .         .         .         .         .         .         .         .         .         .         .         .
10234  78O         .         .         .         .         .         .         .         .         .         .         .         .
10236  79O         .         .         .         .         .         .         .         .         .         .         .         .
10238  80O         .         .         .         .         .         .         .         .         .         .         .         .
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82O         .         .         .         .         .         .         .         .         .         .         .         .
10244  83O         .         .         .         .         .         .         .         .         .         .         .         .
10246  84O         .         .         .         .         .         .         .         .         .         .         .         .
10248  85O         .         .         .         .         .         .         .         .         .         .         .         .
10250  86O         .         .         .         .         .         .         .         .         .         .         .         .
10252  87O         .         .         .         .         .         .         .         .         .         .         .         .
10254  88O         .         .         .         .         .         .         .         .         .         .         .         .
10256  89O         .         .         .         .         .         .         .         .         .         .         .         .
10258  90O         .         .         .         .         .         .         .         .         .         .         .         .
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92O         .         .         .         .         .         .         .         .         .         .         .         .
10304  93O         .         .         .         .         .         .         .         .         .         .         .         .
10306  94O         .         .         .         .         .         .         .         .         .         .         .         .
10308  95O         .         .         .         .         .         .         .         .         .         .         .         .
10310  96O         .         .         .         .         .         .         .         .         .         .         .         .
10312  97O         .         .         .         .         .         .         .         .         .         .         .         .
10314  98O         .         .         .         .         .         .         .         .         .         .         .         .
10316  99O         .         .         .         .         .         .         .         .         .         .         .         .
10318 100O         .         .         .         .         .         .         .         .         .         .         .         .
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102O         .         .         .         .         .         .         .         .         .         .         .         .
10324 103O         .         .         .         .         .         .         .         .         .         .         .         .
10326 104O         .         .         .         .         .         .         .         .         .         .         .         .
10328 105O         .         .         .         .         .         .         .         .         .         .         .         .
10330 106O         .         .         .         .         .         .         .         .         .         .         .         .
10332 107O         .         .         .         .         .         .         .         .         .         .         .         .
10334 108O         .         .         .         .         .         .         .         .         .         .         .         .
10336 109O         .         .         .         .         .         .         .         .         .         .         .         .
10338 110O         .         .         .         .         .         .         .         .         .         .         .         .
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112O         .         .         .         .         .         .         .         .         .         .         .         .
10344 113O         .         .         .         .         .         .         .         .         .         .         .         .
10346 114O         .         .         .         .         .         .         .         .         .         .         .         .
10348 115O         .         .         .         .         .         .         .         .         .         .         .         .
10350 116O         .         .         .         .         .         .         .         .         .         .         .         .
10352 117O         .         .         .         .         .         .         .         .         .         .         .         .
10354 118O         .         .         .         .         .         .         .         .         .         .         .         .
10356 119O         .         .         .         .         .         .         .         .         .         .         .         .
10358 120O         .         .         .         .         .         .         .         .         .         .         .         .
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122O         .         .         .         .         .         .         .         .         .         .         .         .
10404 123O         .         .         .         .         .         .         .         .         .         .         .         .
10406 124O         .         .         .         .         .         .         .         .         .         .         .         .
10408 125O         .         .         .         .         .         .         .         .         .         .         .         .
10410 126O         .         .         .         .         .         .         .         .         .         .         .         .
10412 127O         .         .         .         .         .         .         .         .         .         .         .         .
10414 128O         .         .         .         .         .         .         .         .         .         .         .         .
10416 129O         .         .         .         .         .         .         .         .         .         .         .         .
10418 130O         .         .         .         .         .         .         .         .         .         .         .         .
10420 131.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132.O        .         .         .         .         .         .         .         .         .         .         .         .
10424 133.O        .         .         .         .         .         .         .         .         .         .         .         .
10426 134.O        .         .         .         .         .         .         .         .         .         .         .         .
10428 135.O        .         .         .         .         .         .         .         .         .         .         .         .
10430 136. O       .         .         .         .         .         .         .         .         .         .         .         .
10432 137. O       .         .         .         .         .         .         .         .         .         .         .         .
10434 138. O       .         .         .         .         .         .         .         .         .         .         .         .
10436 139.  O      .         .         .         .         .         .         .         .         .         .         .         .
10438 140.  O      .         .         .         .         .         .         .         .         .         .         .         .
10440 141. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142.   O     .         .         .         .         .         .         .         .         .         .         .         .
```





1
1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	100(A)	823.	5.37	290.	175.	175.	3.50		
+	HYDROGRAPH AT	200(A)	614.	5.77	272.	164.	164.	4.90		
+	2 COMBINED AT	A	1306.	5.47	562.	338.	338.	8.40		
+	ROUTED TO	RTA-B	972.	5.97	523.	315.	315.	8.40		
+									80.69	5.97
+	HYDROGRAPH AT	300	620.	5.53	241.	145.	145.	3.40		
+	2 COMBINED AT	B	1492.	5.70	764.	460.	460.	11.80		
+	HYDROGRAPH AT	400	1313.	6.10	646.	389.	389.	8.60		
+	2 COMBINED AT	B	2707.	5.93	1410.	849.	849.	20.40		
+	ROUTED TO	RTB-C	2699.	6.00	1400.	843.	843.	20.40		
+									30.17	6.00
+	HYDROGRAPH AT	500	801.	6.27	448.	270.	270.	14.10		
+	2 COMBINED AT	C	3462.	6.07	1848.	1113.	1113.	34.50		
+	ROUTED TO	RTC-D	3436.	6.20	1824.	1098.	1098.	34.50		
+									10.99	6.20
+	HYDROGRAPH AT	600	24.	5.37	10.	6.	6.	.40		

```
          2 COMBINED AT
+                              D      3449.    6.20        1834.       1104.       1104.      34.90


 *** NORMAL END OF HEC-1 ***
```

1.3-YEAR STORM EVENT
1.5” Precipitation

```
1****************************************                                                    ****************************************
 *                                      *                                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                *                                                    *          609 SECOND STREET           *
 *                                      *                                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   29MAR13  TIME  11:27:45  *                                                    *           (916) 756-1104             *
 *                                      *                                                    *                                      *
 ****************************************                                                    ****************************************


                                                X     X  XXXXXXX   XXXXX           X
                                                X     X  X        X     X         XX
                                                X     X  X        X               X
                                                XXXXXXX  XXXX     X        XXXXX   X
                                                X     X  X        X               X
                                                X     X  X        X     X         X
                                                X     X  XXXXXXX   XXXXX         XXX


          THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

          THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                   HEC-1 INPUT                                                   PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                        *DIAGRAM
             1          ID   El Camino Real Bridge Construction Project,
             2          ID   1.5", 24-HR STORM EVENT
             3          ID   ECR2415.HC1, 3/29/2012
 *** FREE ***
             4          IT       2       0       0     300
             5          IO       5       2

             6          KK  100(A)  BASIN 100
             7          IN      15
             8          PB     1.5
             9          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
            10          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
            11          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
            12          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
            13          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
            14          BA     3.5
            15          LS       0      85
            16          UD    .306
                        *

            17          KK  200(A)  BASIN 200
            18          IN      15
            19          PB     1.5
            20          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
            21          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
            22          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
            23          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
            24          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
            25          BA     4.9
            26          LS       0      80
            27          UD    .645
                        *

            28          KK       A    100+200
            29          HC       2
                        *

            30          KK   RTA-B
            31          KM   ROUTE BASIN 100 AND 200 THROUGH BASIN 300
            32          RS       1    STOR      -1
            33          RC    0.04   0.035    0.04 12081.5   0.003     160
            34          RX       0   156.5   365.2   533.8   754.0   856.5  1123.8  1316.9
            35          RY     160     140     100      80      80     100     140     144
                        *

            36          KK     300  BASIN 300
            37          IN      15
            38          PB     1.5
            39          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
            40          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
            41          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
            42          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
            43          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
            44          BA     3.4
1                                                   HEC-1 INPUT                                                   PAGE  2

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            45          LS       0      83
            46          UD    .466
                        *

            47          KK       B    100+200+300
            48          HC       2
                        *
```

```
 49          KK     400  BASIN 400
 50          IN      15
 51          PB     1.5
 52          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 53          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 54          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 55          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 56          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 57          BA     8.6
 58          LS       0      85
 59          UD    1.02
             *

 60          KK       B    100+200+300+400
 61          HC       2
             *

 62          KK   RTB-C
 63          KM   ROUTE BASIN 100, 200, 300 AND 400 THROUGH BASIN 500
 64          RS       1    STOR      -1
 65          RC   0.035   0.030   0.035    2575   0.020      85
 66          RX       0   278.5   449.2  2891.2  3704.9    4382  4468.6  4602.3
 67          RY      85      80      40      30      30      35      40      80
             *

 68          KK     500  BASIN 500
 69          IN      15
 70          PB     1.5
 71          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 72          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 73          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 74          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 75          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 76          BA    14.1
 77          LS       0      74
 78          UD   0.937
             *

 79          KK       C    100+200+300+400+500
 80          HC       2
             *
```



```
       LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 81          KK   RTC-D
 82          KM   ROUTE BASIN 100, 200, 300, 400 AND 500 THROUGH BASIN 600
 83          RS       1    STOR      -1
 84          RC    0.04   0.035    0.04  1682.3   0.001     220
 85          RX       0   484.1   726.3  2184.9  2424.5  3660.5  3767.9  4120.6
 86          RY     107      80      40      10      10      40      80     220
             *

 87          KK     600  BASIN 600
 88          IN      15
 89          PB     1.5
 90          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 91          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 92          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 93          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 94          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 95          BA     0.4
 96          LS       0      70
 97          UD   0.190
             *

 98          KK       D
 99          HC       2
100          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6      100(A)
                .
                .
    17          .      200(A)
                .           .
                .           .
    28          A............
                V
                V
    30       RTA-B
                .
                .
    36          .         300
                .           .
                .           .
    47          B............
                .
                .
    49          .         400
                .           .
                .           .
    60          B............
                V
                V
    62       RTB-C
                .
                .
    68          .         500
```

```
                .          .
                .          .
   79           C...........
                V
                V
   81        RTC-D
                .
                .
   87           .         600
                .          .
                .          .
   98           D...........

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                                    ****************************************
 *                                      *                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                    *          609 SECOND STREET           *
 *                                      *                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   29MAR13  TIME  11:27:45  *                                    *           (916) 756-1104             *
 *                                      *                                    *                                      *
 ****************************************                                    ****************************************


                           El Camino Real Bridge Construction Project,
                           1.5", 24-HR STORM EVENT
                           ECR2415.HC1, 3/29/2012

   5 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           5  PRINT CONTROL
                       IPLOT           2  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN           2  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1    0  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1    0  ENDING DATE
                      NDTIME        0958  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .03 HOURS
                       TOTAL TIME BASE    9.97 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT
1                                                   STATION   100(A)

                        (O) OUTFLOW
          0.      100.      200.      300.      400.      500.        0.        0.        0.        0.        0.        0.        0.
                                                                                                      (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .00       .03       .02       .01       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         L.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .        LL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
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10122  42O         .         .         .         .         .         .         .         .         .         .         .       LL.
10124  43O         .         .         .         .         .         .         .         .         .         .         .       LL.
10126  44O         .         .         .         .         .         .         .         .         .         .         .       LL.
10128  45O         .         .         .         .         .         .         .         .         .         .         .       LL.
10130  46O         .         .         .         .         .         .         .         .         .         .         .       LL.
10132  47O         .         .         .         .         .         .         .         .         .         .         .       LL.
10134  48O         .         .         .         .         .         .         .         .         .         .         .       LL.
10136  49O         .         .         .         .         .         .         .         .         .         .         .       LL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .       LL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .       LL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .       LL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .       LL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .       LL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .       LL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .       LL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .       LL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .       LL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .       LL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10352 117O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10354 118O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10356 119O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10358 120O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10404 123O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10406 124O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10408 125O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10410 126O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10412 127O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10414 128O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLX.
10416 129O         .         .         .         .         .         .         .         .         .         .      LLLLLLLLLLLX.
10418 130.O        .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLX.
10420 131.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLLLX.
10422 132.O        .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10424 133. O       .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10426 134. O       .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10428 135.  O      .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10430 136.   O     .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10432 137.    O    .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXX.
10434 138.     O   .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXX.
10436 139.      O  .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXX.
10438 140.       O .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXX.
10440 141. . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLLLLXXXXX.
10442 142.         .O        .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXXX.
10444 143.         .  O      .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXXX.
10446 144.         .   O     .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXX.
10448 145.         .     O   .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXX.
10450 146.         .      O  .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXXX.
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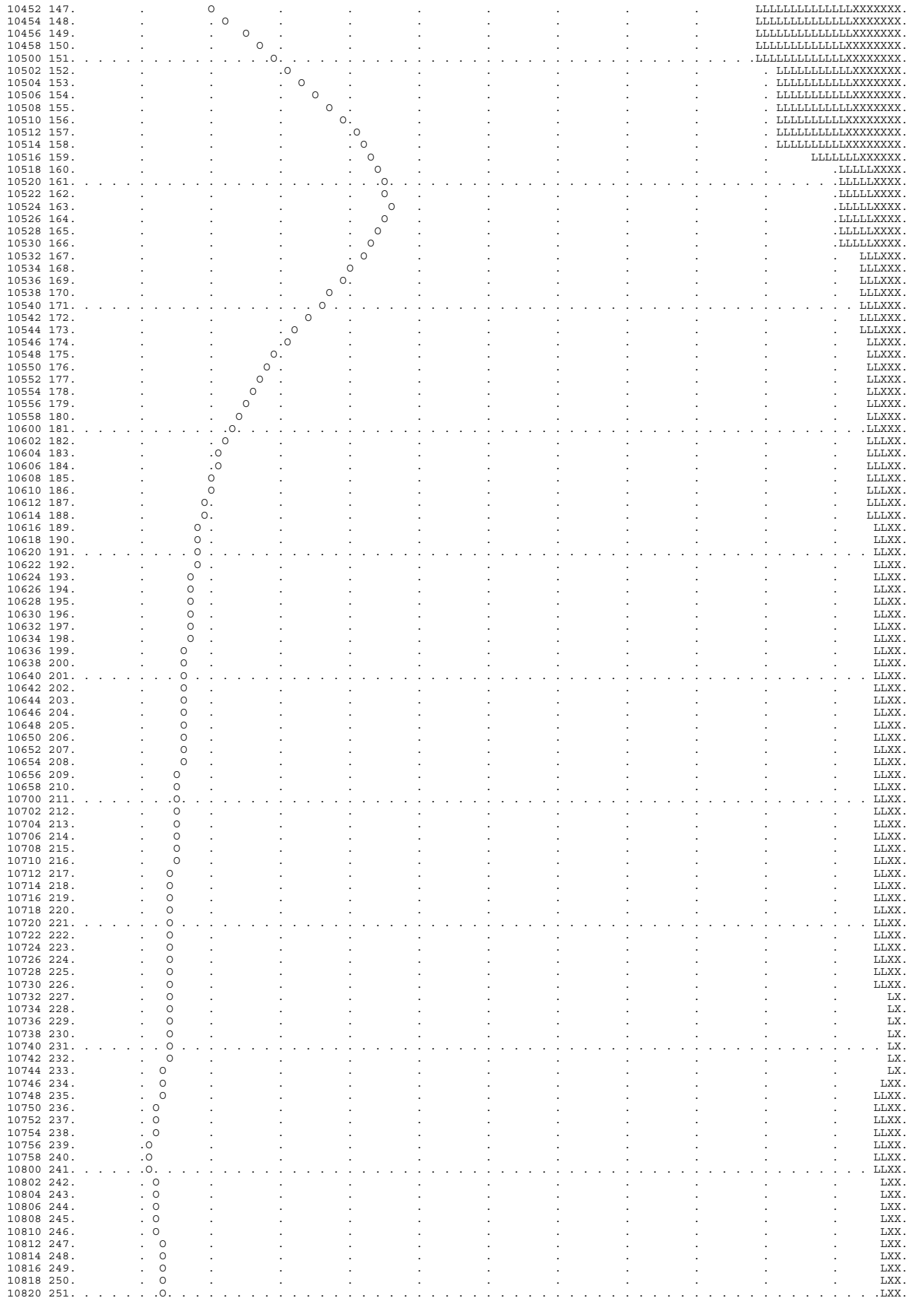

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 10840 261. . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LXX.
 10842 262.         .  O      .         .         .         .         .         .         .         .         .         .      LXX.
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 10852 267.         .  O      .         .         .         .         .         .         .         .         .         .      LXX.
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 10902 272.         . O       .         .         .         .         .         .         .         .         .         .      LXX.
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 10906 274.         . O       .         .         .         .         .         .         .         .         .         .      LXX.
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 10910 276.         . O       .         .         .         .         .         .         .         .         .         .      LXX.
 10912 277.         . O       .         .         .         .         .         .         .         .         .         .      LXX.
 10914 278.         . O       .         .         .         .         .         .         .         .         .         .      LXX.
 10916 279.         . O       .         .         .         .         .         .         .         .         .         .      LXX.
 10918 280.         . O       .         .         .         .         .         .         .         .         .         .       LX.
 10920 281. . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LX.
 10922 282.         . O       .         .         .         .         .         .         .         .         .         .       LX.
 10924 283.         . O       .         .         .         .         .         .         .         .         .         .       LX.
 10926 284.         .O        .         .         .         .         .         .         .         .         .         .       LX.
 10928 285.         .O        .         .         .         .         .         .         .         .         .         .       LX.
 10930 286.         .O        .         .         .         .         .         .         .         .         .         .       LX.
 10932 287.         .O        .         .         .         .         .         .         .         .         .         .       LX.
 10934 288.         .O        .         .         .         .         .         .         .         .         .         .       LX.
 10936 289.         .O        .         .         .         .         .         .         .         .         .         .       LX.
 10938 290.         O         .         .         .         .         .         .         .         .         .         .       LX.
 10940 291. . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LX.
 10942 292.         O         .         .         .         .         .         .         .         .         .         .       LX.
 10944 293.         O         .         .         .         .         .         .         .         .         .         .       LX.
 10946 294.         O         .         .         .         .         .         .         .         .         .         .       LX.
 10948 295.         O         .         .         .         .         .         .         .         .         .         .       LX.
 10950 296.         O         .         .         .         .         .         .         .         .         .         .       LX.
 10952 297.         O         .         .         .         .         .         .         .         .         .         .       LX.
 10954 298.         O         .         .         .         .         .         .         .         .         .         .       LX.
 10956 299.        O.         .         .         .         .         .         .         .         .         .         .       LX.
 10958 300.--------O.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.-------LX.
1
1                                                        STATION   200(A)

                         (O) OUTFLOW
         0.       40.       80.      120.      160.      200.      240.      280.        0.        0.        0.        0.        0.
                                                                                                       (L) PRECIP,   (X) EXCESS
        .00       .00       .00       .00       .00       .00       .00       .00       .00       .03       .02       .01       .00
DAHRMN PER
 10000    1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10002    2O         .         .         .         .         .         .         .         .         .         .         .         .
 10004    3O         .         .         .         .         .         .         .         .         .         .         .         .
 10006    4O         .         .         .         .         .         .         .         .         .         .         .         .
 10008    5O         .         .         .         .         .         .         .         .         .         .         .         .
 10010    6O         .         .         .         .         .         .         .         .         .         .         .         .
 10012    7O         .         .         .         .         .         .         .         .         .         .         .         .
 10014    8O         .         .         .         .         .         .         .         .         .         .         .         .
 10016    9O         .         .         .         .         .         .         .         .         .         .         .        L.
 10018   10O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10020   11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
 10022   12O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10024   13O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10026   14O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10028   15O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10030   16O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10032   17O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10034   18O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10036   19O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10038   20O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10040   21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
 10042   22O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10044   23O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10046   24O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10048   25O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10050   26O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10052   27O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10054   28O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10056   29O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10058   30O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10100   31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
 10102   32O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10104   33O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10106   34O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10108   35O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10110   36O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10112   37O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10114   38O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10116   39O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10118   40O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10120   41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
 10122   42O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10124   43O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10126   44O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10128   45O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10130   46O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10132   47O         .         .         .         .         .         .         .         .         .         .         .       LL.
 10134   48O         .         .         .         .         .         .         .         .         .         .         .       LL.
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10136  49O         .         .         .         .         .         .         .         .         .         .         .       LL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .       LL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .       LL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .       LL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .       LL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .       LL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .       LL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .       LL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .       LL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .       LL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .       LL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10352 117O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10354 118O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10356 119O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10358 120O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10404 123O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10406 124O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10408 125O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10410 126O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10412 127O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10414 128O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10416 129O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLLL.
10418 130O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10420 131O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLLLL.
10422 132O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10424 133O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10426 134O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10428 135O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10430 136O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10432 137O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLX.
10434 138O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLX.
10436 139O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLX.
10438 140O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLX.
10440 141O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLLLLLLLXX.
10442 142.O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLXX.
10444 143.O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLXX.
10446 144.O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLLXXX.
10448 145. O        .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLXXX.
10450 146. O        .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLXXX.
10452 147.  O       .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLXXX.
10454 148.   O      .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLXXXX.
10456 149.    O     .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLXXXX.
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10502 152.        O         .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLXXXX.
10504 153.         .  O     .         .         .         .         .         .         .         .         . LLLLLLLLLLLLLLXXXX.
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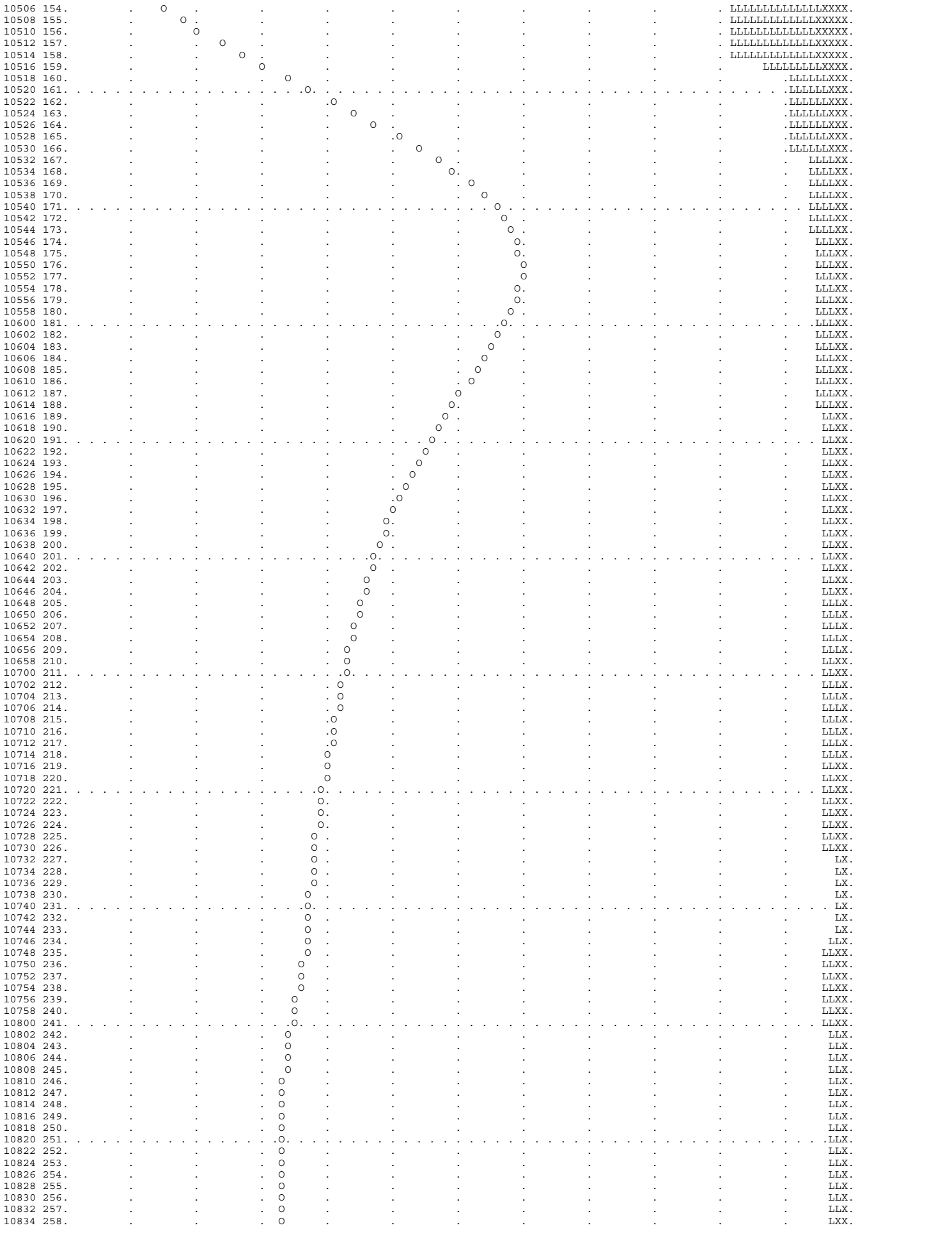

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  10902 272.         .         .         .   O     .         .         .         .         .         .         .         .       LLX.
  10904 273.         .         .         .   O     .         .         .         .         .         .         .         .       LLX.
  10906 274.         .         .         .   O     .         .         .         .         .         .         .         .       LLX.
  10908 275.         .         .         .   O     .         .         .         .         .         .         .         .       LLX.
  10910 276.         .         .         .  O      .         .         .         .         .         .         .         .       LLX.
  10912 277.         .         .         .  O      .         .         .         .         .         .         .         .       LLX.
  10914 278.         .         .         .  O      .         .         .         .         .         .         .         .       LLX.
  10916 279.         .         .         .  O      .         .         .         .         .         .         .         .       LLX.
  10918 280.         .         .         .  O      .         .         .         .         .         .         .         .        LX.
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  10922 282.         .         .         .  O      .         .         .         .         .         .         .         .        LX.
  10924 283.         .         .         .  O      .         .         .         .         .         .         .         .        LX.
  10926 284.         .         .         .  O      .         .         .         .         .         .         .         .        LX.
  10928 285.         .         .         . O       .         .         .         .         .         .         .         .        LX.
  10930 286.         .         .         . O       .         .         .         .         .         .         .         .        LX.
  10932 287.         .         .         . O       .         .         .         .         .         .         .         .        LX.
  10934 288.         .         .         . O       .         .         .         .         .         .         .         .        LX.
  10936 289.         .         .         . O       .         .         .         .         .         .         .         .        LX.
  10938 290.         .         .         .O        .         .         .         .         .         .         .         .        LX.
  10940 291. . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LX.
  10942 292.         .         .         .O        .         .         .         .         .         .         .         .        LX.
  10944 293.         .         .         .O        .         .         .         .         .         .         .         .        LX.
  10946 294.         .         .         O         .         .         .         .         .         .         .         .        LX.
  10948 295.         .         .         O         .         .         .         .         .         .         .         .        LX.
  10950 296.         .         .         O         .         .         .         .         .         .         .         .        LX.
  10952 297.         .         .         O         .         .         .         .         .         .         .         .        LX.
  10954 298.         .         .        O.         .         .         .         .         .         .         .         .        LX.
  10956 299.         .         .        O.         .         .         .         .         .         .         .         .        LX.
  10958 300.---------.---------.--------O.---------.---------.---------.---------.---------.---------.---------.---------.--------LX.
1
1                                                               STATION        A

                         (O) OUTFLOW
          0.      100.      200.      300.      400.      500.      600.      700.        0.        0.        0.        0.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
  10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
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  10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
  10132  47O         .         .         .         .         .         .         .         .         .         .         .         .
  10134  48O         .         .         .         .         .         .         .         .         .         .         .         .
  10136  49O         .         .         .         .         .         .         .         .         .         .         .         .
  10138  50O         .         .         .         .         .         .         .         .         .         .         .         .
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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  10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
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10154  58O        .        .        .        .        .        .        .        .        .        .        .        .
10156  59O        .        .        .        .        .        .        .        .        .        .        .        .
10158  60O        .        .        .        .        .        .        .        .        .        .        .        .
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62O        .        .        .        .        .        .        .        .        .        .        .        .
10204  63O        .        .        .        .        .        .        .        .        .        .        .        .
10206  64O        .        .        .        .        .        .        .        .        .        .        .        .
10208  65O        .        .        .        .        .        .        .        .        .        .        .        .
10210  66O        .        .        .        .        .        .        .        .        .        .        .        .
10212  67O        .        .        .        .        .        .        .        .        .        .        .        .
10214  68O        .        .        .        .        .        .        .        .        .        .        .        .
10216  69O        .        .        .        .        .        .        .        .        .        .        .        .
10218  70O        .        .        .        .        .        .        .        .        .        .        .        .
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72O        .        .        .        .        .        .        .        .        .        .        .        .
10224  73O        .        .        .        .        .        .        .        .        .        .        .        .
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10230  76O        .        .        .        .        .        .        .        .        .        .        .        .
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10234  78O        .        .        .        .        .        .        .        .        .        .        .        .
10236  79O        .        .        .        .        .        .        .        .        .        .        .        .
10238  80O        .        .        .        .        .        .        .        .        .        .        .        .
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82O        .        .        .        .        .        .        .        .        .        .        .        .
10244  83O        .        .        .        .        .        .        .        .        .        .        .        .
10246  84O        .        .        .        .        .        .        .        .        .        .        .        .
10248  85O        .        .        .        .        .        .        .        .        .        .        .        .
10250  86O        .        .        .        .        .        .        .        .        .        .        .        .
10252  87O        .        .        .        .        .        .        .        .        .        .        .        .
10254  88O        .        .        .        .        .        .        .        .        .        .        .        .
10256  89O        .        .        .        .        .        .        .        .        .        .        .        .
10258  90O        .        .        .        .        .        .        .        .        .        .        .        .
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92O        .        .        .        .        .        .        .        .        .        .        .        .
10304  93O        .        .        .        .        .        .        .        .        .        .        .        .
10306  94O        .        .        .        .        .        .        .        .        .        .        .        .
10308  95O        .        .        .        .        .        .        .        .        .        .        .        .
10310  96O        .        .        .        .        .        .        .        .        .        .        .        .
10312  97O        .        .        .        .        .        .        .        .        .        .        .        .
10314  98O        .        .        .        .        .        .        .        .        .        .        .        .
10316  99O        .        .        .        .        .        .        .        .        .        .        .        .
10318 100O        .        .        .        .        .        .        .        .        .        .        .        .
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102O        .        .        .        .        .        .        .        .        .        .        .        .
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10332 107O        .        .        .        .        .        .        .        .        .        .        .        .
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10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112O        .        .        .        .        .        .        .        .        .        .        .        .
10344 113O        .        .        .        .        .        .        .        .        .        .        .        .
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10350 116O        .        .        .        .        .        .        .        .        .        .        .        .
10352 117O        .        .        .        .        .        .        .        .        .        .        .        .
10354 118O        .        .        .        .        .        .        .        .        .        .        .        .
10356 119O        .        .        .        .        .        .        .        .        .        .        .        .
10358 120O        .        .        .        .        .        .        .        .        .        .        .        .
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122O        .        .        .        .        .        .        .        .        .        .        .        .
10404 123O        .        .        .        .        .        .        .        .        .        .        .        .
10406 124O        .        .        .        .        .        .        .        .        .        .        .        .
10408 125O        .        .        .        .        .        .        .        .        .        .        .        .
10410 126O        .        .        .        .        .        .        .        .        .        .        .        .
10412 127O        .        .        .        .        .        .        .        .        .        .        .        .
10414 128O        .        .        .        .        .        .        .        .        .        .        .        .
10416 129O        .        .        .        .        .        .        .        .        .        .        .        .
10418 130.O       .        .        .        .        .        .        .        .        .        .        .        .
10420 131.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132.O       .        .        .        .        .        .        .        .        .        .        .        .
10424 133. O      .        .        .        .        .        .        .        .        .        .        .        .
10426 134. O      .        .        .        .        .        .        .        .        .        .        .        .
10428 135.  O     .        .        .        .        .        .        .        .        .        .        .        .
10430 136.   O    .        .        .        .        .        .        .        .        .        .        .        .
10432 137.    O   .        .        .        .        .        .        .        .        .        .        .        .
10434 138.     O  .        .        .        .        .        .        .        .        .        .        .        .
10436 139.      O .        .        .        .        .        .        .        .        .        .        .        .
10438 140.       O .       .        .        .        .        .        .        .        .        .        .        .
10440 141. . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142.        .O       .        .        .        .        .        .        .        .        .        .        .
10444 143.        .  O     .        .        .        .        .        .        .        .        .        .        .
10446 144.        .    O   .        .        .        .        .        .        .        .        .        .        .
10448 145.        .     O  .        .        .        .        .        .        .        .        .        .        .
10450 146.        .       O.        .        .        .        .        .        .        .        .        .        .
10452 147.        .        . O      .        .        .        .        .        .        .        .        .        .
10454 148.        .         .  O    .        .        .        .        .        .        .        .        .        .
10456 149.        .         .     O .        .        .        .        .        .        .        .        .        .
10458 150.        .         .       O        .        .        .        .        .        .        .        .        .
10500 151. . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.        .         .         .  O   .        .        .        .        .        .        .        .        .
10504 153.        .         .         .     O .        .        .        .        .        .        .        .        .
10506 154.        .         .         .       .O       .        .        .        .        .        .        .        .
10508 155.        .         .         .        .  O    .        .        .        .        .        .        .        .
10510 156.        .         .         .        .    O  .        .        .        .        .        .        .        .
10512 157.        .         .         .        .       O        .        .        .        .        .        .        .
10514 158.        .         .         .        .        .  O    .        .        .        .        .        .        .
10516 159.        .         .         .        .        .   O   .        .        .        .        .        .        .
10518 160.        .         .         .        .        .     O .        .        .        .        .        .        .
10520 161. . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.        .        .        .        .        .        . O      .        .        .        .        .        .
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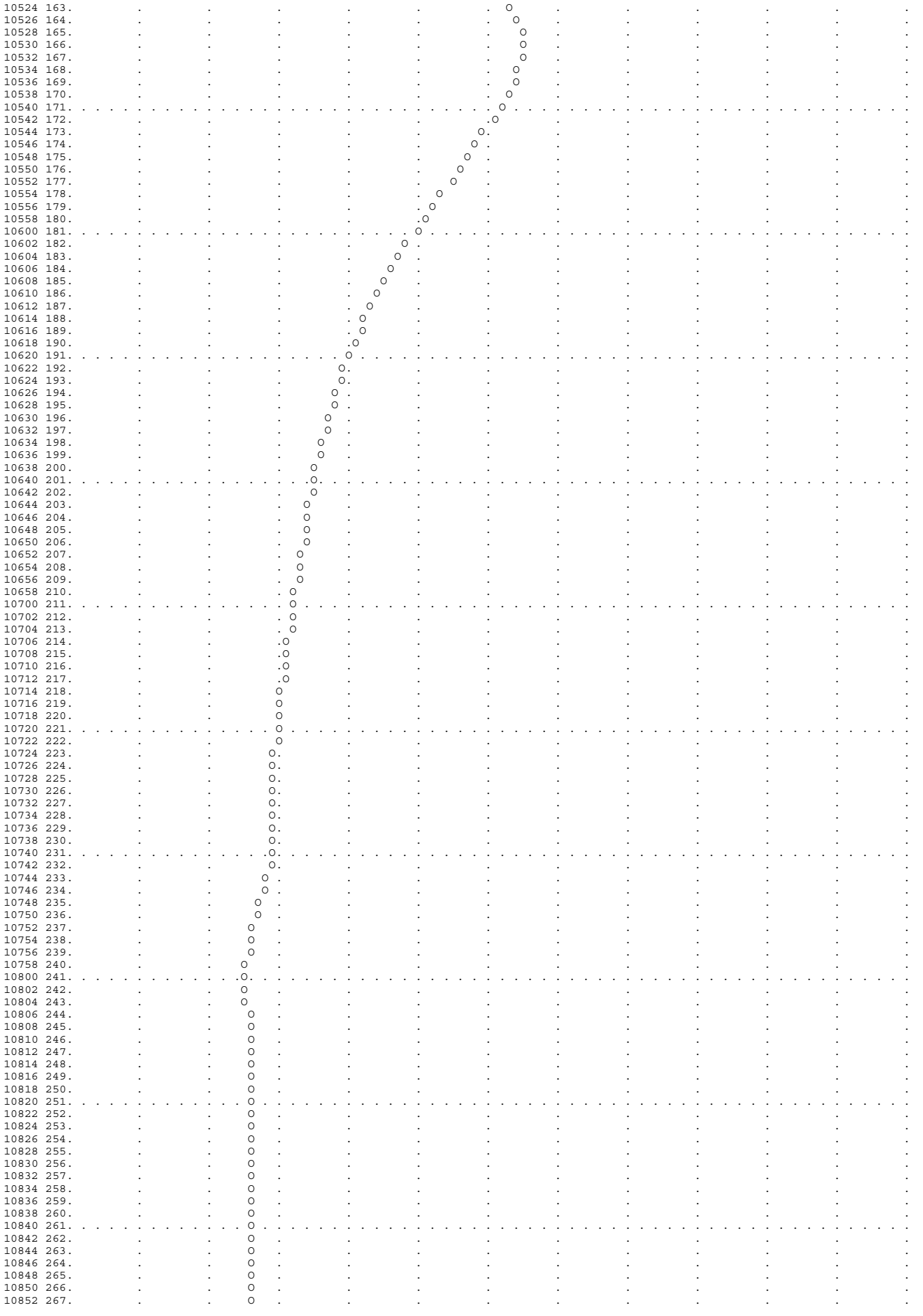

```
  10854 268.         .         .     O   .         .         .         .         .         .         .         .         .         .
  10856 269.         .         .     O   .         .         .         .         .         .         .         .         .         .
  10858 270.         .         .     O   .         .         .         .         .         .         .         .         .         .
  10900 271. . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10902 272.         .         .     O   .         .         .         .         .         .         .         .         .         .
  10904 273.         .         .     O   .         .         .         .         .         .         .         .         .         .
  10906 274.         .         .     O   .         .         .         .         .         .         .         .         .         .
  10908 275.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10910 276.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10912 277.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10914 278.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10916 279.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10918 280.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10920 281. . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10922 282.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10924 283.         .         .    O    .         .         .         .         .         .         .         .         .         .
  10926 284.         .         .   O     .         .         .         .         .         .         .         .         .         .
  10928 285.         .         .   O     .         .         .         .         .         .         .         .         .         .
  10930 286.         .         .   O     .         .         .         .         .         .         .         .         .         .
  10932 287.         .         .   O     .         .         .         .         .         .         .         .         .         .
  10934 288.         .         .   O     .         .         .         .         .         .         .         .         .         .
  10936 289.         .         .  O      .         .         .         .         .         .         .         .         .         .
  10938 290.         .         .  O      .         .         .         .         .         .         .         .         .         .
  10940 291. . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292.         .         . O       .         .         .         .         .         .         .         .         .         .
  10944 293.         .         . O       .         .         .         .         .         .         .         .         .         .
  10946 294.         .         . O       .         .         .         .         .         .         .         .         .         .
  10948 295.         .         . O       .         .         .         .         .         .         .         .         .         .
  10950 296.         .         . O       .         .         .         .         .         .         .         .         .         .
  10952 297.         .         .O        .         .         .         .         .         .         .         .         .         .
  10954 298.         .         .O        .         .         .         .         .         .         .         .         .         .
  10956 299.         .         .O        .         .         .         .         .         .         .         .         .         .
  10958 300.---------.---------.O--------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
1                                                          STATION    RTA-B

                          (I) INFLOW,   (O) OUTFLOW
          0.      100.      200.      300.      400.      500.      600.      700.        0.        0.        0.        0.        0.
                                                                                 (S) STORAGE
          0.        0.        0.        0.        0.        0.        0.       10.       20.       30.        0.        0.        0.
 DAHRMN PER
  10000    1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
  10002    2I         .         .         .         .         .         S         .         .         .         .         .         .
  10004    3I         .         .         .         .         .         S         .         .         .         .         .         .
  10006    4I         .         .         .         .         .         S         .         .         .         .         .         .
  10008    5I         .         .         .         .         .         S         .         .         .         .         .         .
  10010    6I         .         .         .         .         .         S         .         .         .         .         .         .
  10012    7I         .         .         .         .         .         S         .         .         .         .         .         .
  10014    8I         .         .         .         .         .         S         .         .         .         .         .         .
  10016    9I         .         .         .         .         .         S         .         .         .         .         .         .
  10018   10I         .         .         .         .         .         S         .         .         .         .         .         .
  10020   11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022   12I         .         .         .         .         .         S         .         .         .         .         .         .
  10024   13I         .         .         .         .         .         S         .         .         .         .         .         .
  10026   14I         .         .         .         .         .         S         .         .         .         .         .         .
  10028   15I         .         .         .         .         .         S         .         .         .         .         .         .
  10030   16I         .         .         .         .         .         S         .         .         .         .         .         .
  10032   17I         .         .         .         .         .         S         .         .         .         .         .         .
  10034   18I         .         .         .         .         .         S         .         .         .         .         .         .
  10036   19I         .         .         .         .         .         S         .         .         .         .         .         .
  10038   20I         .         .         .         .         .         S         .         .         .         .         .         .
  10040   21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042   22I         .         .         .         .         .         S         .         .         .         .         .         .
  10044   23I         .         .         .         .         .         S         .         .         .         .         .         .
  10046   24I         .         .         .         .         .         S         .         .         .         .         .         .
  10048   25I         .         .         .         .         .         S         .         .         .         .         .         .
  10050   26I         .         .         .         .         .         S         .         .         .         .         .         .
  10052   27I         .         .         .         .         .         S         .         .         .         .         .         .
  10054   28I         .         .         .         .         .         S         .         .         .         .         .         .
  10056   29I         .         .         .         .         .         S         .         .         .         .         .         .
  10058   30I         .         .         .         .         .         S         .         .         .         .         .         .
  10100   31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102   32I         .         .         .         .         .         S         .         .         .         .         .         .
  10104   33I         .         .         .         .         .         S         .         .         .         .         .         .
  10106   34I         .         .         .         .         .         S         .         .         .         .         .         .
  10108   35I         .         .         .         .         .         S         .         .         .         .         .         .
  10110   36I         .         .         .         .         .         S         .         .         .         .         .         .
  10112   37I         .         .         .         .         .         S         .         .         .         .         .         .
  10114   38I         .         .         .         .         .         S         .         .         .         .         .         .
  10116   39I         .         .         .         .         .         S         .         .         .         .         .         .
  10118   40I         .         .         .         .         .         S         .         .         .         .         .         .
  10120   41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122   42I         .         .         .         .         .         S         .         .         .         .         .         .
  10124   43I         .         .         .         .         .         S         .         .         .         .         .         .
  10126   44I         .         .         .         .         .         S         .         .         .         .         .         .
  10128   45I         .         .         .         .         .         S         .         .         .         .         .         .
  10130   46I         .         .         .         .         .         S         .         .         .         .         .         .
  10132   47I         .         .         .         .         .         S         .         .         .         .         .         .
  10134   48I         .         .         .         .         .         S         .         .         .         .         .         .
  10136   49I         .         .         .         .         .         S         .         .         .         .         .         .
  10138   50I         .         .         .         .         .         S         .         .         .         .         .         .
  10140   51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142   52I         .         .         .         .         .         S         .         .         .         .         .         .
  10144   53I         .         .         .         .         .         S         .         .         .         .         .         .
  10146   54I         .         .         .         .         .         S         .         .         .         .         .         .
  10148   55I         .         .         .         .         .         S         .         .         .         .         .         .
  10150   56I         .         .         .         .         .         S         .         .         .         .         .         .
  10152   57I         .         .         .         .         .         S         .         .         .         .         .         .
  10154   58I         .         .         .         .         .         S         .         .         .         .         .         .
  10156   59I         .         .         .         .         .         S         .         .         .         .         .         .
  10158   60I         .         .         .         .         .         S         .         .         .         .         .         .
  10200   61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10202   62I         .         .         .         .         .         S         .         .         .         .         .         .
  10204   63I         .         .         .         .         .         S         .         .         .         .         .         .
  10206   64I         .         .         .         .         .         S         .         .         .         .         .         .
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10208  65I         .         .         .         .         .        S         .         .         .         .         .         .
10210  66I         .         .         .         .         .        S         .         .         .         .         .         .
10212  67I         .         .         .         .         .        S         .         .         .         .         .         .
10214  68I         .         .         .         .         .        S         .         .         .         .         .         .
10216  69I         .         .         .         .         .        S         .         .         .         .         .         .
10218  70I         .         .         .         .         .        S         .         .         .         .         .         .
10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72I         .         .         .         .         .        S         .         .         .         .         .         .
10224  73I         .         .         .         .         .        S         .         .         .         .         .         .
10226  74I         .         .         .         .         .        S         .         .         .         .         .         .
10228  75I         .         .         .         .         .        S         .         .         .         .         .         .
10230  76I         .         .         .         .         .        S         .         .         .         .         .         .
10232  77I         .         .         .         .         .        S         .         .         .         .         .         .
10234  78I         .         .         .         .         .        S         .         .         .         .         .         .
10236  79I         .         .         .         .         .        S         .         .         .         .         .         .
10238  80I         .         .         .         .         .        S         .         .         .         .         .         .
10240  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82I         .         .         .         .         .        S         .         .         .         .         .         .
10244  83I         .         .         .         .         .        S         .         .         .         .         .         .
10246  84I         .         .         .         .         .        S         .         .         .         .         .         .
10248  85I         .         .         .         .         .        S         .         .         .         .         .         .
10250  86I         .         .         .         .         .        S         .         .         .         .         .         .
10252  87I         .         .         .         .         .        S         .         .         .         .         .         .
10254  88I         .         .         .         .         .        S         .         .         .         .         .         .
10256  89I         .         .         .         .         .        S         .         .         .         .         .         .
10258  90I         .         .         .         .         .        S         .         .         .         .         .         .
10300  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92I         .         .         .         .         .        S         .         .         .         .         .         .
10304  93I         .         .         .         .         .        S         .         .         .         .         .         .
10306  94I         .         .         .         .         .        S         .         .         .         .         .         .
10308  95I         .         .         .         .         .        S         .         .         .         .         .         .
10310  96I         .         .         .         .         .        S         .         .         .         .         .         .
10312  97I         .         .         .         .         .        S         .         .         .         .         .         .
10314  98I         .         .         .         .         .        S         .         .         .         .         .         .
10316  99I         .         .         .         .         .        S         .         .         .         .         .         .
10318 100I         .         .         .         .         .        S         .         .         .         .         .         .
10320 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102I         .         .         .         .         .        S         .         .         .         .         .         .
10324 103I         .         .         .         .         .        S         .         .         .         .         .         .
10326 104I         .         .         .         .         .        S         .         .         .         .         .         .
10328 105I         .         .         .         .         .        S         .         .         .         .         .         .
10330 106I         .         .         .         .         .        S         .         .         .         .         .         .
10332 107I         .         .         .         .         .        S         .         .         .         .         .         .
10334 108I         .         .         .         .         .        S         .         .         .         .         .         .
10336 109I         .         .         .         .         .        S         .         .         .         .         .         .
10338 110I         .         .         .         .         .        S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I         .         .         .         .         .        S         .         .         .         .         .         .
10344 113I         .         .         .         .         .        S         .         .         .         .         .         .
10346 114I         .         .         .         .         .        S         .         .         .         .         .         .
10348 115I         .         .         .         .         .        S         .         .         .         .         .         .
10350 116I         .         .         .         .         .        S         .         .         .         .         .         .
10352 117I         .         .         .         .         .        S         .         .         .         .         .         .
10354 118I         .         .         .         .         .        S         .         .         .         .         .         .
10356 119I         .         .         .         .         .        S         .         .         .         .         .         .
10358 120I         .         .         .         .         .        S         .         .         .         .         .         .
10400 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122I         .         .         .         .         .        S         .         .         .         .         .         .
10404 123I         .         .         .         .         .        S         .         .         .         .         .         .
10406 124I         .         .         .         .         .        S         .         .         .         .         .         .
10408 125I         .         .         .         .         .        S         .         .         .         .         .         .
10410 126I         .         .         .         .         .        S         .         .         .         .         .         .
10412 127I         .         .         .         .         .        S         .         .         .         .         .         .
10414 128I         .         .         .         .         .        S         .         .         .         .         .         .
10416 129I         .         .         .         .         .        S         .         .         .         .         .         .
10418 130OI        .         .         .         .         .        S         .         .         .         .         .         .
10420 131OI. . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132OI        .         .         .         .         .        S         .         .         .         .         .         .
10424 133O I       .         .         .         .         .        S         .         .         .         .         .         .
10426 134O I       .         .         .         .         .        S         .         .         .         .         .         .
10428 135O  I      .         .         .         .         .        S         .         .         .         .         .         .
10430 136.O  I     .         .         .         .         .        S         .         .         .         .         .         .
10432 137.O   I    .         .         .         .         .        S         .         .         .         .         .         .
10434 138.O    I   .         .         .         .         .        S         .         .         .         .         .         .
10436 139.O     I  .         .         .         .         .       .S         .         .         .         .         .         .
10438 140. O     I .         .         .         .         .       .S         .         .         .         .         .         .
10440 141. O . . . I . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142. O      .I         .         .         .         .       .S         .         .         .         .         .         .
10444 143.  O     .  I       .         .         .         .       .S         .         .         .         .         .         .
10446 144.   O    .    I     .         .         .         .       . S        .         .         .         .         .         .
10448 145.   O    .      I   .         .         .         .       . S        .         .         .         .         .         .
10450 146.    O   .        I.         .         .         .       . S        .         .         .         .         .         .
10452 147.     O  .         . I       .         .         .       .  S       .         .         .         .         .         .
10454 148.      O .         .  I      .         .         .       .  S       .         .         .         .         .         .
10456 149.       O .         .    I   .         .         .       .   S      .         .         .         .         .         .
10458 150.        O.         .       I         .         .       .   S      .         .         .         .         .         .
10500 151. . . . . O . . . . . . . . . I . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.         .O        .     I   .         .         .     .    S     .         .         .         .         .         .
10504 153.         .  O      .       I .         .         .     .    S     .         .         .         .         .         .
10506 154.         .   O     .         .I        .         .     .     S    .         .         .         .         .         .
10508 155.         .    O    .         .   I     .         .     .      S   .         .         .         .         .         .
10510 156.         .      O  .         .     I   .         .     .       S  .         .         .         .         .         .
10512 157.         .       O.         .       I  .         .     .       S  .         .         .         .         .         .
10514 158.         .        .O        .         .  I        .     .        S .         .         .         .         .         .
10516 159.         .         .  O     .         .   I       .     .        .S        .         .         .         .         .
10518 160.         .         .   O    .         .      I    .     .         . S      .         .         .         .         .
10520 161. . . . . . . . . . . . . O . . . . . . . . . . . . I . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.         .         .     O .         .         .  . I       .   S     .         .         .         .         .         .
10524 163.         .         .       O         .         .  .  I      .    S    .         .         .         .         .         .
10526 164.         .         .        . O      .         .  .   I     .     S   .         .         .         .         .         .
10528 165.         .         .         .  O     .         .  .    I    .      S  .         .         .         .         .         .
10530 166.         .         .         .   O    .         .  .    I    .      S  .         .         .         .         .         .
10532 167.         .         .         .     O  .         .  .    I    .       S .         .         .         .         .         .
10534 168.         .         .         .       O.         .  .   I     .        S.         .         .         .         .         .
10536 169.         .         .         .        O         .  .   I     .         S         .         .         .         .         .
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10538 170.        .        .        .        .O       .        . I      .        S        .        .        .        .
10540 171. . . . . . . . . . . . . . . . . . . . O . . . . . . . . . I . . . . . . . . . . . . . . . . . . .
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  10908 275.         .         .    I O  .         .         .         .         .  S      .         .         .         .         .
  10910 276.         .         .    I O  .         .         .         .         .  S      .         .         .         .         .
  10912 277.         .         .    I O  .         .         .         .         .  S      .         .         .         .         .
  10914 278.         .         .    IO   .         .         .         .         .  S      .         .         .         .         .
  10916 279.         .         .    IO   .         .         .         .         .  S      .         .         .         .         .
  10918 280.         .         .    IO   .         .         .         .         .  S      .         .         .         .         .
  10920 281. . . . . . . . . . . .IO . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . .
  10922 282.         .         .    IO   .         .         .         .         .  S      .         .         .         .         .
  10924 283.         .         .    IO   .         .         .         .         .  S      .         .         .         .         .
  10926 284.         .         .   I O   .         .         .         .         .  S      .         .         .         .         .
  10928 285.         .         .   I O   .         .         .         .         .  S      .         .         .         .         .
  10930 286.         .         .   I O   .         .         .         .         .  S      .         .         .         .         .
  10932 287.         .         .   I O   .         .         .         .         .  S      .         .         .         .         .
  10934 288.         .         .   I O   .         .         .         .         .  S      .         .         .         .         .
  10936 289.         .         .  I O    .         .         .         .         . S       .         .         .         .         .
  10938 290.         .         .  I O    .         .         .         .         . S       .         .         .         .         .
  10940 291. . . . . . . . . . . .I.O. . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
  10942 292.         .         . I  O    .         .         .         .         . S       .         .         .         .         .
  10944 293.         .         . I  O    .         .         .         .         . S       .         .         .         .         .
  10946 294.         .         . I  O    .         .         .         .         . S       .         .         .         .         .
  10948 295.         .         . I  O    .         .         .         .         . S       .         .         .         .         .
  10950 296.         .         . I O     .         .         .         .         . S       .         .         .         .         .
  10952 297.         .         .I  O     .         .         .         .         . S       .         .         .         .         .
  10954 298.         .         .I  O     .         .         .         .         . S       .         .         .         .         .
  10956 299.         .         .I  O     .         .         .         .         . S       .         .         .         .         .
  10958 300.---------.---------.I--O-----.---------.---------.---------.---------.-S-------.---------.---------.---------.---------.
1
1                                                         STATION      300

                         (O) OUTFLOW
          0.       40.       80.      120.      160.      200.      240.      280.      320.        0.        0.        0.        0.
                                                                                                       (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .00       .03       .02       .01       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .        L.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10122  42O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10124  43O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10126  44O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10128  45O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10130  46O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10132  47O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10134  48O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10136  49O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10138  50O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10142  52O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10144  53O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10146  54O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10148  55O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10150  56O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10152  57O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10154  58O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10156  59O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10158  60O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10202  62O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10204  63O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10206  64O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10208  65O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10210  66O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10212  67O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10214  68O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10216  69O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10218  70O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
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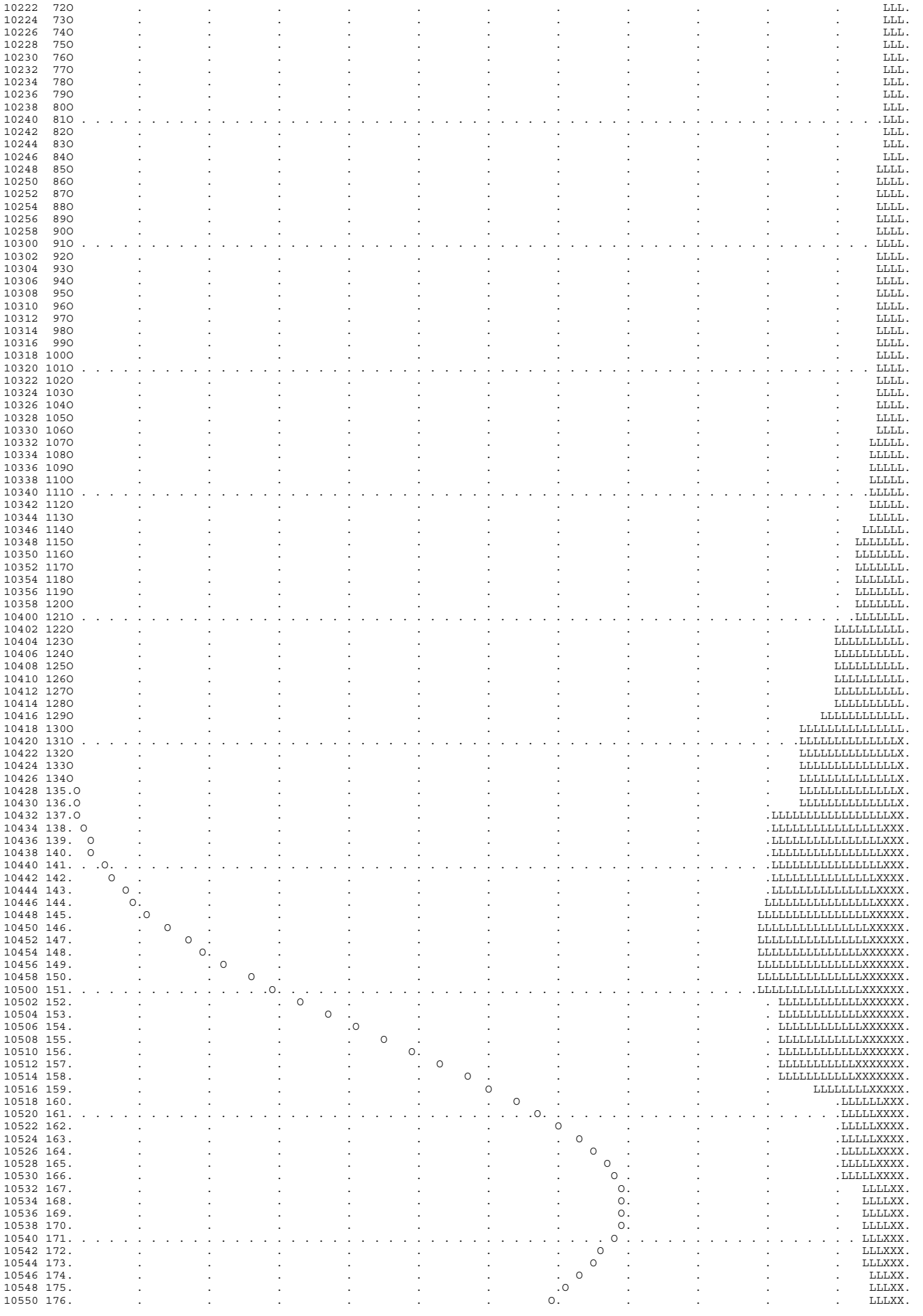

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10552 177.         .         .         .         .         .         .     O   .         .         .         .         .    LLLXX.
10554 178.         .         .         .         .         .         .   O     .         .         .         .         .    LLLXX.
10556 179.         .         .         .         .         .         . O       .         .         .         .         .    LLLXX.
10558 180.         .         .         .         .         .        .O         .         .         .         .         .    LLLXX.
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O. . . . . . . . . . . . . . . . . . . .
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  10922 282.         .         .     O   .         .         .         .         .         .         .         .         .       LX.
  10924 283.         .         .     O   .         .         .         .         .         .         .         .         .       LX.
  10926 284.         .         .     O   .         .         .         .         .         .         .         .         .       LX.
  10928 285.         .         .     O   .         .         .         .         .         .         .         .         .       LX.
  10930 286.         .         .     O   .         .         .         .         .         .         .         .         .       LX.
  10932 287.         .         .    O    .         .         .         .         .         .         .         .         .       LX.
  10934 288.         .         .    O    .         .         .         .         .         .         .         .         .       LX.
  10936 289.         .         .    O    .         .         .         .         .         .         .         .         .       LX.
  10938 290.         .         .    O    .         .         .         .         .         .         .         .         .       LX.
  10940 291. . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LX.
  10942 292.         .         .   O     .         .         .         .         .         .         .         .         .       LX.
  10944 293.         .         .   O     .         .         .         .         .         .         .         .         .       LX.
  10946 294.         .         .  O      .         .         .         .         .         .         .         .         .       LX.
  10948 295.         .         .  O      .         .         .         .         .         .         .         .         .       LX.
  10950 296.         .         .  O      .         .         .         .         .         .         .         .         .       LX.
  10952 297.         .         .  O      .         .         .         .         .         .         .         .         .       LX.
  10954 298.         .         . O       .         .         .         .         .         .         .         .         .       LX.
  10956 299.         .         . O       .         .         .         .         .         .         .         .         .       LX.
  10958 300.---------.---------.-O-------.---------.---------.---------.---------.---------.---------.---------.---------.-------LX.
1
1                                                          STATION        B

                          (O) OUTFLOW
          0.      100.      200.      300.      400.      500.      600.      700.      800.        0.        0.        0.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
  10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
  10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
  10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
  10132  47O         .         .         .         .         .         .         .         .         .         .         .         .
  10134  48O         .         .         .         .         .         .         .         .         .         .         .         .
  10136  49O         .         .         .         .         .         .         .         .         .         .         .         .
  10138  50O         .         .         .         .         .         .         .         .         .         .         .         .
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142  52O         .         .         .         .         .         .         .         .         .         .         .         .
  10144  53O         .         .         .         .         .         .         .         .         .         .         .         .
  10146  54O         .         .         .         .         .         .         .         .         .         .         .         .
  10148  55O         .         .         .         .         .         .         .         .         .         .         .         .
  10150  56O         .         .         .         .         .         .         .         .         .         .         .         .
  10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
  10154  58O         .         .         .         .         .         .         .         .         .         .         .         .
  10156  59O         .         .         .         .         .         .         .         .         .         .         .         .
  10158  60O         .         .         .         .         .         .         .         .         .         .         .         .
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10202  62O         .         .         .         .         .         .         .         .         .         .         .         .
  10204  63O         .         .         .         .         .         .         .         .         .         .         .         .
  10206  64O         .         .         .         .         .         .         .         .         .         .         .         .
  10208  65O         .         .         .         .         .         .         .         .         .         .         .         .
  10210  66O         .         .         .         .         .         .         .         .         .         .         .         .
  10212  67O         .         .         .         .         .         .         .         .         .         .         .         .
  10214  68O         .         .         .         .         .         .         .         .         .         .         .         .
  10216  69O         .         .         .         .         .         .         .         .         .         .         .         .
  10218  70O         .         .         .         .         .         .         .         .         .         .         .         .
  10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10222  72O         .         .         .         .         .         .         .         .         .         .         .         .
  10224  73O         .         .         .         .         .         .         .         .         .         .         .         .
  10226  74O         .         .         .         .         .         .         .         .         .         .         .         .
  10228  75O         .         .         .         .         .         .         .         .         .         .         .         .
  10230  76O         .         .         .         .         .         .         .         .         .         .         .         .
  10232  77O         .         .         .         .         .         .         .         .         .         .         .         .
  10234  78O         .         .         .         .         .         .         .         .         .         .         .         .
  10236  79O         .         .         .         .         .         .         .         .         .         .         .         .
  10238  80O         .         .         .         .         .         .         .         .         .         .         .         .
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10240  81O . . .
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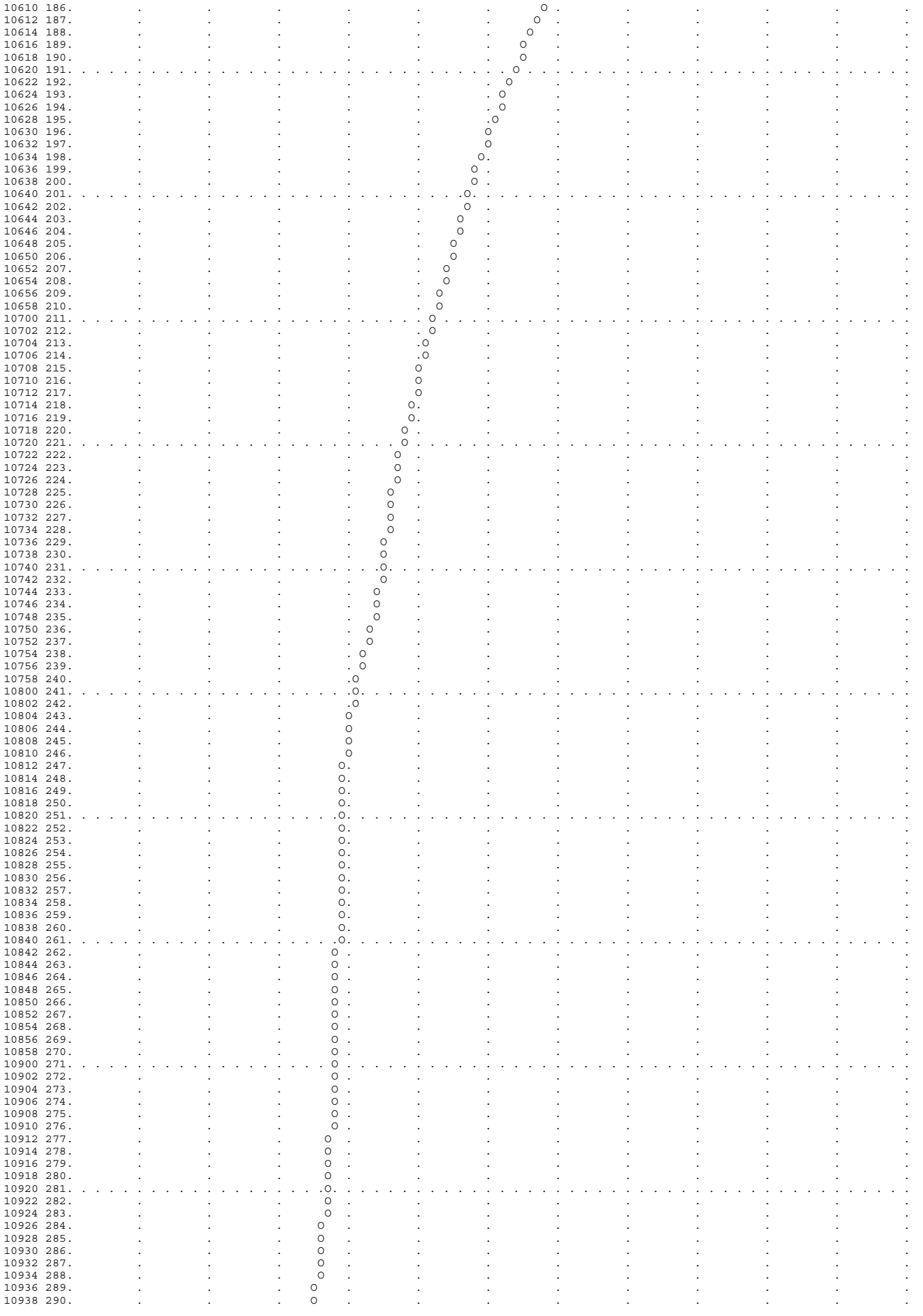

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 10940 291. . . . . .O. . . . . .
 10942 292.         .         .         .   O     .         .         .         
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10254  88O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10352 117O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10354 118O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10356 119O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10358 120O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10404 123O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10406 124O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10408 125O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10410 126O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10412 127O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10414 128O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLX.
10416 129O         .         .         .         .         .         .         .         .         .         .      LLLLLLLLLLLX.
10418 130O         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLX.
10420 131O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLLX.
10422 132O         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10424 133O         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10426 134O         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10428 135O         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10430 136.O        .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10432 137.O        .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXX.
10434 138.O        .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXX.
10436 139.O        .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXX.
10438 140.O        .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXX.
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10442 142. O       .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXXX.
10444 143.  O      .         .         .         .         .         .         .         .         .         .  .LLLLLLLLLLLLLLLXXXXX.
10446 144.  O      .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXX.
10448 145.   O     .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXX.
10450 146.   O     .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXX.
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10454 148.     O   .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXX.
10456 149.      O  .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXX.
10458 150.       O .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLXXXXXX.
10500 151. . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLLLLXXXXXX.
10502 152.         .O        .         .         .         .         .         .         .         .         .  . LLLLLLLLLLLLXXXXXX.
10504 153.         . O       .         .         .         .         .         .         .         .         .  . LLLLLLLLLLLLXXXXXX.
10506 154.         .   O     .         .         .         .         .         .         .         .         .  . LLLLLLLLLLLLXXXXXX.
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10510 156.         .      O  .         .         .         .         .         .         .         .         .  . LLLLLLLLLLLLXXXXXX.
10512 157.         .        O.         .         .         .         .         .         .         .         .  . LLLLLLLLLLLLXXXXXX.
10514 158.         .         .O        .         .         .         .         .         .         .         .  . LLLLLLLLLLLLXXXXXX.
10516 159.         .          .  O     .         .         .         .         .         .         .         .      LLLLLLLXXXXXX.
10518 160.         .             .  O  .         .         .         .         .         .         .         .         .LLLLLXXXX.
10520 161. . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLXXXX.
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10524 163.         .         .          .  O     .         .         .         .         .         .         .         .LLLLLXXXX.
10526 164.         .         .           .   O   .         .         .         .         .         .         .         .LLLLLXXXX.
10528 165.         .         .             .     O .         .         .         .         .         .         .         .LLLLLXXXX.
10530 166.         .         .               .       O         .         .         .         .         .         .         .LLLLLXXXX.
10532 167.         .         .                 .  O    .         .         .         .         .         .         .   LLLXXX.
10534 168.         .         .                  .   O  .         .         .         .         .         .         .   LLLXXX.
10536 169.         .         .                   .      O .         .         .         .         .         .         .   LLLXXX.
10538 170.         .         .                   .        O         .         .         .         .         .         .   LLLXXX.
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLXXX.
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10544 173.         .         .                   .         .     O   .         .         .         .         .         .   LLLXXX.
10546 174.         .         .                   .         .       O.         .         .         .         .         .    LLXXX.
10548 175.         .         .                   .         .         .O        .         .         .         .         .    LLXXX.
10550 176.         .         .                   .         .         . O       .         .         .         .         .    LLXXX.
10552 177.         .         .                   .         .         .  O      .         .         .         .         .    LLXXX.
10554 178.         .         .                   .         .         .   O     .         .         .         .         .    LLXXX.
10556 179.         .         .                   .         .         .    O    .         .         .         .         .    LLXXX.
10558 180.         .         .                   .         .         .     O   .         .         .         .         .    LLXXX.
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . .LLXXX.
10602 182.         .         .                   .         .         .      O.         .         .         .         .    LLLXX.
10604 183.         .         .                   .         .         .       O         .         .         .         .    LLLXX.
10606 184.         .         .                   .         .         .       O         .         .         .         .    LLLXX.
10608 185.         .         .                   .         .         .       O         .         .         .         .    LLLXX.
10610 186.         .         .                   .         .         .        .O       .         .         .         .    LLLXX.
10612 187.         .         .                   .         .         .        .O       .         .         .         .    LLLXX.
10614 188.         .         .                   .         .         .       O         .         .         .         .    LLLXX.
10616 189.         .         .                   .         .         .       O         .         .         .         .     LLXX.
10618 190.         .         .                   .         .         .       O         .         .         .         .     LLXX.
10620 191. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . LLXX.
10622 192.         .         .                   .         .         .       O.         .         .         .         .     LLXX.
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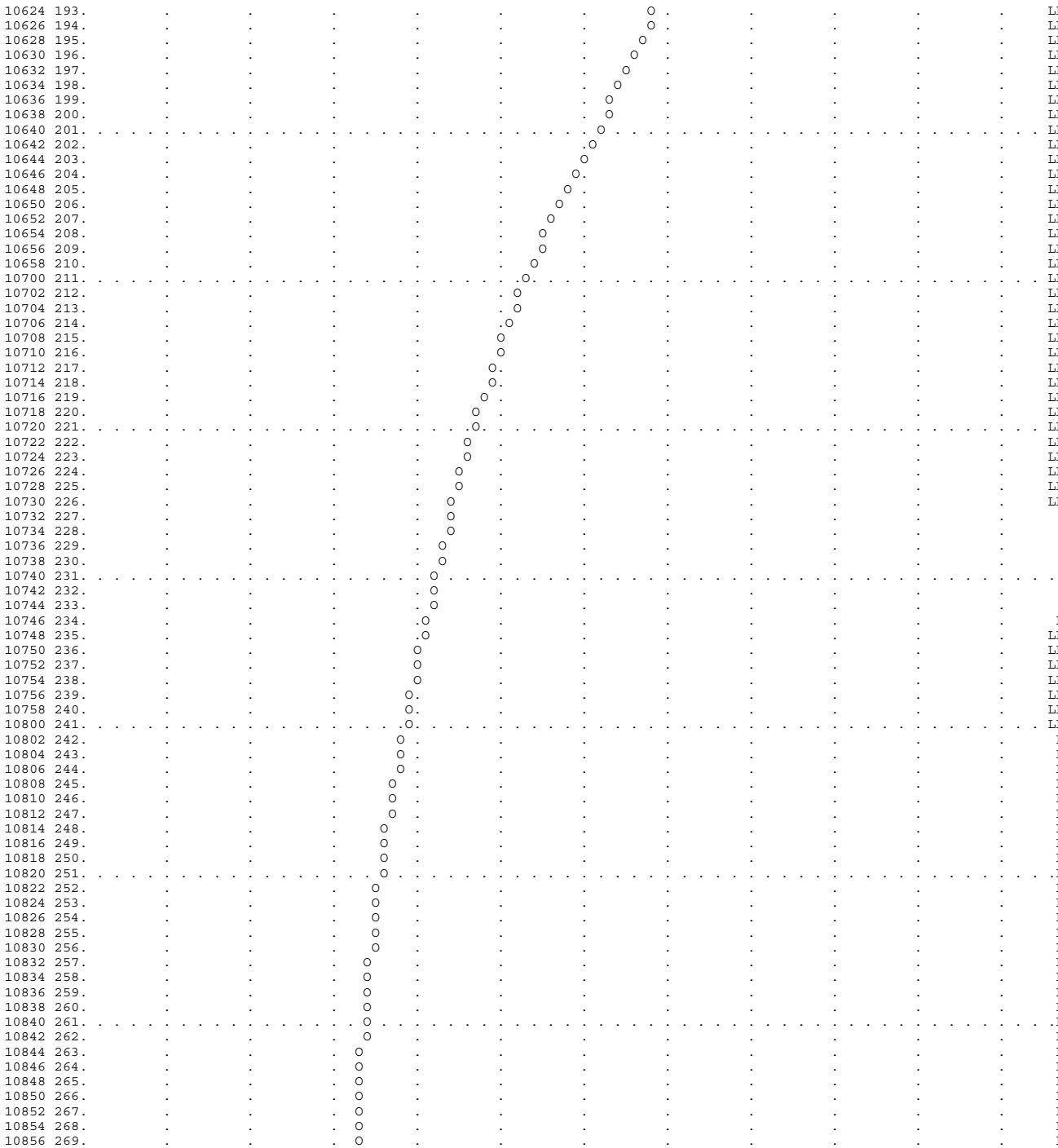

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  10958 300.---------.---------.--------O.---------.---------.---------.---------.---------.---------.---------.---------.-------LX.
1
1                                                                    STATION        B

                                (O) OUTFLOW
             0.      200.      400.      600.      800.     1000.     1200.     1400.        0.        0.        0.        0.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
  10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
  10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
  10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
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  10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
  10154  58O         .         .         .         .         .         .         .         .         .         .         .         .
  10156  59O         .         .         .         .         .         .         .         .         .         .         .         .
  10158  60O         .         .         .         .         .         .         .         .         .         .         .         .
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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  10204  63O         .         .         .         .         .         .         .         .         .         .         .         .
  10206  64O         .         .         .         .         .         .         .         .         .         .         .         .
  10208  65O         .         .         .         .         .         .         .         .         .         .         .         .
  10210  66O         .         .         .         .         .         .         .         .         .         .         .         .
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  10228  75O         .         .         .         .         .         .         .         .         .         .         .         .
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  10232  77O         .         .         .         .         .         .         .         .         .         .         .         .
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  10238  80O         .         .         .         .         .         .         .         .         .         .         .         .
  10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10242  82O         .         .         .         .         .         .         .         .         .         .         .         .
  10244  83O         .         .         .         .         .         .         .         .         .         .         .         .
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  10254  88O         .         .         .         .         .         .         .         .         .         .         .         .
  10256  89O         .         .         .         .         .         .         .         .         .         .         .         .
  10258  90O         .         .         .         .         .         .         .         .         .         .         .         .
  10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10302  92O         .         .         .         .         .         .         .         .         .         .         .         .
  10304  93O         .         .         .         .         .         .         .         .         .         .         .         .
  10306  94O         .         .         .         .         .         .         .         .         .         .         .         .
  10308  95O         .         .         .         .         .         .         .         .         .         .         .         .
  10310  96O         .         .         .         .         .         .         .         .         .         .         .         .
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10312  97O         .         .         .         .         .         .         .         .         .         .         .         .
10314  98O         .         .         .         .         .         .         .         .         .         .         .         .
10316  99O         .         .         .         .         .         .         .         .         .         .         .         .
10318 100O         .         .         .         .         .         .         .         .         .         .         .         .
10320 101O . . .
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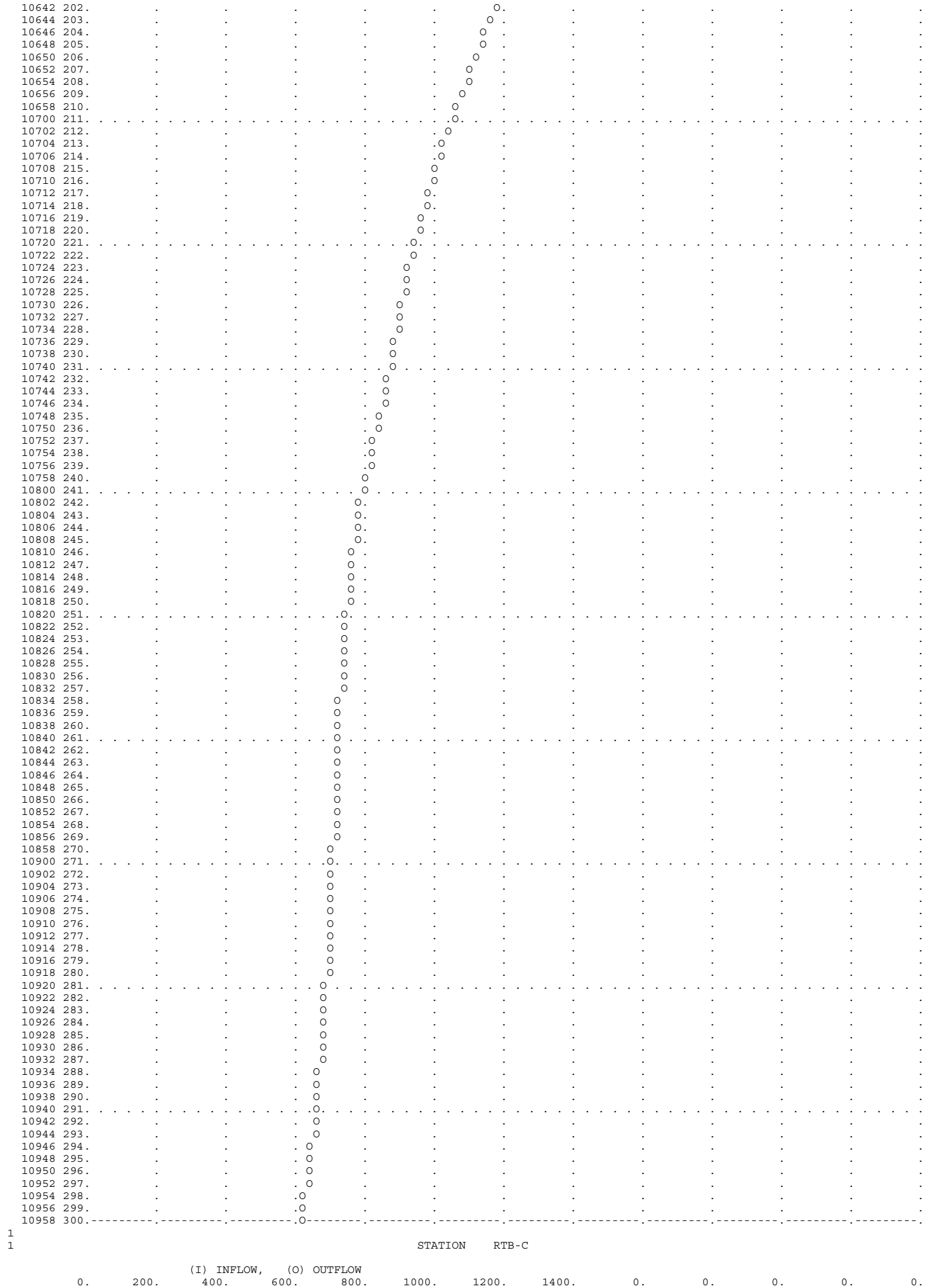
10642 202.
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10646 204.
10648 205.
10650 206.
10652 207.
10654 208.
10656 209.
10658 210.
10700 211.
10702 212.
10704 213.
10706 214.
10708 215.
10710 216.
10712 217.
10714 218.
10716 219.
10718 220.
10720 221.
10722 222.
10724 223.
10726 224.
10728 225.
10730 226.
10732 227.
10734 228.
10736 229.
10738 230.
10740 231.
10742 232.
10744 233.
10746 234.
10748 235.
10750 236.
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10836 259.
10838 260.
10840 261.
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10844 263.
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10848 265.
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10854 268.
10856 269.
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10900 271.
10902 272.
10904 273.
10906 274.
10908 275.
10910 276.
10912 277.
10914 278.
10916 279.
10918 280.
10920 281.
10922 282.
10924 283.
10926 284.
10928 285.
10930 286.
10932 287.
10934 288.
10936 289.
10938 290.
10940 291.
10942 292.
10944 293.
10946 294.
10948 295.
10950 296.
10952 297.
10954 298.
10956 299.
10958 300.
1
1
STATION RTB-C
(I) INFLOW, (O) OUTFLOW
0. 200. 400. 600. 800. 1000. 1200. 1400. 0. 0. 0. 0. 0.
(S) STORAGE

```
         0.        0.        0.        0.        0.        0.        0.        2.        4.        6.        8.        0.        0.
DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
 10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
 10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
 10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . .
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10326 104I         .         .         .         .         .        S         .         .         .         .         .         .
10328 105I         .         .         .         .         .        S         .         .         .         .         .         .
10330 106I         .         .         .         .         .        S         .         .         .         .         .         .
10332 107I         .         .         .         .         .        S         .         .         .         .         .         .
10334 108I         .         .         .         .         .        S         .         .         .         .         .         .
10336 109I         .         .         .         .         .        S         .         .         .         .         .         .
10338 110I         .         .         .         .         .        S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I         .         .         .         .         .        S         .         .         .         .         .         .
10344 113I         .         .         .         .         .        S         .         .         .         .         .         .
10346 114I         .         .         .         .         .        S         .         .         .         .         .         .
10348 115I         .         .         .         .         .        S         .         .         .         .         .         .
10350 116I         .         .         .         .         .        S         .         .         .         .         .         .
10352 117I         .         .         .         .         .        S         .         .         .         .         .         .
10354 118I         .         .         .         .         .        S         .         .         .         .         .         .
10356 119I         .         .         .         .         .        S         .         .         .         .         .         .
10358 120I         .         .         .         .         .        S         .         .         .         .         .         .
10400 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122I         .         .         .         .         .        S         .         .         .         .         .         .
10404 123I         .         .         .         .         .        S         .         .         .         .         .         .
10406 124I         .         .         .         .         .        S         .         .         .         .         .         .
10408 125I         .         .         .         .         .        S         .         .         .         .         .         .
10410 126I         .         .         .         .         .        S         .         .         .         .         .         .
10412 127I         .         .         .         .         .        S         .         .         .         .         .         .
10414 128I         .         .         .         .         .        S         .         .         .         .         .         .
10416 129I         .         .         .         .         .        S         .         .         .         .         .         .
10418 130I         .         .         .         .         .        S         .         .         .         .         .         .
10420 131I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132I         .         .         .         .         .        S         .         .         .         .         .         .
10424 133I         .         .         .         .         .        S         .         .         .         .         .         .
10426 134I         .         .         .         .         .        S         .         .         .         .         .         .
10428 135OI        .         .         .         .         .        S         .         .         .         .         .         .
10430 136OI        .         .         .         .         .        S         .         .         .         .         .         .
10432 137.I        .         .         .         .         .        S         .         .         .         .         .         .
10434 138.I        .         .         .         .         .        S         .         .         .         .         .         .
10436 139.OI       .         .         .         .         .        .S        .         .         .         .         .         .
10438 140.OI       .         .         .         .         .        .S        .         .         .         .         .         .
10440 141. OI. . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142. OI      .         .         .         .         .        .S        .         .         .         .         .         .
10444 143.  OI     .         .         .         .         .        . S       .         .         .         .         .         .
10446 144.   OI    .         .         .         .         .        . S       .         .         .         .         .         .
10448 145.    OI   .         .         .         .         .        . S       .         .         .         .         .         .
10450 146.     O I .         .         .         .         .        .  S      .         .         .         .         .         .
10452 147.      O I.         .         .         .         .        .  S      .         .         .         .         .         .
10454 148.       O I         .         .         .         .        .   S     .         .         .         .         .         .
10456 149.        O. I       .         .         .         .        .    S    .         .         .         .         .         .
10458 150.         .O  I     .         .         .         .        .     S   .         .         .         .         .         .
10500 151. . . . . . O . I . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.         .   O  I .         .         .         .        .      S  .         .         .         .         .         .
10504 153.         .     O  I        .         .         .        .       S .         .         .         .         .         .
10506 154.         .       O . I     .         .         .        .        S.         .         .         .         .         .
10508 155.         .        O   I    .         .         .        .         .S        .         .         .         .         .
10510 156.         .         .  O  I .         .         .        .         . S       .         .         .         .         .
10512 157.         .         .   O   I         .         .        .         .  S      .         .         .         .         .
10514 158.         .         .      O .  I     .         .        .         .   S     .         .         .         .         .
10516 159.         .         .        O   I    .         .        .         .    S    .         .         .         .         .
10518 160.         .         .         .  O   I .         .        .         .     S  .         .         .         .         .
10520 161. . . . . . . . . . . . . . . . . O . .I. . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . .
10522 162.         .         .         .      O .  I     .         .         .        S         .         .         .         .
10524 163.         .         .         .         .O   I  .         .         .         .S        .         .         .         .
10526 164.         .         .         .         .  O   I.         .         .         .  S      .         .         .         .
10528 165.         .         .         .         .    O  .I        .         .         .   S     .         .         .         .
10530 166.         .         .         .         .      O.  I      .         .         .    S    .         .         .         .
10532 167.         .         .         .         .       .O   I     .         .         .     S  .         .         .         .
10534 168.         .         .         .         .         .  O  I .         .         .      S .         .         .         .
10536 169.         .         .         .         .         .    O  I         .         .       S.         .         .         .
10538 170.         .         .         .         .         .      O .I       .         .        S         .         .         .
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . . O .I. . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . .
10542 172.         .         .         .         .         .        .O  I     .         .         . S       .         .         .
10544 173.         .         .         .         .         .        .  O  I   .         .         .  S      .         .         .
10546 174.         .         .         .         .         .        .   O  I  .         .         .  S      .         .         .
10548 175.         .         .         .         .         .        .    O I  .         .         .   S     .         .         .
10550 176.         .         .         .         .         .        .     O I .         .         .   S     .         .         .
10552 177.         .         .         .         .         .        .      O I.         .         .    S    .         .         .
10554 178.         .         .         .         .         .        .       OI.         .         .    S    .         .         .
10556 179.         .         .         .         .         .        .        OI         .         .     S   .         .         .
10558 180.         .         .         .         .         .        .        OI         .         .     S   .         .         .
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .OI . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . .
10602 182.         .         .         .         .         .        .         I         .         .     S   .         .         .
10604 183.         .         .         .         .         .        .         I         .         .     S   .         .         .
10606 184.         .         .         .         .         .        .         I         .         .     S   .         .         .
10608 185.         .         .         .         .         .        .        IO         .         .     S   .         .         .
10610 186.         .         .         .         .         .        .        I.         .         .     S   .         .         .
10612 187.         .         .         .         .         .        .        I.         .         .     S   .         .         .
10614 188.         .         .         .         .         .        .       IO.         .         .     S   .         .         .
10616 189.         .         .         .         .         .        .       IO.         .         .     S   .         .         .
10618 190.         .         .         .         .         .        .      IO .         .         .    S    .         .         .
10620 191. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .IO . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . .
10622 192.         .         .         .         .         .        .     IO .         .         .    S    .         .         .
10624 193.         .         .         .         .         .        .    IO  .         .         .    S    .         .         .
10626 194.         .         .         .         .         .        .    IO  .         .         .   S     .         .         .
10628 195.         .         .         .         .         .        .   IO   .         .         .   S     .         .         .
10630 196.         .         .         .         .         .        .  I O   .         .         .   S     .         .         .
10632 197.         .         .         .         .         .        . I O    .         .         .  S      .         .         .
10634 198.         .         .         .         .         .        . IO     .         .         .  S      .         .         .
10636 199.         .         .         .         .         .        .IO      .         .         . S       .         .         .
10638 200.         .         .         .         .         .        I O      .         .         . S       .         .         .
10640 201. . . . . . . . . . . . . . . . . . . . . . . . . . . . .I.O. . . . . . . . . . . . . . . . S . . . . . . . . . . . . . .
10642 202.         .         .         .         .         .       IO        .         .         .S        .         .         .
10644 203.         .         .         .         .         .      IO.        .         .         .S        .         .         .
10646 204.         .         .         .         .         .     I O.        .         .         S         .         .         .
10648 205.         .         .         .         .         .     IO .        .         .         S         .         .         .
10650 206.         .         .         .         .         .    IO  .        .         .         S         .         .         .
10652 207.         .         .         .         .         .   IO   .        .         .        S.         .         .         .
10654 208.         .         .         .         .         .   IO   .        .         .        S.         .         .         .
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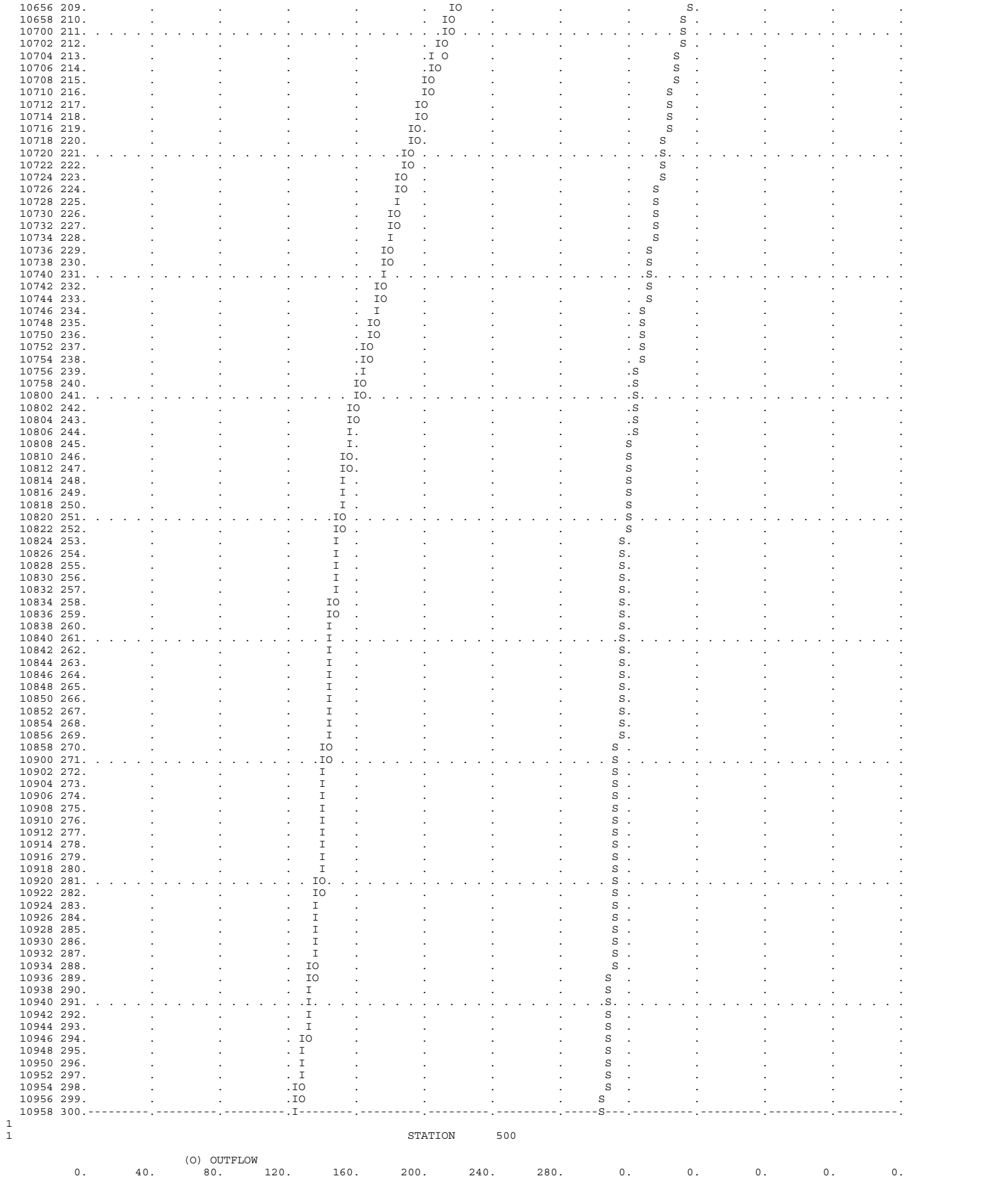
STATION 500
(O) OUTFLOW
(L) PRECIP, (X) EXCESS
DAHRMN PER

```
10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
10016   9O         .         .         .         .         .         .         .         .         .         .         .         L.
10018  10O         .         .         .         .         .         .         .         .         .         .         .        LL.
10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10022  12O         .         .         .         .         .         .         .         .         .         .         .        LL.
10024  13O         .         .         .         .         .         .         .         .         .         .         .        LL.
10026  14O         .         .         .         .         .         .         .         .         .         .         .        LL.
10028  15O         .         .         .         .         .         .         .         .         .         .         .        LL.
10030  16O         .         .         .         .         .         .         .         .         .         .         .        LL.
10032  17O         .         .         .         .         .         .         .         .         .         .         .        LL.
10034  18O         .         .         .         .         .         .         .         .         .         .         .        LL.
10036  19O         .         .         .         .         .         .         .         .         .         .         .        LL.
10038  20O         .         .         .         .         .         .         .         .         .         .         .        LL.
10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10042  22O         .         .         .         .         .         .         .         .         .         .         .        LL.
10044  23O         .         .         .         .         .         .         .         .         .         .         .        LL.
10046  24O         .         .         .         .         .         .         .         .         .         .         .        LL.
10048  25O         .         .         .         .         .         .         .         .         .         .         .        LL.
10050  26O         .         .         .         .         .         .         .         .         .         .         .        LL.
10052  27O         .         .         .         .         .         .         .         .         .         .         .        LL.
10054  28O         .         .         .         .         .         .         .         .         .         .         .        LL.
10056  29O         .         .         .         .         .         .         .         .         .         .         .        LL.
10058  30O         .         .         .         .         .         .         .         .         .         .         .        LL.
10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10102  32O         .         .         .         .         .         .         .         .         .         .         .        LL.
10104  33O         .         .         .         .         .         .         .         .         .         .         .        LL.
10106  34O         .         .         .         .         .         .         .         .         .         .         .        LL.
10108  35O         .         .         .         .         .         .         .         .         .         .         .        LL.
10110  36O         .         .         .         .         .         .         .         .         .         .         .        LL.
10112  37O         .         .         .         .         .         .         .         .         .         .         .        LL.
10114  38O         .         .         .         .         .         .         .         .         .         .         .        LL.
10116  39O         .         .         .         .         .         .         .         .         .         .         .        LL.
10118  40O         .         .         .         .         .         .         .         .         .         .         .        LL.
10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10122  42O         .         .         .         .         .         .         .         .         .         .         .        LL.
10124  43O         .         .         .         .         .         .         .         .         .         .         .        LL.
10126  44O         .         .         .         .         .         .         .         .         .         .         .        LL.
10128  45O         .         .         .         .         .         .         .         .         .         .         .        LL.
10130  46O         .         .         .         .         .         .         .         .         .         .         .        LL.
10132  47O         .         .         .         .         .         .         .         .         .         .         .        LL.
10134  48O         .         .         .         .         .         .         .         .         .         .         .        LL.
10136  49O         .         .         .         .         .         .         .         .         .         .         .        LL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .        LL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .        LL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .        LL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .        LL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .        LL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .        LL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .        LL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .        LL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .        LL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .        LL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
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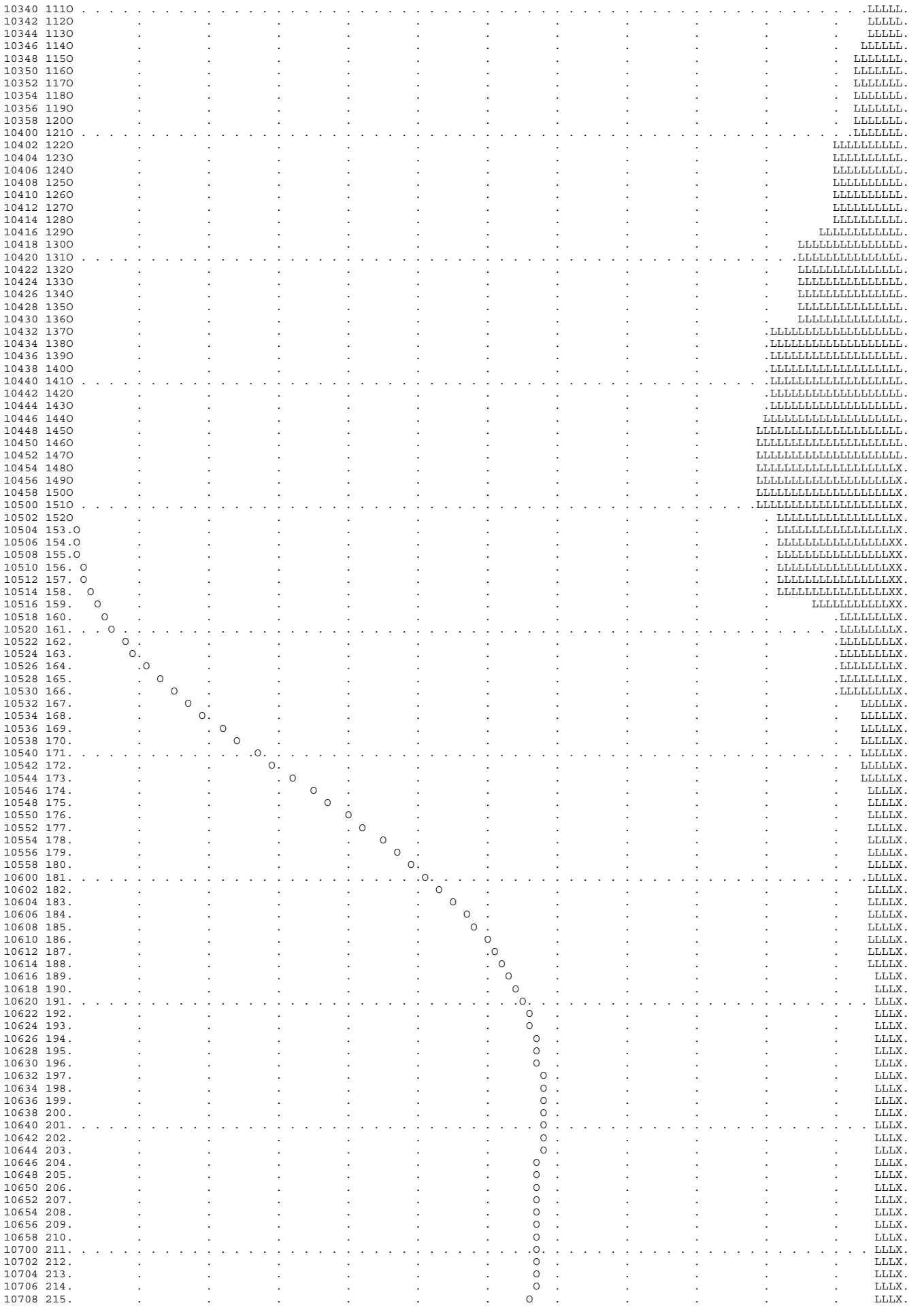

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  10712 217.         .         .         .         .         .         .     O   .         .         .         .         .     LLLX.
  10714 218.         .         .         .         .         .         .     O   .         .         .         .         .     LLLX.
  10716 219.         .         .         .         .         .         .     O   .         .         .         .         .     LLLX.
  10718 220.         .         .         .         .         .         .     O   .         .         .         .         .     LLLX.
  10720 221. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . LLLX.
  10722 222.         .         .         .         .         .         .     O   .         .         .         .         .     LLLX.
  10724 223.         .         .         .         .         .         .     O   .         .         .         .         .     LLLX.
  10726 224.         .         .         .         .         .         .     O   .         .         .         .         .     LLLX.
  10728 225.         .         .         .         .         .         .     O   .         .         .         .         .     LLLX.
  10730 226.         .         .         .         .         .         .    O    .         .         .         .         .     LLLX.
  10732 227.         .         .         .         .         .         .    O    .         .         .         .         .       LX.
  10734 228.         .         .         .         .         .         .    O    .         .         .         .         .       LX.
  10736 229.         .         .         .         .         .         .    O    .         .         .         .         .       LX.
  10738 230.         .         .         .         .         .         .    O    .         .         .         .         .       LX.
  10740 231. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . LX.
  10742 232.         .         .         .         .         .         .    O    .         .         .         .         .       LX.
  10744 233.         .         .         .         .         .         .    O    .         .         .         .         .       LX.
  10746 234.         .         .         .         .         .         .    O    .         .         .         .         .      LLX.
  10748 235.         .         .         .         .         .         .   O     .         .         .         .         .     LLLX.
  10750 236.         .         .         .         .         .         .   O     .         .         .         .         .     LLLX.
  10752 237.         .         .         .         .         .         .   O     .         .         .         .         .     LLLX.
  10754 238.         .         .         .         .         .         .   O     .         .         .         .         .     LLLX.
  10756 239.         .         .         .         .         .         .   O     .         .         .         .         .     LLLX.
  10758 240.         .         .         .         .         .         .   O     .         .         .         .         .     LLLX.
  10800 241. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . LLLX.
  10802 242.         .         .         .         .         .         .  O      .         .         .         .         .      LLX.
  10804 243.         .         .         .         .         .         .  O      .         .         .         .         .      LLX.
  10806 244.         .         .         .         .         .         .  O      .         .         .         .         .      LLX.
  10808 245.         .         .         .         .         .         .  O      .         .         .         .         .      LLX.
  10810 246.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10812 247.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10814 248.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10816 249.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10818 250.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
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  10822 252.         .         .         .         .         .         .O        .         .         .         .         .      LLX.
  10824 253.         .         .         .         .         .         .O        .         .         .         .         .      LLX.
  10826 254.         .         .         .         .         .         .O        .         .         .         .         .      LLX.
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  10836 259.         .         .         .         .         .         .O        .         .         .         .         .      LLX.
  10838 260.         .         .         .         .         .         .O        .         .         .         .         .      LLX.
  10840 261. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
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  10844 263.         .         .         .         .         .         .O        .         .         .         .         .      LLX.
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  10854 268.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10856 269.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10858 270.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10900 271. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . .LLX.
  10902 272.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10904 273.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10906 274.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10908 275.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10910 276.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
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  10914 278.         .         .         .         .         .         . O       .         .         .         .         .      LLX.
  10916 279.         .         .         .         .         .         .  O      .         .         .         .         .      LLX.
  10918 280.         .         .         .         .         .         .  O      .         .         .         .         .       LX.
  10920 281. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . LX.
  10922 282.         .         .         .         .         .         . O       .         .         .         .         .       LX.
  10924 283.         .         .         .         .         .         . O       .         .         .         .         .       LX.
  10926 284.         .         .         .         .         .         . O       .         .         .         .         .       LX.
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  10936 289.         .         .         .         .         .         . O       .         .         .         .         .       LX.
  10938 290.         .         .         .         .         .         . O       .         .         .         .         .       LX.
  10940 291. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . LX.
  10942 292.         .         .         .         .         .         .O        .         .         .         .         .       LX.
  10944 293.         .         .         .         .         .         .O        .         .         .         .         .       LX.
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  10948 295.         .         .         .         .         .         O         .         .         .         .         .       LX.
  10950 296.         .         .         .         .         .         O         .         .         .         .         .       LX.
  10952 297.         .         .         .         .         .         O         .         .         .         .         .       LX.
  10954 298.         .         .         .         .         .         O         .         .         .         .         .       LX.
  10956 299.         .         .         .         .         .        O.         .         .         .         .         .       LX.
  10958 300.---------.---------.---------.---------.---------.--------O.---------.---------.---------.---------.---------.-------LX.
1
1                                                          STATION        C

                          (O) OUTFLOW
          0.      200.      400.      600.      800.     1000.     1200.     1400.     1600.     1800.        0.        0.        0.
 DAHRMN PER
  10000    1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002    2O        .         .         .         .         .         .         .         .         .         .         .         .
  10004    3O        .         .         .         .         .         .         .         .         .         .         .         .
  10006    4O        .         .         .         .         .         .         .         .         .         .         .         .
  10008    5O        .         .         .         .         .         .         .         .         .         .         .         .
  10010    6O        .         .         .         .         .         .         .         .         .         .         .         .
  10012    7O        .         .         .         .         .         .         .         .         .         .         .         .
  10014    8O        .         .         .         .         .         .         .         .         .         .         .         .
  10016    9O        .         .         .         .         .         .         .         .         .         .         .         .
  10018   10O        .         .         .         .         .         .         .         .         .         .         .         .
  10020   11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022   12O        .         .         .         .         .         .         .         .         .         .         .         .
  10024   13O        .         .         .         .         .         .         .         .         .         .         .         .
  10026   14O        .         .         .         .         .         .         .         .         .         .         .         .
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10028 15O
10030 16O
10032 17O
10034 18O
10036 19O
10038 20O
10040 21O
10042 22O
10044 23O
10046 24O
10048 25O
10050 26O
10052 27O
10054 28O
10056 29O
10058 30O
10100 31O
10102 32O
10104 33O
10106 34O
10108 35O
10110 36O
10112 37O
10114 38O
10116 39O
10118 40O
10120 41O
10122 42O
10124 43O
10126 44O
10128 45O
10130 46O
10132 47O
10134 48O
10136 49O
10138 50O
10140 51O
10142 52O
10144 53O
10146 54O
10148 55O
10150 56O
10152 57O
10154 58O
10156 59O
10158 60O
10200 61O
10202 62O
10204 63O
10206 64O
10208 65O
10210 66O
10212 67O
10214 68O
10216 69O
10218 70O
10220 71O
10222 72O
10224 73O
10226 74O
10228 75O
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10232 77O
10234 78O
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10302 92O
10304 93O
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10312 97O
10314 98O
10316 99O
10318 100O
10320 101O
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10332 107O
10334 108O
10336 109O
10338 110O
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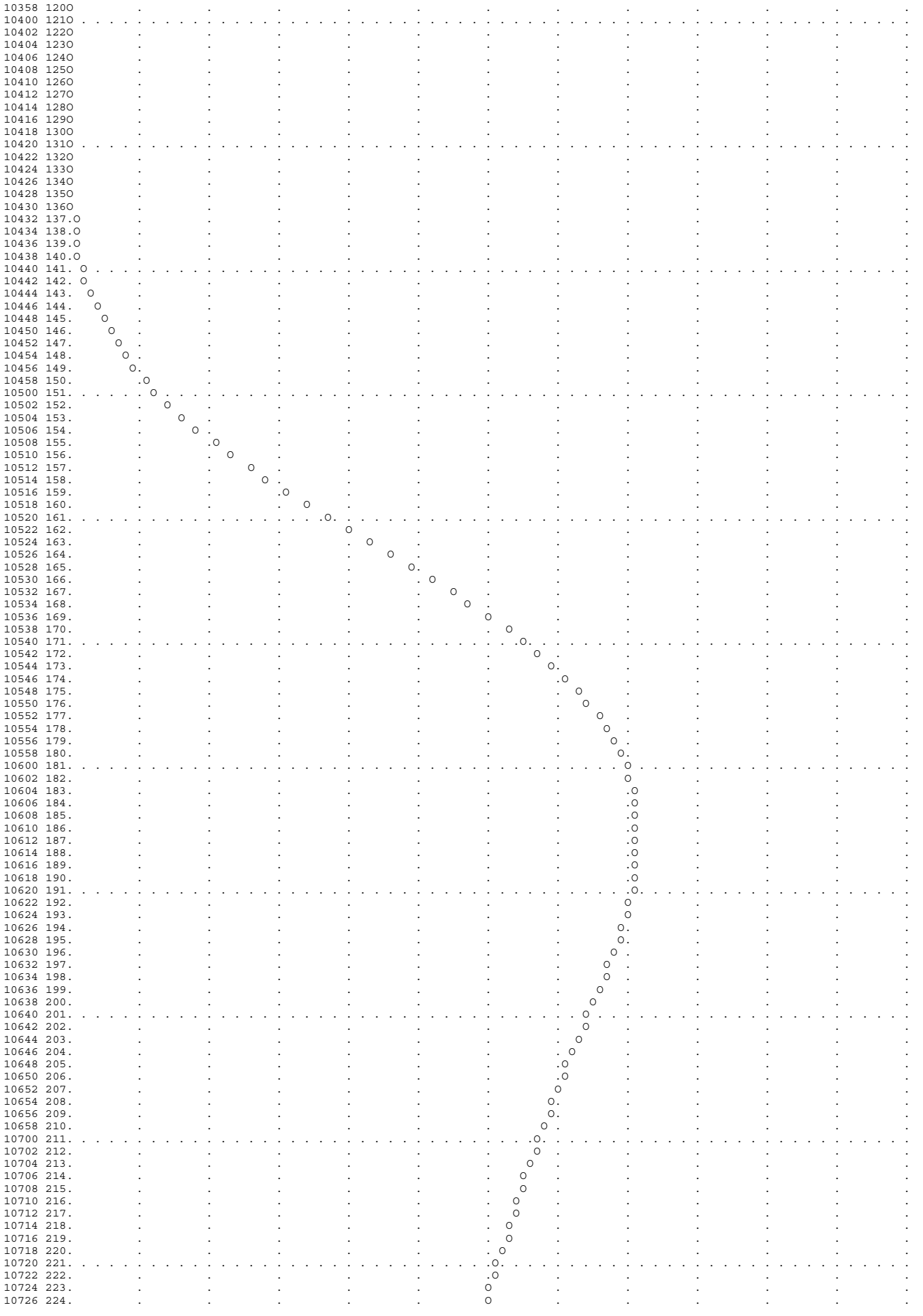
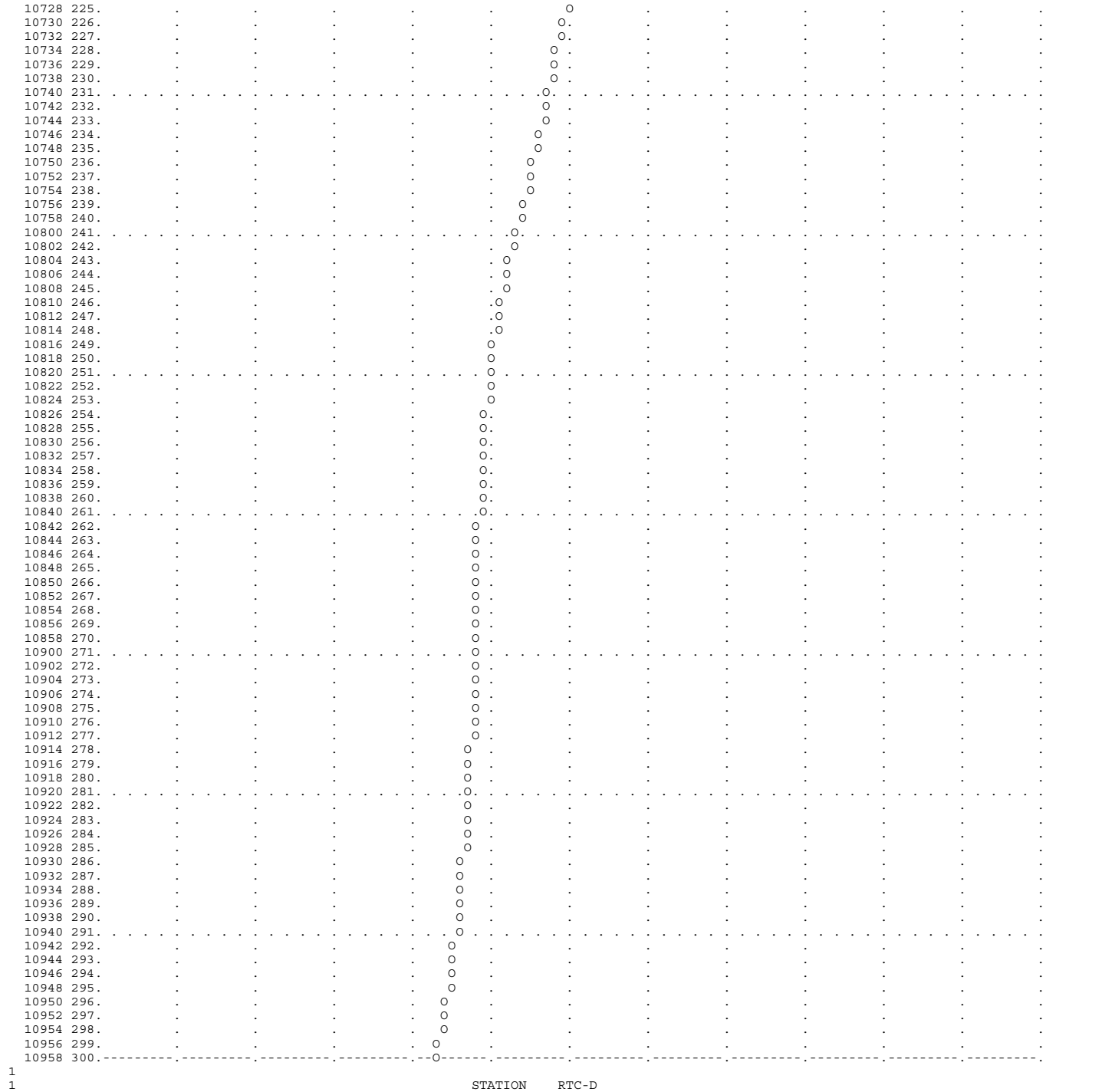
10344 113O
10346 114O
10348 115O
10350 116O
10352 117O
10354 118O
10356 119O




STATION RTC-D
(I) INFLOW, (O) OUTFLOW
0. 200. 400. 600. 800. 1000. 1200. 1400. 1600. 1800. 0. 0. 0.
(S) STORAGE
0. 0. 0. 0. 0. 0. 0. 4. 8. 12. 16. 0. 0.
DAHRMN PER

```
10042  22I        .         .         .         .         .         S         .         .         .         .         .         .
10044  23I        .         .         .         .         .         S         .         .         .         .         .         .
10046  24I        .         .         .         .         .         S         .         .         .         .         .         .
10048  25I        .         .         .         .         .         S         .         .         .         .         .         .
10050  26I        .         .         .         .         .         S         .         .         .         .         .         .
10052  27I        .         .         .         .         .         S         .         .         .         .         .         .
10054  28I        .         .         .         .         .         S         .         .         .         .         .         .
10056  29I        .         .         .         .         .         S         .         .         .         .         .         .
10058  30I        .         .         .         .         .         S         .         .         .         .         .         .
10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10102  32I        .         .         .         .         .         S         .         .         .         .         .         .
10104  33I        .         .         .         .         .         S         .         .         .         .         .         .
10106  34I        .         .         .         .         .         S         .         .         .         .         .         .
10108  35I        .         .         .         .         .         S         .         .         .         .         .         .
10110  36I        .         .         .         .         .         S         .         .         .         .         .         .
10112  37I        .         .         .         .         .         S         .         .         .         .         .         .
10114  38I        .         .         .         .         .         S         .         .         .         .         .         .
10116  39I        .         .         .         .         .         S         .         .         .         .         .         .
10118  40I        .         .         .         .         .         S         .         .         .         .         .         .
10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10122  42I        .         .         .         .         .         S         .         .         .         .         .         .
10124  43I        .         .         .         .         .         S         .         .         .         .         .         .
10126  44I        .         .         .         .         .         S         .         .         .         .         .         .
10128  45I        .         .         .         .         .         S         .         .         .         .         .         .
10130  46I        .         .         .         .         .         S         .         .         .         .         .         .
10132  47I        .         .         .         .         .         S         .         .         .         .         .         .
10134  48I        .         .         .         .         .         S         .         .         .         .         .         .
10136  49I        .         .         .         .         .         S         .         .         .         .         .         .
10138  50I        .         .         .         .         .         S         .         .         .         .         .         .
10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10142  52I        .         .         .         .         .         S         .         .         .         .         .         .
10144  53I        .         .         .         .         .         S         .         .         .         .         .         .
10146  54I        .         .         .         .         .         S         .         .         .         .         .         .
10148  55I        .         .         .         .         .         S         .         .         .         .         .         .
10150  56I        .         .         .         .         .         S         .         .         .         .         .         .
10152  57I        .         .         .         .         .         S         .         .         .         .         .         .
10154  58I        .         .         .         .         .         S         .         .         .         .         .         .
10156  59I        .         .         .         .         .         S         .         .         .         .         .         .
10158  60I        .         .         .         .         .         S         .         .         .         .         .         .
10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62I        .         .         .         .         .         S         .         .         .         .         .         .
10204  63I        .         .         .         .         .         S         .         .         .         .         .         .
10206  64I        .         .         .         .         .         S         .         .         .         .         .         .
10208  65I        .         .         .         .         .         S         .         .         .         .         .         .
10210  66I        .         .         .         .         .         S         .         .         .         .         .         .
10212  67I        .         .         .         .         .         S         .         .         .         .         .         .
10214  68I        .         .         .         .         .         S         .         .         .         .         .         .
10216  69I        .         .         .         .         .         S         .         .         .         .         .         .
10218  70I        .         .         .         .         .         S         .         .         .         .         .         .
10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72I        .         .         .         .         .         S         .         .         .         .         .         .
10224  73I        .         .         .         .         .         S         .         .         .         .         .         .
10226  74I        .         .         .         .         .         S         .         .         .         .         .         .
10228  75I        .         .         .         .         .         S         .         .         .         .         .         .
10230  76I        .         .         .         .         .         S         .         .         .         .         .         .
10232  77I        .         .         .         .         .         S         .         .         .         .         .         .
10234  78I        .         .         .         .         .         S         .         .         .         .         .         .
10236  79I        .         .         .         .         .         S         .         .         .         .         .         .
10238  80I        .         .         .         .         .         S         .         .         .         .         .         .
10240  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82I        .         .         .         .         .         S         .         .         .         .         .         .
10244  83I        .         .         .         .         .         S         .         .         .         .         .         .
10246  84I        .         .         .         .         .         S         .         .         .         .         .         .
10248  85I        .         .         .         .         .         S         .         .         .         .         .         .
10250  86I        .         .         .         .         .         S         .         .         .         .         .         .
10252  87I        .         .         .         .         .         S         .         .         .         .         .         .
10254  88I        .         .         .         .         .         S         .         .         .         .         .         .
10256  89I        .         .         .         .         .         S         .         .         .         .         .         .
10258  90I        .         .         .         .         .         S         .         .         .         .         .         .
10300  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92I        .         .         .         .         .         S         .         .         .         .         .         .
10304  93I        .         .         .         .         .         S         .         .         .         .         .         .
10306  94I        .         .         .         .         .         S         .         .         .         .         .         .
10308  95I        .         .         .         .         .         S         .         .         .         .         .         .
10310  96I        .         .         .         .         .         S         .         .         .         .         .         .
10312  97I        .         .         .         .         .         S         .         .         .         .         .         .
10314  98I        .         .         .         .         .         S         .         .         .         .         .         .
10316  99I        .         .         .         .         .         S         .         .         .         .         .         .
10318 100I        .         .         .         .         .         S         .         .         .         .         .         .
10320 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102I        .         .         .         .         .         S         .         .         .         .         .         .
10324 103I        .         .         .         .         .         S         .         .         .         .         .         .
10326 104I        .         .         .         .         .         S         .         .         .         .         .         .
10328 105I        .         .         .         .         .         S         .         .         .         .         .         .
10330 106I        .         .         .         .         .         S         .         .         .         .         .         .
10332 107I        .         .         .         .         .         S         .         .         .         .         .         .
10334 108I        .         .         .         .         .         S         .         .         .         .         .         .
10336 109I        .         .         .         .         .         S         .         .         .         .         .         .
10338 110I        .         .         .         .         .         S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I        .         .         .         .         .         S         .         .         .         .         .         .
10344 113I        .         .         .         .         .         S         .         .         .         .         .         .
10346 114I        .         .         .         .         .         S         .         .         .         .         .         .
10348 115I        .         .         .         .         .         S         .         .         .         .         .         .
10350 116I        .         .         .         .         .         S         .         .         .         .         .         .
10352 117I        .         .         .         .         .         S         .         .         .         .         .         .
10354 118I        .         .         .         .         .         S         .         .         .         .         .         .
10356 119I        .         .         .         .         .         S         .         .         .         .         .         .
10358 120I        .         .         .         .         .         S         .         .         .         .         .         .
10400 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122I        .         .         .         .         .         S         .         .         .         .         .         .
10404 123I        .         .         .         .         .         S         .         .         .         .         .         .
10406 124I        .         .         .         .         .         S         .         .         .         .         .         .
10408 125I        .         .         .         .         .         S         .         .         .         .         .         .
10410 126I        .         .         .         .         .         S         .         .         .         .         .         .
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10412 127I         .         .         .         .         .         S         .         .         .         .         .         .
10414 128I         .         .         .         .         .         S         .         .         .         .         .         .
10416 129I         .         .         .         .         .         S         .         .         .         .         .         .
10418 130I         .         .         .         .         .         S         .         .         .         .         .         .
10420 131I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132I         .         .         .         .         .         S         .         .         .         .         .         .
10424 133I         .         .         .         .         .         S         .         .         .         .         .         .
10426 134I         .         .         .         .         .         S         .         .         .         .         .         .
10428 135I         .         .         .         .         .         S         .         .         .         .         .         .
10430 136I         .         .         .         .         .         S         .         .         .         .         .         .
10432 137OI        .         .         .         .         .         S         .         .         .         .         .         .
10434 138OI        .         .         .         .         .         S         .         .         .         .         .         .
10436 139.I        .         .         .         .         .         S         .         .         .         .         .         .
10438 140.I        .         .         .         .         .         S         .         .         .         .         .         .
10440 141.OI . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142.OI       .         .         .         .         .         .S        .         .         .         .         .         .
10444 143. OI      .         .         .         .         .         .S        .         .         .         .         .         .
10446 144. O I     .         .         .         .         .         .S        .         .         .         .         .         .
10448 145.  O I    .         .         .         .         .         .S        .         .         .         .         .         .
10450 146.  O  I   .         .         .         .         .         .S        .         .         .         .         .         .
10452 147.   O  I  .         .         .         .         .         . S       .         .         .         .         .         .
10454 148.    O  I .         .         .         .         .         . S       .         .         .         .         .         .
10456 149.     O  I.         .         .         .         .         . S       .         .         .         .         .         .
10458 150.      O  .I        .         .         .         .         .  S      .         .         .         .         .         .
10500 151. . . . .O. I . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.         O   I     .         .         .         .         .   S     .         .         .         .         .         .
10504 153.         .O    I   .         .         .         .         .    S    .         .         .         .         .         .
10506 154.         .  O    I .         .         .         .         .    S    .         .         .         .         .         .
10508 155.         .    O    .I        .         .         .         .     S   .         .         .         .         .         .
10510 156.         .      O  .  I      .         .         .         .      S  .         .         .         .         .         .
10512 157.         .        O.     I   .         .         .         .       S .         .         .         .         .         .
10514 158.         .         .O      I .         .         .         .        S.         .         .         .         .         .
10516 159.         .         .   O     .I        .         .         .         S         .         .         .         .         .
10518 160.         .         .     O   .   I     .         .         .         .S        .         .         .         .         .
10520 161. . . . . . . . . . . . . . .O. . . .I. . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.         .         .         . O       I         .         .         .  S      .         .         .         .         .
10524 163.         .         .         .   O     .  I      .         .         .   S     .         .         .         .         .
10526 164.         .         .         .      O  .     I   .         .         .    S    .         .         .         .         .
10528 165.         .         .         .         O        I.         .         .     S   .         .         .         .         .
10530 166.         .         .         .         .  O      . I       .         .       S .         .         .         .         .
10532 167.         .         .         .         .     O   .    I    .         .        S.         .         .         .         .
10534 168.         .         .         .         .        O.      I  .         .         S         .         .         .         .
10536 169.         .         .         .         .         . O       I         .         .S        .         .         .         .
10538 170.         .         .         .         .         .    O    .  I      .         . S       .         .         .         .
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . .I. . . . . . . . .S. . . . . . . . . . . . . . . . . . .
10542 172.         .         .         .         .         .         O      I  .         .   S     .         .         .         .
10544 173.         .         .         .         .         .         . O      I.         .    S    .         .         .         .
10546 174.         .         .         .         .         .         .   O     .I        .     S   .         .         .         .
10548 175.         .         .         .         .         .         .      O  .  I      .      S  .         .         .         .
10550 176.         .         .         .         .         .         .        O.   I     .       S .         .         .         .
10552 177.         .         .         .         .         .         .         O     I   .        S.         .         .         .
10554 178.         .         .         .         .         .         .         . O    I  .        S.         .         .         .
10556 179.         .         .         .         .         .         .         .   O   I .         S         .         .         .
10558 180.         .         .         .         .         .         .         .    O   I.         .S        .         .         .
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . I . . . . .S. . . . . . . . . . . . . . .
10602 182.         .         .         .         .         .         .         .      O  I         . S       .         .         .
10604 183.         .         .         .         .         .         .         .       O .I        . S       .         .         .
10606 184.         .         .         .         .         .         .         .        O.I        . S       .         .         .
10608 185.         .         .         .         .         .         .         .         OI        . S       .         .         .
10610 186.         .         .         .         .         .         .         .         OI        .  S      .         .         .
10612 187.         .         .         .         .         .         .         .         .I        .  S      .         .         .
10614 188.         .         .         .         .         .         .         .         .I        .  S      .         .         .
10616 189.         .         .         .         .         .         .         .         .I        .  S      .         .         .
10618 190.         .         .         .         .         .         .         .         .I        .  S      .         .         .
10620 191. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .I. . . . . .S. . . . . . . . . . . . . .
10622 192.         .         .         .         .         .         .         .         IO        .  S      .         .         .
10624 193.         .         .         .         .         .         .         .         IO        .  S      .         .         .
10626 194.         .         .         .         .         .         .         .        IO         .  S      .         .         .
10628 195.         .         .         .         .         .         .         .        IO         .  S      .         .         .
10630 196.         .         .         .         .         .         .         .       IO.         . S       .         .         .
10632 197.         .         .         .         .         .         .         .      I O.         . S       .         .         .
10634 198.         .         .         .         .         .         .         .      IO .         . S       .         .         .
10636 199.         .         .         .         .         .         .         .     I O .         . S       .         .         .
10638 200.         .         .         .         .         .         .         .    I O  .         .S        .         .         .
10640 201. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . I O . . . . . . . .S. . . . . . . . . . . . . . .
10642 202.         .         .         .         .         .         .         .   I O   .         .S        .         .         .
10644 203.         .         .         .         .         .         .         .  I O    .         .S        .         .         .
10646 204.         .         .         .         .         .         .         . I O     .         S         .         .         .
10648 205.         .         .         .         .         .         .         .I  O     .         S         .         .         .
10650 206.         .         .         .         .         .         .         .I O      .         S         .         .         .
10652 207.         .         .         .         .         .         .         I O       .        S.         .         .         .
10654 208.         .         .         .         .         .         .        I.O        .        S.         .         .         .
10656 209.         .         .         .         .         .         .        I.O        .        S.         .         .         .
10658 210.         .         .         .         .         .         .       I O         .        S.         .         .         .
10700 211. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .I.O. . . . . . . . . . S . . . . . . . . . . . . . . . .
10702 212.         .         .         .         .         .         .      I O.         .       S .         .         .         .
10704 213.         .         .         .         .         .         .     I O .         .       S .         .         .         .
10706 214.         .         .         .         .         .         .    I O  .         .      S  .         .         .         .
10708 215.         .         .         .         .         .         .    I O  .         .      S  .         .         .         .
10710 216.         .         .         .         .         .         .   I O   .         .      S  .         .         .         .
10712 217.         .         .         .         .         .         .   IO    .         .      S  .         .         .         .
10714 218.         .         .         .         .         .         .  I O    .         .     S   .         .         .         .
10716 219.         .         .         .         .         .         .  IO     .         .     S   .         .         .         .
10718 220.         .         .         .         .         .         . I O     .         .     S   .         .         .         .
10720 221. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .I.O. . . . . . . . . . . S . . . . . . . . . . . . . . . . .
10722 222.         .         .         .         .         .         .I O      .         .    S    .         .         .         .
10724 223.         .         .         .         .         .         I O       .         .    S    .         .         .         .
10726 224.         .         .         .         .         .         I O       .         .    S    .         .         .         .
10728 225.         .         .         .         .         .         IO        .         .    S    .         .         .         .
10730 226.         .         .         .         .         .        I.O        .         .    S    .         .         .         .
10732 227.         .         .         .         .         .        IO         .         .   S     .         .         .         .
10734 228.         .         .         .         .         .       I O         .         .   S     .         .         .         .
10736 229.         .         .         .         .         .       IO.         .         .   S     .         .         .         .
10738 230.         .         .         .         .         .       IO.         .         .   S     .         .         .         .
10740 231. . . . . . . . . . . . . . . . . . . . . . . . . . . .IO . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . .
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  10742 232.         .         .         .         .         .      IO .         .         .   S     .         .         .         .
  10744 233.         .         .         .         .         .      IO .         .         .  S      .         .         .         .
  10746 234.         .         .         .         .         .     IO  .         .         .  S      .         .         .         .
  10748 235.         .         .         .         .         .     IO  .         .         .  S      .         .         .         .
  10750 236.         .         .         .         .         .    I O  .         .         .  S      .         .         .         .
  10752 237.         .         .         .         .         .    IO   .         .         .  S      .         .         .         .
  10754 238.         .         .         .         .         .    IO   .         .         .  S      .         .         .         .
  10756 239.         .         .         .         .         .   IO    .         .         .  S      .         .         .         .
  10758 240.         .         .         .         .         .   IO    .         .         . S       .         .         .         .
  10800 241. . . . . . . . . . . . . . . . . . . . . . . . . .IO . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . .
  10802 242.         .         .         .         .         .  IO     .         .         . S       .         .         .         .
  10804 243.         .         .         .         .         . I O     .         .         . S       .         .         .         .
  10806 244.         .         .         .         .         . IO      .         .         . S       .         .         .         .
  10808 245.         .         .         .         .         . IO      .         .         . S       .         .         .         .
  10810 246.         .         .         .         .         .IO       .         .         .S        .         .         .         .
  10812 247.         .         .         .         .         .IO       .         .         .S        .         .         .         .
  10814 248.         .         .         .         .         .IO       .         .         .S        .         .         .         .
  10816 249.         .         .         .         .         IO        .         .         .S        .         .         .         .
  10818 250.         .         .         .         .         IO        .         .         .S        .         .         .         .
  10820 251. . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . .
  10822 252.         .         .         .         .         IO        .         .         .S        .         .         .         .
  10824 253.         .         .         .         .         I         .         .         .S        .         .         .         .
  10826 254.         .         .         .         .        IO         .         .         S         .         .         .         .
  10828 255.         .         .         .         .        IO         .         .         S         .         .         .         .
  10830 256.         .         .         .         .        IO         .         .         S         .         .         .         .
  10832 257.         .         .         .         .        IO         .         .         S         .         .         .         .
  10834 258.         .         .         .         .        I.         .         .         S         .         .         .         .
  10836 259.         .         .         .         .        I.         .         .         S         .         .         .         .
  10838 260.         .         .         .         .        I.         .         .         S         .         .         .         .
  10840 261. . . . . . . . . . . . . . . . . . . . . . . . .I. . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . .
  10842 262.         .         .         .         .       IO.         .         .         S         .         .         .         .
  10844 263.         .         .         .         .       IO.         .         .         S         .         .         .         .
  10846 264.         .         .         .         .       IO.         .         .         S         .         .         .         .
  10848 265.         .         .         .         .       I .         .         .         S         .         .         .         .
  10850 266.         .         .         .         .       I .         .         .         S         .         .         .         .
  10852 267.         .         .         .         .       I .         .         .         S         .         .         .         .
  10854 268.         .         .         .         .       I .         .         .         S         .         .         .         .
  10856 269.         .         .         .         .       I .         .         .         S         .         .         .         .
  10858 270.         .         .         .         .       I .         .         .         S         .         .         .         .
  10900 271. . . . . . . . . . . . . . . . . . . . . . . . I . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . .
  10902 272.         .         .         .         .       I .         .         .         S         .         .         .         .
  10904 273.         .         .         .         .       I .         .         .         S         .         .         .         .
  10906 274.         .         .         .         .       I .         .         .         S         .         .         .         .
  10908 275.         .         .         .         .       I .         .         .         S         .         .         .         .
  10910 276.         .         .         .         .       I .         .         .        S.         .         .         .         .
  10912 277.         .         .         .         .       I .         .         .        S.         .         .         .         .
  10914 278.         .         .         .         .      IO .         .         .        S.         .         .         .         .
  10916 279.         .         .         .         .      IO .         .         .        S.         .         .         .         .
  10918 280.         .         .         .         .      I  .         .         .        S.         .         .         .         .
  10920 281. . . . . . . . . . . . . . . . . . . . . . . .I. . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
  10922 282.         .         .         .         .      I  .         .         .        S.         .         .         .         .
  10924 283.         .         .         .         .      I  .         .         .        S.         .         .         .         .
  10926 284.         .         .         .         .      I  .         .         .        S.         .         .         .         .
  10928 285.         .         .         .         .      I  .         .         .        S.         .         .         .         .
  10930 286.         .         .         .         .     IO  .         .         .        S.         .         .         .         .
  10932 287.         .         .         .         .     IO  .         .         .        S.         .         .         .         .
  10934 288.         .         .         .         .     IO  .         .         .        S.         .         .         .         .
  10936 289.         .         .         .         .     I   .         .         .        S.         .         .         .         .
  10938 290.         .         .         .         .     I   .         .         .        S.         .         .         .         .
  10940 291. . . . . . . . . . . . . . . . . . . . . . . I . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
  10942 292.         .         .         .         .    IO   .         .         .        S.         .         .         .         .
  10944 293.         .         .         .         .    IO   .         .         .        S.         .         .         .         .
  10946 294.         .         .         .         .    I    .         .         .        S.         .         .         .         .
  10948 295.         .         .         .         .    I    .         .         .       S .         .         .         .         .
  10950 296.         .         .         .         .   IO    .         .         .       S .         .         .         .         .
  10952 297.         .         .         .         .   IO    .         .         .       S .         .         .         .         .
  10954 298.         .         .         .         .   IO    .         .         .       S .         .         .         .         .
  10956 299.         .         .         .         .  IO     .         .         .       S .         .         .         .         .
  10958 300.---------.---------.---------.---------.--IO-----.---------.---------.-------S-.---------.---------.---------.---------.
1
1                                                          STATION      600

                          (O) OUTFLOW
          0.        1.        2.        3.        4.        5.        6.        0.        0.        0.        0.        0.        0.
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .00       .03       .02       .01       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .        L.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .       LL.
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  10048  25O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .       LL.
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10056  29O        .        .        .        .        .        .        .        .        .        .        .      LL.
10058  30O        .        .        .        .        .        .        .        .        .        .        .      LL.
10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LL.
10102  32O        .        .        .        .        .        .        .        .        .        .        .      LL.
10104  33O        .        .        .        .        .        .        .        .        .        .        .      LL.
10106  34O        .        .        .        .        .        .        .        .        .        .        .      LL.
10108  35O        .        .        .        .        .        .        .        .        .        .        .      LL.
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10112  37O        .        .        .        .        .        .        .        .        .        .        .      LL.
10114  38O        .        .        .        .        .        .        .        .        .        .        .      LL.
10116  39O        .        .        .        .        .        .        .        .        .        .        .      LL.
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10122  42O        .        .        .        .        .        .        .        .        .        .        .      LL.
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10132  47O        .        .        .        .        .        .        .        .        .        .        .      LL.
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10338 110O        .        .        .        .        .        .        .        .        .        .    LLLLL.
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10422 132O        .        .        .        .        .        .        .        .        .   LLLLLLLLLLLLLLL.
10424 133O        .        .        .        .        .        .        .        .        .   LLLLLLLLLLLLLLL.
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10430 136O         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLL.
10432 137O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLL.
10434 138O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLL.
10436 139O         .         .         .         .         .         .         .         .         .         .LLLLLLLLLLLLLLLLLL.
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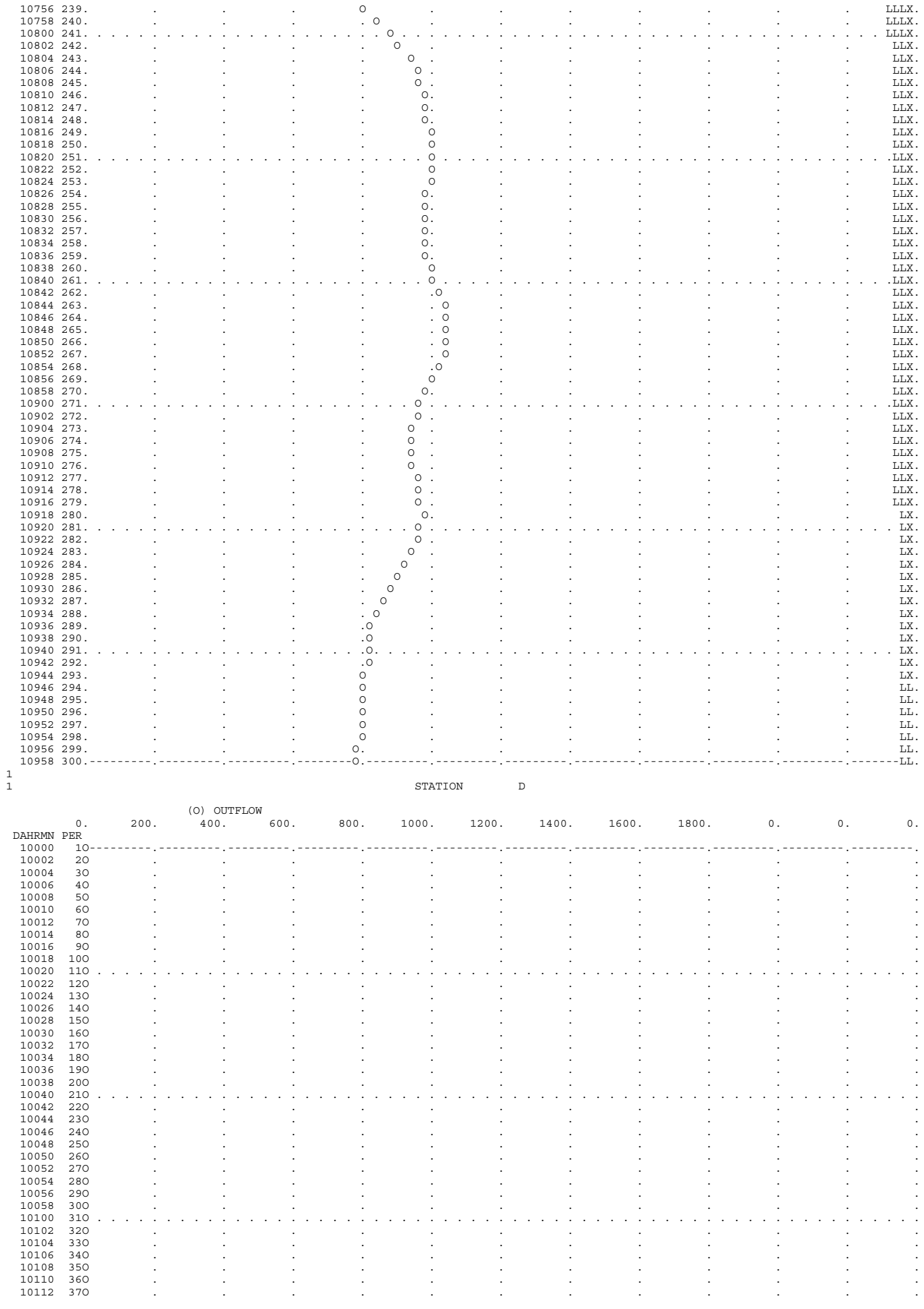
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10958 300.
1
1
STATION D

(O) OUTFLOW
0. 200. 400. 600. 800. 1000. 1200. 1400. 1600. 1800. 0. 0. 0.
DAHRMN PER
10000 1O
10002 2O
10004 3O
10006 4O
10008 5O
10010 6O
10012 7O
10014 8O
10016 9O
10018 10O
10020 11O
10022 12O
10024 13O
10026 14O
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10034 18O
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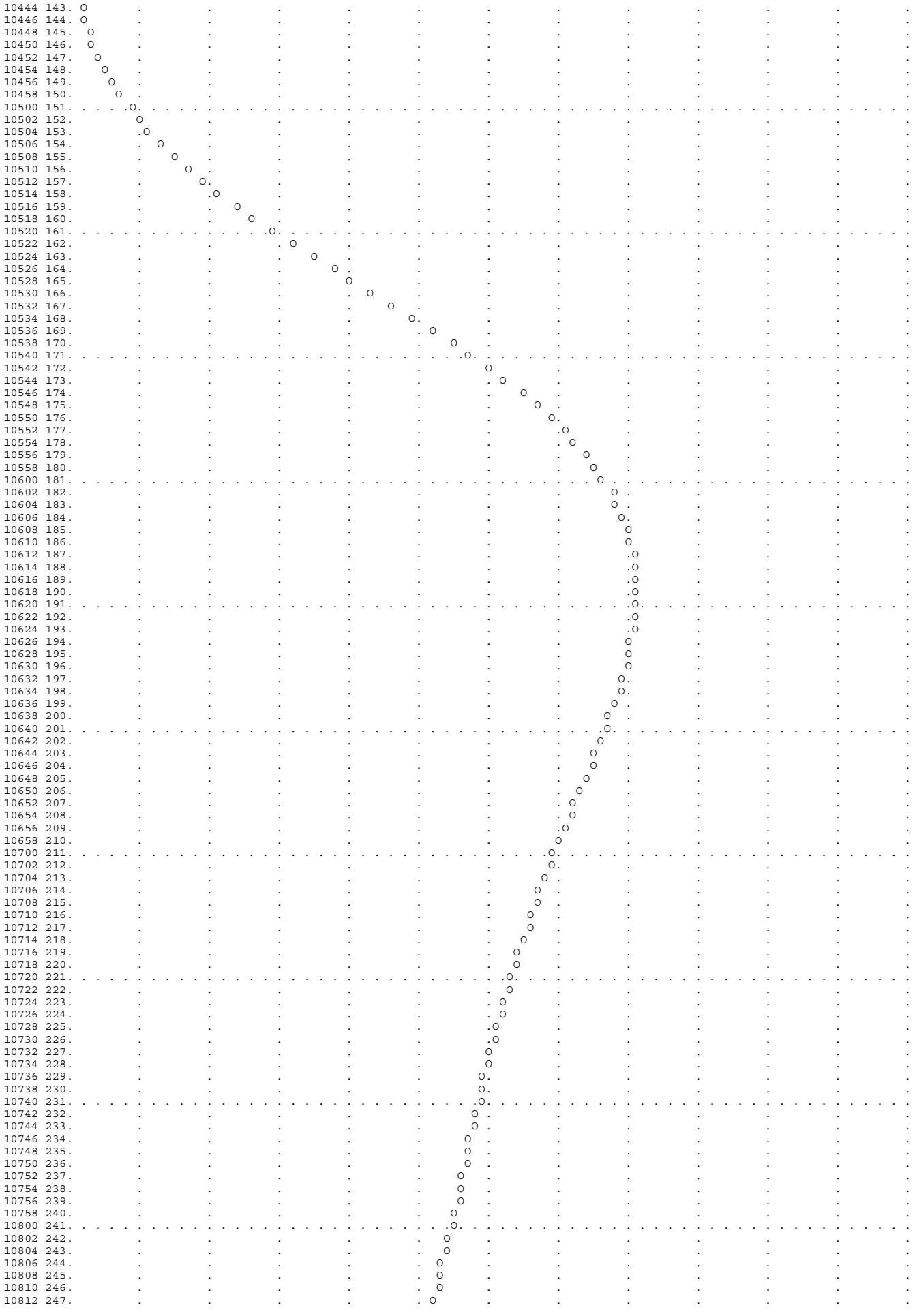

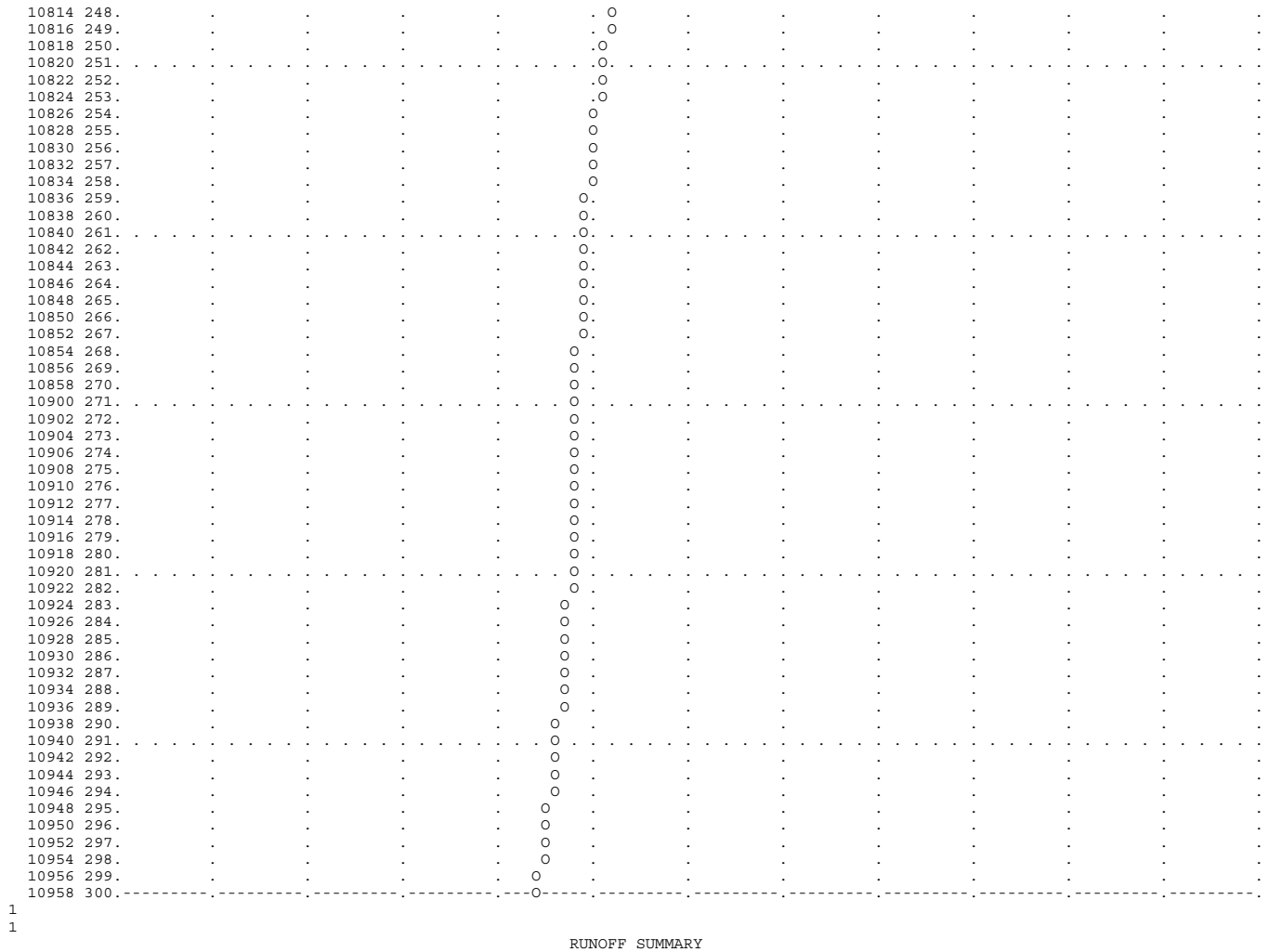

1
1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	100(A)	455.	5.40	164.	99.	99.	3.50		
+	HYDROGRAPH AT	200(A)	278.	5.83	136.	82.	82.	4.90		
+	2 COMBINED AT	A	647.	5.50	300.	181.	181.	8.40		
+	ROUTED TO	RTA-B	479.	6.03	276.	166.	166.	8.40		
+									80.34	6.03
+	HYDROGRAPH AT	300	318.	5.57	130.	78.	78.	3.40		
+	2 COMBINED AT	B	744.	5.77	407.	245.	245.	11.80		
+	HYDROGRAPH AT	400	705.	6.20	361.	217.	217.	8.60		
+	2 COMBINED AT	B	1397.	6.03	767.	462.	462.	20.40		
+	ROUTED TO	RTB-C	1394.	6.10	761.	458.	458.	20.40		
+									30.09	6.10
+	HYDROGRAPH AT	500	271.	6.60	180.	108.	108.	14.10		
+	2 COMBINED AT	C	1629.	6.20	941.	566.	566.	34.50		
+	ROUTED TO	RTC-D	1620.	6.30	926.	558.	558.	34.50		
+									10.46	6.30
+	HYDROGRAPH AT	600	5.	8.83	3.	2.	2.	.40		

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          2 COMBINED AT
+                              D      1624.    6.30         930.        560.        560.      34.90


 *** NORMAL END OF HEC-1 ***
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1.0-YEAR STORM EVENT
1.0” Precipitation

```
1****************************************                                                    ****************************************
 *                                      *                                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                *                                                    *          609 SECOND STREET           *
 *                                      *                                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   29MAR13  TIME  11:39:51  *                                                    *           (916) 756-1104             *
 *                                      *                                                    *                                      *
 ****************************************                                                    ****************************************


                                                X     X  XXXXXXX   XXXXX           X
                                                X     X  X        X     X         XX
                                                X     X  X        X               X
                                                XXXXXXX  XXXX     X        XXXXX   X
                                                X     X  X        X               X
                                                X     X  X        X     X         X
                                                X     X  XXXXXXX   XXXXX         XXX


          THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

          THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                   HEC-1 INPUT                                                   PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                        *DIAGRAM
             1          ID   El Camino Real Bridge Construction Project,
             2          ID   1", 24-HR STORM EVENT
             3          ID   ECR241IB.HC1, 3/29/2012
 *** FREE ***
             4          IT       2       0       0     300
             5          IO       5       2

             6          KK  100(A)  BASIN 100
             7          IN      15
             8          PB     1.0
             9          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
            10          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
            11          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
            12          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
            13          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
            14          BA     3.5
            15          LS       0      85
            16          UD    .306
                        *

            17          KK  200(A)  BASIN 200
            18          IN      15
            19          PB     1.0
            20          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
            21          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
            22          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
            23          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
            24          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
            25          BA     4.9
            26          LS       0      80
            27          UD    .645
                        *

            28          KK       A    100+200
            29          HC       2
                        *

            30          KK   RTA-B
            31          KM   ROUTE BASIN 100 AND 200 THROUGH BASIN 300
            32          RS       1    STOR      -1
            33          RC    0.04   0.035    0.04 12081.5   0.003     160
            34          RX       0   156.5   365.2   533.8   754.0   856.5  1123.8  1316.9
            35          RY     160     140     100      80      80     100     140     144
                        *

            36          KK     300  BASIN 300
            37          IN      15
            38          PB     1.0
            39          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
            40          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
            41          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
            42          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
            43          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
            44          BA     3.4
1                                                   HEC-1 INPUT                                                   PAGE  2

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            45          LS       0      83
            46          UD    .466
                        *

            47          KK       B    100+200+300
            48          HC       2
                        *
```

```
 49          KK     400  BASIN 400
 50          IN      15
 51          PB     1.0
 52          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 53          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 54          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 55          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 56          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 57          BA     8.6
 58          LS       0      85
 59          UD    1.02
             *

 60          KK       B    100+200+300+400
 61          HC       2
             *

 62          KK   RTB-C
 63          KM   ROUTE BASIN 100, 200, 300 AND 400 THROUGH BASIN 500
 64          RS       1    STOR      -1
 65          RC   0.035   0.030   0.035    2575   0.020      85
 66          RX       0   278.5   449.2  2891.2  3704.9    4382  4468.6  4602.3
 67          RY      85      80      40      30      30      35      40      80
             *

 68          KK     500  BASIN 500
 69          IN      15
 70          PB     1.0
 71          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 72          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 73          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 74          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 75          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 76          BA    14.1
 77          LS       0      74
 78          UD   0.937
             *

 79          KK       C    100+200+300+400+500
 80          HC       2
             *
```

1 HEC-1 INPUT PAGE 3

```
        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 81          KK   RTC-D
 82          KM   ROUTE BASIN 100, 200, 300, 400 AND 500 THROUGH BASIN 600
 83          RS       1    STOR      -1
 84          RC    0.04   0.035    0.04  1682.3   0.001     220
 85          RX       0   484.1   726.3  2184.9  2424.5  3660.5  3767.9  4120.6
 86          RY     107      80      40      10      10      40      80     220
             *

 87          KK     600  BASIN 600
 88          IN      15
 89          PB     1.0
 90          PI       0    .009    .007    .009    .009    .011    .009    .011    .012    .013
 91          PI    .014    .016    .017     .02    .023     .03    .045    .067    .088    .096
 92          PI    .082    .041    .027    .023    .021     .02    .019    .017    .016    .018
 93          PI     .01    .016    .015    .014    .015    .012    .013     .01     .01    .009
 94          PI     .01    .011     .01    .009    .009    .009    .009     .01    .009
 95          BA     0.4
 96          LS       0      70
 97          UD   0.190
             *

 98          KK       D
 99          HC       2
100          ZZ
```

1

```
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6      100(A)
                .
                .
    17          .      200(A)
                .           .
                .           .
    28          A............
                V
                V
    30       RTA-B
                .
                .
    36          .         300
                .           .
                .           .
    47          B............
                .
                .
    49          .         400
                .           .
                .           .
    60          B............
                V
                V
    62       RTB-C
                .
                .
    68          .         500
```

```
                .          .
                .          .
   79           C...........
                V
                V
   81        RTC-D
                .
                .
   87           .         600
                .          .
                .          .
   98           D...........

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                                    ****************************************
 *                                      *                                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                                    *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                    *          609 SECOND STREET           *
 *                                      *                                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   29MAR13  TIME  11:39:51  *                                    *           (916) 756-1104             *
 *                                      *                                    *                                      *
 ****************************************                                    ****************************************


                           El Camino Real Bridge Construction Project,
                           1", 24-HR STORM EVENT
                           ECR241IB.HC1, 3/29/2012

    5 IO          OUTPUT CONTROL VARIABLES
                        IPRNT           5  PRINT CONTROL
                        IPLOT           2  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                         NMIN           2  MINUTES IN COMPUTATION INTERVAL
                        IDATE      1    0  STARTING DATE
                        ITIME        0000  STARTING TIME
                           NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE      1    0  ENDING DATE
                       NDTIME        0958  ENDING TIME
                       ICENT          19  CENTURY MARK

                   COMPUTATION INTERVAL     .03 HOURS
                        TOTAL TIME BASE    9.97 HOURS

           ENGLISH UNITS
                DRAINAGE AREA         SQUARE MILES
                PRECIPITATION DEPTH   INCHES
                LENGTH, ELEVATION     FEET
                FLOW                  CUBIC FEET PER SECOND
                STORAGE VOLUME        ACRE-FEET
                SURFACE AREA          ACRES
                TEMPERATURE           DEGREES FAHRENHEIT
1                                                   STATION   100(A)

                        (O) OUTFLOW
          0.       20.       40.       60.       80.      100.      120.      140.      160.        0.        0.        0.        0.
                                                                                                   (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .02       .01       .01       .00       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
```

```
10122  42O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10124  43O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10126  44O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10128  45O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10130  46O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10132  47O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10134  48O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10136  49O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10352 117O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10354 118O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10356 119O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10358 120O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLL.
10404 123O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLL.
10406 124O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLL.
10408 125O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLL.
10410 126O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLL.
10412 127O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLL.
10414 128O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLL.
10416 129O         .         .         .         .         .         .         .         .         .         .  LLLLLLLLLLLLLLLLLLL.
10418 130O         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLL.
10420 131O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLL.
10422 132O         .         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLL.
10424 133O         .         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLL.
10426 134O         .         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLL.
10428 135O         .         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLL.
10430 136O         .         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLL.
10432 137O         .         .         .         .         .         .         .         .         .         .      LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10434 138O         .         .         .         .         .         .         .         .         .         .      LLLLLLLLLLLLLLLLLLLLLLLLLLLLLX.
10436 139O         .         .         .         .         .         .         .         .         .         .      LLLLLLLLLLLLLLLLLLLLLLLLLLLLLX.
10438 140O         .         .         .         .         .         .         .         .         .         .      LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10440 141.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10442 142. O       .         .         .         .         .         .         .         .         .         .      LLLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10444 143.  O      .         .         .         .         .         .         .         .         .         .      LLLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10446 144.   O     .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10448 145.     O   .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXXX.
10450 146.       O .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXXX.
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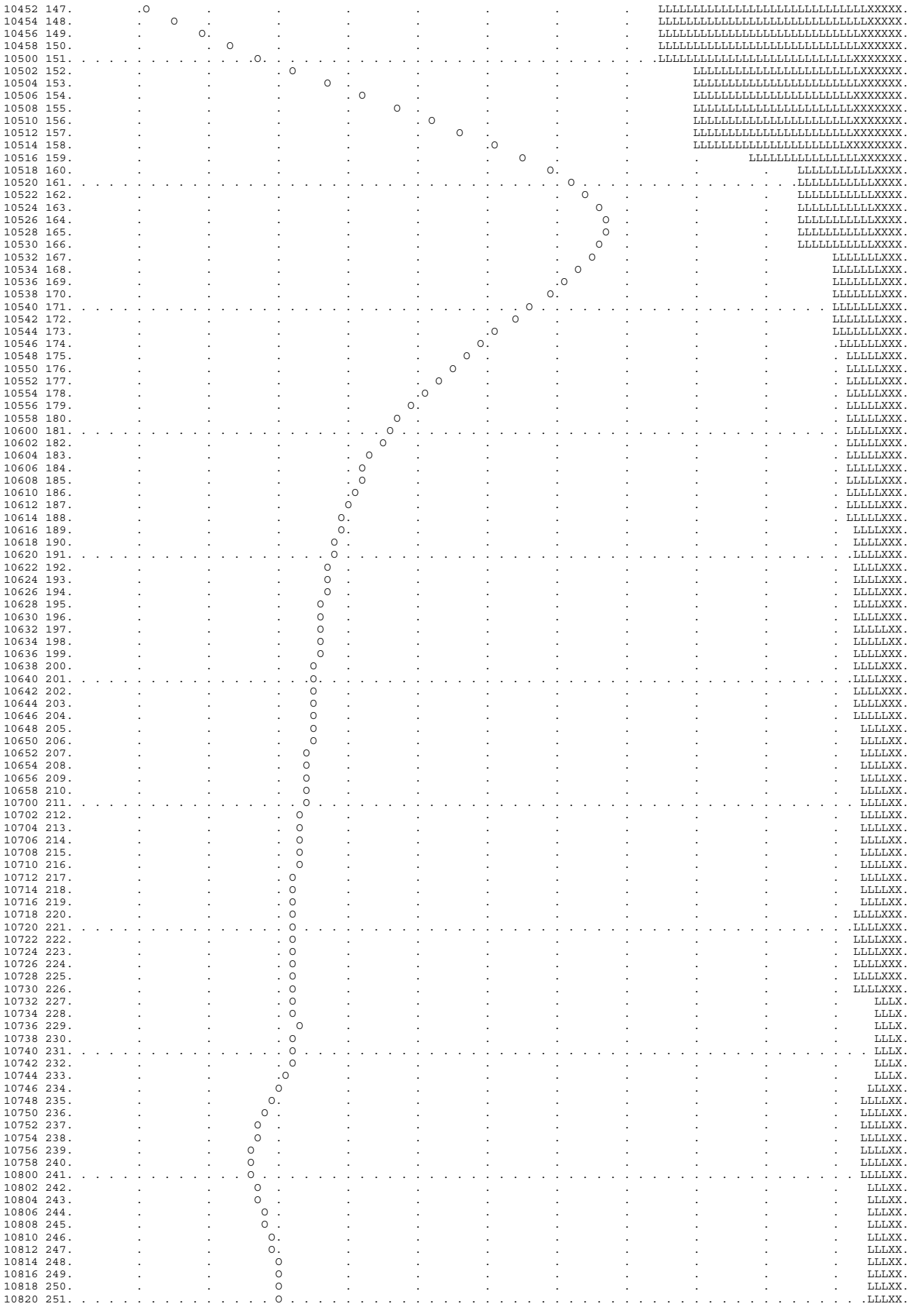

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  10822 252.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10824 253.         .         .         .O        .         .         .         .         .         .         .         .    LLLXX.
  10826 254.         .         .         .O        .         .         .         .         .         .         .         .    LLLXX.
  10828 255.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10830 256.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10832 257.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10834 258.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10836 259.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10838 260.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10840 261. . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLXX.
  10842 262.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10844 263.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10846 264.         .         .         .O        .         .         .         .         .         .         .         .    LLLXX.
  10848 265.         .         .         .O        .         .         .         .         .         .         .         .     LLXX.
  10850 266.         .         .         .O        .         .         .         .         .         .         .         .     LLXX.
  10852 267.         .         .         .O        .         .         .         .         .         .         .         .     LLXX.
  10854 268.         .         .         .O        .         .         .         .         .         .         .         .     LLXX.
  10856 269.         .         .         .O        .         .         .         .         .         .         .         .     LLXX.
  10858 270.         .         .         O         .         .         .         .         .         .         .         .     LLXX.
  10900 271. . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
  10902 272.         .         .         O         .         .         .         .         .         .         .         .    LLLXX.
  10904 273.         .         .        O.         .         .         .         .         .         .         .         .    LLLXX.
  10906 274.         .         .        O.         .         .         .         .         .         .         .         .    LLLXX.
  10908 275.         .         .        O.         .         .         .         .         .         .         .         .    LLLXX.
  10910 276.         .         .        O.         .         .         .         .         .         .         .         .    LLLXX.
  10912 277.         .         .       O .         .         .         .         .         .         .         .         .    LLLXX.
  10914 278.         .         .       O .         .         .         .         .         .         .         .         .    LLLXX.
  10916 279.         .         .       O .         .         .         .         .         .         .         .         .     LLXX.
  10918 280.         .         .       O .         .         .         .         .         .         .         .         .     LLXX.
  10920 281. . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
  10922 282.         .         .       O .         .         .         .         .         .         .         .         .     LLXX.
  10924 283.         .         .       O .         .         .         .         .         .         .         .         .     LLXX.
  10926 284.         .         .       O .         .         .         .         .         .         .         .         .     LLXX.
  10928 285.         .         .      O  .         .         .         .         .         .         .         .         .     LLXX.
  10930 286.         .         .      O  .         .         .         .         .         .         .         .         .     LLXX.
  10932 287.         .         .      O  .         .         .         .         .         .         .         .         .     LLXX.
  10934 288.         .         .     O   .         .         .         .         .         .         .         .         .     LLXX.
  10936 289.         .         .     O   .         .         .         .         .         .         .         .         .     LLXX.
  10938 290.         .         .    O    .         .         .         .         .         .         .         .         .     LLXX.
  10940 291. . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
  10942 292.         .         .   O     .         .         .         .         .         .         .         .         .     LLXX.
  10944 293.         .         .   O     .         .         .         .         .         .         .         .         .     LLXX.
  10946 294.         .         .   O     .         .         .         .         .         .         .         .         .      LXX.
  10948 295.         .         .   O     .         .         .         .         .         .         .         .         .      LXX.
  10950 296.         .         .  O      .         .         .         .         .         .         .         .         .      LXX.
  10952 297.         .         .  O      .         .         .         .         .         .         .         .         .      LXX.
  10954 298.         .         .  O      .         .         .         .         .         .         .         .         .      LXX.
  10956 299.         .         .  O      .         .         .         .         .         .         .         .         .      LXX.
  10958 300.---------.---------.--O------.---------.---------.---------.---------.---------.---------.---------.---------.------LXX.
1
1                                                           STATION   200(A)

                           (O) OUTFLOW
          0.       10.       20.       30.       40.       50.       60.        0.        0.        0.        0.        0.        0.
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .02       .01       .01       .00       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
  10122  42O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10124  43O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10126  44O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10128  45O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10130  46O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10132  47O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10134  48O         .         .         .         .         .         .         .         .         .         .         .      LLL.
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10136  49O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10352 117O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10354 118O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10356 119O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10358 120O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10404 123O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10406 124O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10408 125O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10410 126O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10412 127O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10414 128O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10416 129O         .         .         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLL.
10418 130O         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLL.
10420 131O . . . . . . . . . . . . . . . . . . .
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10506 154.O        .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10508 155.O        .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10510 156. O       .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10512 157.  O      .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10514 158.   O     .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10516 159.    O    .         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLXX.
10518 160.     O   .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLXX.
10520 161. . . . O . . .
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  10836 259.         .         .         .         .         O         .         .         .         .         .         .    LLLLX.
  10838 260.         .         .         .         .         O         .         .         .         .         .         .    LLLLX.
  10840 261. . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLXX.
  10842 262.         .         .         .         .         .O        .         .         .         .         .         .    LLLXX.
  10844 263.         .         .         .         .         .O        .         .         .         .         .         .    LLLXX.
  10846 264.         .         .         .         .         .O        .         .         .         .         .         .    LLLLX.
  10848 265.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10850 266.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10852 267.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10854 268.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10856 269.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10858 270.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10900 271. . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLX.
  10902 272.         .         .         .         .         . O       .         .         .         .         .         .    LLLLX.
  10904 273.         .         .         .         .         . O       .         .         .         .         .         .    LLLLX.
  10906 274.         .         .         .         .         . O       .         .         .         .         .         .    LLLLX.
  10908 275.         .         .         .         .         . O       .         .         .         .         .         .    LLLLX.
  10910 276.         .         .         .         .         . O       .         .         .         .         .         .    LLLLX.
  10912 277.         .         .         .         .         . O       .         .         .         .         .         .    LLLLX.
  10914 278.         .         .         .         .         . O       .         .         .         .         .         .    LLLLX.
  10916 279.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10918 280.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10920 281. . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLX.
  10922 282.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10924 283.         .         .         .         .         . O       .         .         .         .         .         .     LLLX.
  10926 284.         .         .         .         .         .O        .         .         .         .         .         .     LLLX.
  10928 285.         .         .         .         .         .O        .         .         .         .         .         .     LLLX.
  10930 286.         .         .         .         .         .O        .         .         .         .         .         .     LLLX.
  10932 287.         .         .         .         .         .O        .         .         .         .         .         .     LLLX.
  10934 288.         .         .         .         .         .O        .         .         .         .         .         .     LLLX.
  10936 289.         .         .         .         .         O         .         .         .         .         .         .     LLLX.
  10938 290.         .         .         .         .         O         .         .         .         .         .         .     LLLX.
  10940 291. . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLX.
  10942 292.         .         .         .         .        O.         .         .         .         .         .         .     LLLX.
  10944 293.         .         .         .         .        O.         .         .         .         .         .         .     LLLX.
  10946 294.         .         .         .         .        O.         .         .         .         .         .         .      LLX.
  10948 295.         .         .         .         .       O .         .         .         .         .         .         .      LLX.
  10950 296.         .         .         .         .       O .         .         .         .         .         .         .      LLX.
  10952 297.         .         .         .         .       O .         .         .         .         .         .         .      LLX.
  10954 298.         .         .         .         .      O  .         .         .         .         .         .         .      LLX.
  10956 299.         .         .         .         .      O  .         .         .         .         .         .         .      LLX.
  10958 300.---------.---------.---------.---------.-----O---.---------.---------.---------.---------.---------.---------.------LLX.
1
1                                                          STATION        A

                          (O) OUTFLOW
          0.        20.        40.        60.        80.       100.       120.       140.       160.       180.         0.         0.         0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
  10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
  10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
  10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
  10132  47O         .         .         .         .         .         .         .         .         .         .         .         .
  10134  48O         .         .         .         .         .         .         .         .         .         .         .         .
  10136  49O         .         .         .         .         .         .         .         .         .         .         .         .
  10138  50O         .         .         .         .         .         .         .         .         .         .         .         .
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142  52O         .         .         .         .         .         .         .         .         .         .         .         .
  10144  53O         .         .         .         .         .         .         .         .         .         .         .         .
  10146  54O         .         .         .         .         .         .         .         .         .         .         .         .
  10148  55O         .         .         .         .         .         .         .         .         .         .         .         .
  10150  56O         .         .         .         .         .         .         .         .         .         .         .         .
  10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
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10154  58O         .         .         .         .         .         .         .         .         .         .         .         .
10156  59O         .         .         .         .         .         .         .         .         .         .         .         .
10158  60O         .         .         .         .         .         .         .         .         .         .         .         .
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62O         .         .         .         .         .         .         .         .         .         .         .         .
10204  63O         .         .         .         .         .         .         .         .         .         .         .         .
10206  64O         .         .         .         .         .         .         .         .         .         .         .         .
10208  65O         .         .         .         .         .         .         .         .         .         .         .         .
10210  66O         .         .         .         .         .         .         .         .         .         .         .         .
10212  67O         .         .         .         .         .         .         .         .         .         .         .         .
10214  68O         .         .         .         .         .         .         .         .         .         .         .         .
10216  69O         .         .         .         .         .         .         .         .         .         .         .         .
10218  70O         .         .         .         .         .         .         .         .         .         .         .         .
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72O         .         .         .         .         .         .         .         .         .         .         .         .
10224  73O         .         .         .         .         .         .         .         .         .         .         .         .
10226  74O         .         .         .         .         .         .         .         .         .         .         .         .
10228  75O         .         .         .         .         .         .         .         .         .         .         .         .
10230  76O         .         .         .         .         .         .         .         .         .         .         .         .
10232  77O         .         .         .         .         .         .         .         .         .         .         .         .
10234  78O         .         .         .         .         .         .         .         .         .         .         .         .
10236  79O         .         .         .         .         .         .         .         .         .         .         .         .
10238  80O         .         .         .         .         .         .         .         .         .         .         .         .
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82O         .         .         .         .         .         .         .         .         .         .         .         .
10244  83O         .         .         .         .         .         .         .         .         .         .         .         .
10246  84O         .         .         .         .         .         .         .         .         .         .         .         .
10248  85O         .         .         .         .         .         .         .         .         .         .         .         .
10250  86O         .         .         .         .         .         .         .         .         .         .         .         .
10252  87O         .         .         .         .         .         .         .         .         .         .         .         .
10254  88O         .         .         .         .         .         .         .         .         .         .         .         .
10256  89O         .         .         .         .         .         .         .         .         .         .         .         .
10258  90O         .         .         .         .         .         .         .         .         .         .         .         .
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92O         .         .         .         .         .         .         .         .         .         .         .         .
10304  93O         .         .         .         .         .         .         .         .         .         .         .         .
10306  94O         .         .         .         .         .         .         .         .         .         .         .         .
10308  95O         .         .         .         .         .         .         .         .         .         .         .         .
10310  96O         .         .         .         .         .         .         .         .         .         .         .         .
10312  97O         .         .         .         .         .         .         .         .         .         .         .         .
10314  98O         .         .         .         .         .         .         .         .         .         .         .         .
10316  99O         .         .         .         .         .         .         .         .         .         .         .         .
10318 100O         .         .         .         .         .         .         .         .         .         .         .         .
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102O         .         .         .         .         .         .         .         .         .         .         .         .
10324 103O         .         .         .         .         .         .         .         .         .         .         .         .
10326 104O         .         .         .         .         .         .         .         .         .         .         .         .
10328 105O         .         .         .         .         .         .         .         .         .         .         .         .
10330 106O         .         .         .         .         .         .         .         .         .         .         .         .
10332 107O         .         .         .         .         .         .         .         .         .         .         .         .
10334 108O         .         .         .         .         .         .         .         .         .         .         .         .
10336 109O         .         .         .         .         .         .         .         .         .         .         .         .
10338 110O         .         .         .         .         .         .         .         .         .         .         .         .
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112O         .         .         .         .         .         .         .         .         .         .         .         .
10344 113O         .         .         .         .         .         .         .         .         .         .         .         .
10346 114O         .         .         .         .         .         .         .         .         .         .         .         .
10348 115O         .         .         .         .         .         .         .         .         .         .         .         .
10350 116O         .         .         .         .         .         .         .         .         .         .         .         .
10352 117O         .         .         .         .         .         .         .         .         .         .         .         .
10354 118O         .         .         .         .         .         .         .         .         .         .         .         .
10356 119O         .         .         .         .         .         .         .         .         .         .         .         .
10358 120O         .         .         .         .         .         .         .         .         .         .         .         .
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122O         .         .         .         .         .         .         .         .         .         .         .         .
10404 123O         .         .         .         .         .         .         .         .         .         .         .         .
10406 124O         .         .         .         .         .         .         .         .         .         .         .         .
10408 125O         .         .         .         .         .         .         .         .         .         .         .         .
10410 126O         .         .         .         .         .         .         .         .         .         .         .         .
10412 127O         .         .         .         .         .         .         .         .         .         .         .         .
10414 128O         .         .         .         .         .         .         .         .         .         .         .         .
10416 129O         .         .         .         .         .         .         .         .         .         .         .         .
10418 130O         .         .         .         .         .         .         .         .         .         .         .         .
10420 131O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132O         .         .         .         .         .         .         .         .         .         .         .         .
10424 133O         .         .         .         .         .         .         .         .         .         .         .         .
10426 134O         .         .         .         .         .         .         .         .         .         .         .         .
10428 135O         .         .         .         .         .         .         .         .         .         .         .         .
10430 136O         .         .         .         .         .         .         .         .         .         .         .         .
10432 137O         .         .         .         .         .         .         .         .         .         .         .         .
10434 138O         .         .         .         .         .         .         .         .         .         .         .         .
10436 139O         .         .         .         .         .         .         .         .         .         .         .         .
10438 140O         .         .         .         .         .         .         .         .         .         .         .         .
10440 141.O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142. O       .         .         .         .         .         .         .         .         .         .         .         .
10444 143.  O      .         .         .         .         .         .         .         .         .         .         .         .
10446 144.   O     .         .         .         .         .         .         .         .         .         .         .         .
10448 145.    O    .         .         .         .         .         .         .         .         .         .         .         .
10450 146.     O   .         .         .         .         .         .         .         .         .         .         .         .
10452 147.        .O         .         .         .         .         .         .         .         .         .         .         .
10454 148.        .   O      .         .         .         .         .         .         .         .         .         .         .
10456 149.        .       O. .         .         .         .         .         .         .         .         .         .         .
10458 150.        .         . O        .         .         .         .         .         .         .         .         .         .
10500 151. . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.        .         .  O       .         .         .         .         .         .         .         .         .         .
10504 153.        .         .     O    .         .         .         .         .         .         .         .         .         .
10506 154.        .         .        . O         .         .         .         .         .         .         .         .         .
10508 155.        .         .         .     O     .         .         .         .         .         .         .         .         .
10510 156.        .         .         .        . O        .         .         .         .         .         .         .         .
10512 157.        .         .         .         .      O   .         .         .         .         .         .         .         .
10514 158.        .         .         .         .         . O        .         .         .         .         .         .         .
10516 159.        .         .         .         .         .    O     .         .         .         .         .         .         .
10518 160.        .         .         .         .         .        . O         .         .         .         .         .         .
10520 161. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.        .         .         .         .         .         .         .       O.         .         .         .         .
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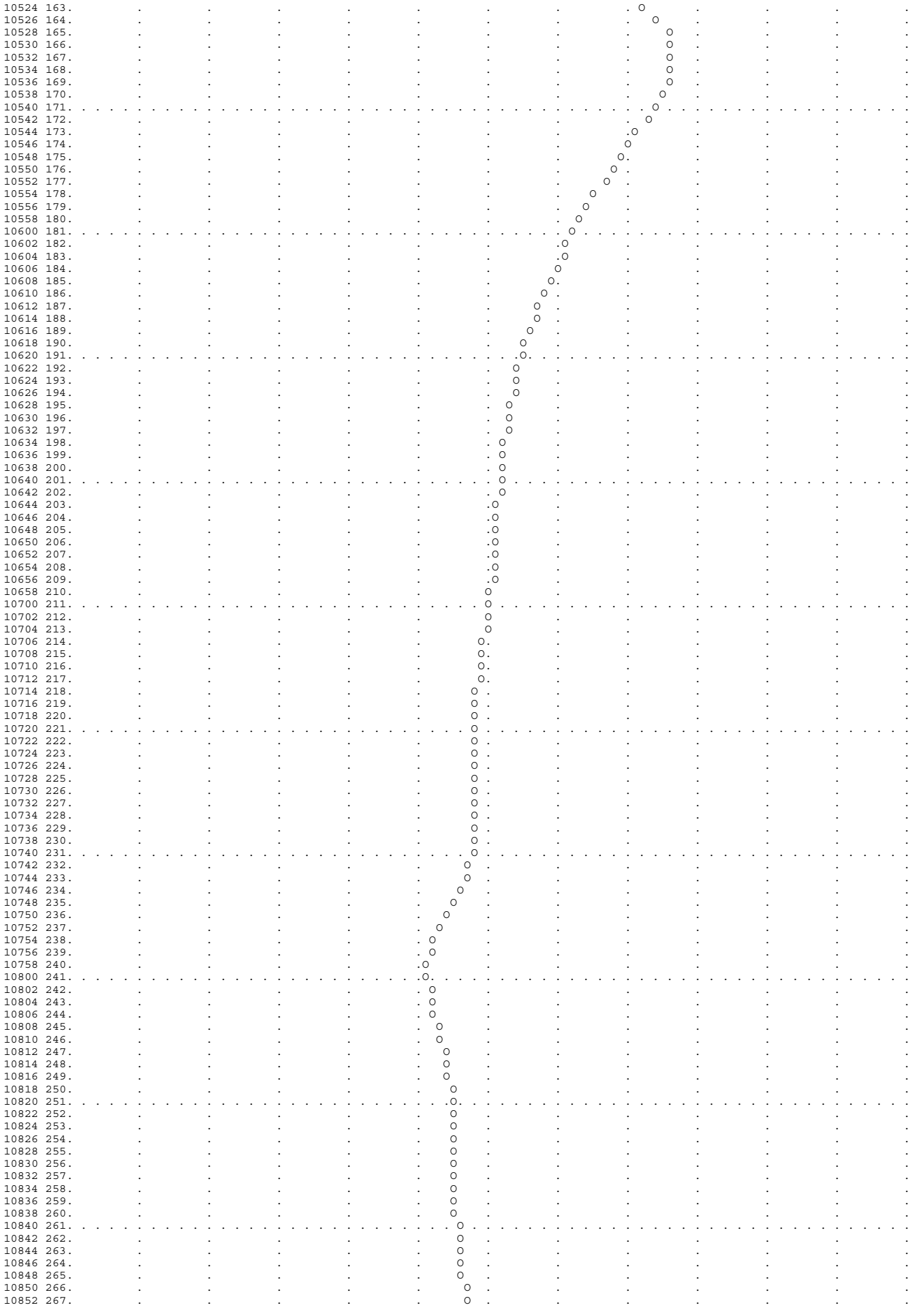

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 10854 268.         .         .         .         .         .         O .         .         .         .         .         .         .
 10856 269.         .         .         .         .         .         O .         .         .         .         .         .         .
 10858 270.         .         .         .         .         .         O .         .         .         .         .         .         .
 10900 271. . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10902 272.         .         .         .         .         .         O .         .         .         .         .         .         .
 10904 273.         .         .         .         .         .         O .         .         .         .         .         .         .
 10906 274.         .         .         .         .         .        O  .         .         .         .         .         .         .
 10908 275.         .         .         .         .         .        O  .         .         .         .         .         .         .
 10910 276.         .         .         .         .         .        O  .         .         .         .         .         .         .
 10912 277.         .         .         .         .         .       O   .         .         .         .         .         .         .
 10914 278.         .         .         .         .         .       O   .         .         .         .         .         .         .
 10916 279.         .         .         .         .         .       O   .         .         .         .         .         .         .
 10918 280.         .         .         .         .         .       O   .         .         .         .         .         .         .
 10920 281. . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10922 282.         .         .         .         .         .       O   .         .         .         .         .         .         .
 10924 283.         .         .         .         .         .       O   .         .         .         .         .         .         .
 10926 284.         .         .         .         .         .      O    .         .         .         .         .         .         .
 10928 285.         .         .         .         .         .      O    .         .         .         .         .         .         .
 10930 286.         .         .         .         .         .      O    .         .         .         .         .         .         .
 10932 287.         .         .         .         .         .     O     .         .         .         .         .         .         .
 10934 288.         .         .         .         .         .    O      .         .         .         .         .         .         .
 10936 289.         .         .         .         .         .    O      .         .         .         .         .         .         .
 10938 290.         .         .         .         .         .   O       .         .         .         .         .         .         .
 10940 291. . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10942 292.         .         .         .         .       O.          .         .         .         .         .         .         .
 10944 293.         .         .         .         .       O.          .         .         .         .         .         .         .
 10946 294.         .         .         .         .      O .          .         .         .         .         .         .         .
 10948 295.         .         .         .         .      O .          .         .         .         .         .         .         .
 10950 296.         .         .         .         .     O  .          .         .         .         .         .         .         .
 10952 297.         .         .         .         .     O  .          .         .         .         .         .         .         .
 10954 298.         .         .         .         .     O  .          .         .         .         .         .         .         .
 10956 299.         .         .         .         .    O   .          .         .         .         .         .         .         .
 10958 300.---------.---------.---------.---------.----O---.---------.---------.---------.---------.---------.---------.---------.
1
1                                                   STATION    RTA-B

                        (I) INFLOW,   (O) OUTFLOW
          0.       20.       40.       60.       80.      100.      120.      140.      160.      180.        0.        0.        0.
                                                                                  (S) STORAGE
          0.        0.        0.        0.        0.        0.        0.        2.        4.        6.        8.        0.        0.
 DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
 10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
 10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
 10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  12I         .         .         .         .         .         S         .         .         .         .         .         .
 10024  13I         .         .         .         .         .         S         .         .         .         .         .         .
 10026  14I         .         .         .         .         .         S         .         .         .         .         .         .
 10028  15I         .         .         .         .         .         S         .         .         .         .         .         .
 10030  16I         .         .         .         .         .         S         .         .         .         .         .         .
 10032  17I         .         .         .         .         .         S         .         .         .         .         .         .
 10034  18I         .         .         .         .         .         S         .         .         .         .         .         .
 10036  19I         .         .         .         .         .         S         .         .         .         .         .         .
 10038  20I         .         .         .         .         .         S         .         .         .         .         .         .
 10040  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10042  22I         .         .         .         .         .         S         .         .         .         .         .         .
 10044  23I         .         .         .         .         .         S         .         .         .         .         .         .
 10046  24I         .         .         .         .         .         S         .         .         .         .         .         .
 10048  25I         .         .         .         .         .         S         .         .         .         .         .         .
 10050  26I         .         .         .         .         .         S         .         .         .         .         .         .
 10052  27I         .         .         .         .         .         S         .         .         .         .         .         .
 10054  28I         .         .         .         .         .         S         .         .         .         .         .         .
 10056  29I         .         .         .         .         .         S         .         .         .         .         .         .
 10058  30I         .         .         .         .         .         S         .         .         .         .         .         .
 10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10102  32I         .         .         .         .         .         S         .         .         .         .         .         .
 10104  33I         .         .         .         .         .         S         .         .         .         .         .         .
 10106  34I         .         .         .         .         .         S         .         .         .         .         .         .
 10108  35I         .         .         .         .         .         S         .         .         .         .         .         .
 10110  36I         .         .         .         .         .         S         .         .         .         .         .         .
 10112  37I         .         .         .         .         .         S         .         .         .         .         .         .
 10114  38I         .         .         .         .         .         S         .         .         .         .         .         .
 10116  39I         .         .         .         .         .         S         .         .         .         .         .         .
 10118  40I         .         .         .         .         .         S         .         .         .         .         .         .
 10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10122  42I         .         .         .         .         .         S         .         .         .         .         .         .
 10124  43I         .         .         .         .         .         S         .         .         .         .         .         .
 10126  44I         .         .         .         .         .         S         .         .         .         .         .         .
 10128  45I         .         .         .         .         .         S         .         .         .         .         .         .
 10130  46I         .         .         .         .         .         S         .         .         .         .         .         .
 10132  47I         .         .         .         .         .         S         .         .         .         .         .         .
 10134  48I         .         .         .         .         .         S         .         .         .         .         .         .
 10136  49I         .         .         .         .         .         S         .         .         .         .         .         .
 10138  50I         .         .         .         .         .         S         .         .         .         .         .         .
 10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10142  52I         .         .         .         .         .         S         .         .         .         .         .         .
 10144  53I         .         .         .         .         .         S         .         .         .         .         .         .
 10146  54I         .         .         .         .         .         S         .         .         .         .         .         .
 10148  55I         .         .         .         .         .         S         .         .         .         .         .         .
 10150  56I         .         .         .         .         .         S         .         .         .         .         .         .
 10152  57I         .         .         .         .         .         S         .         .         .         .         .         .
 10154  58I         .         .         .         .         .         S         .         .         .         .         .         .
 10156  59I         .         .         .         .         .         S         .         .         .         .         .         .
 10158  60I         .         .         .         .         .         S         .         .         .         .         .         .
 10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10202  62I         .         .         .         .         .         S         .         .         .         .         .         .
 10204  63I         .         .         .         .         .         S         .         .         .         .         .         .
 10206  64I         .         .         .         .         .         S         .         .         .         .         .         .
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10208  65I         .         .         .         .         .        S         .         .         .         .         .         .
10210  66I         .         .         .         .         .        S         .         .         .         .         .         .
10212  67I         .         .         .         .         .        S         .         .         .         .         .         .
10214  68I         .         .         .         .         .        S         .         .         .         .         .         .
10216  69I         .         .         .         .         .        S         .         .         .         .         .         .
10218  70I         .         .         .         .         .        S         .         .         .         .         .         .
10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72I         .         .         .         .         .        S         .         .         .         .         .         .
10224  73I         .         .         .         .         .        S         .         .         .         .         .         .
10226  74I         .         .         .         .         .        S         .         .         .         .         .         .
10228  75I         .         .         .         .         .        S         .         .         .         .         .         .
10230  76I         .         .         .         .         .        S         .         .         .         .         .         .
10232  77I         .         .         .         .         .        S         .         .         .         .         .         .
10234  78I         .         .         .         .         .        S         .         .         .         .         .         .
10236  79I         .         .         .         .         .        S         .         .         .         .         .         .
10238  80I         .         .         .         .         .        S         .         .         .         .         .         .
10240  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82I         .         .         .         .         .        S         .         .         .         .         .         .
10244  83I         .         .         .         .         .        S         .         .         .         .         .         .
10246  84I         .         .         .         .         .        S         .         .         .         .         .         .
10248  85I         .         .         .         .         .        S         .         .         .         .         .         .
10250  86I         .         .         .         .         .        S         .         .         .         .         .         .
10252  87I         .         .         .         .         .        S         .         .         .         .         .         .
10254  88I         .         .         .         .         .        S         .         .         .         .         .         .
10256  89I         .         .         .         .         .        S         .         .         .         .         .         .
10258  90I         .         .         .         .         .        S         .         .         .         .         .         .
10300  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92I         .         .         .         .         .        S         .         .         .         .         .         .
10304  93I         .         .         .         .         .        S         .         .         .         .         .         .
10306  94I         .         .         .         .         .        S         .         .         .         .         .         .
10308  95I         .         .         .         .         .        S         .         .         .         .         .         .
10310  96I         .         .         .         .         .        S         .         .         .         .         .         .
10312  97I         .         .         .         .         .        S         .         .         .         .         .         .
10314  98I         .         .         .         .         .        S         .         .         .         .         .         .
10316  99I         .         .         .         .         .        S         .         .         .         .         .         .
10318 100I         .         .         .         .         .        S         .         .         .         .         .         .
10320 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102I         .         .         .         .         .        S         .         .         .         .         .         .
10324 103I         .         .         .         .         .        S         .         .         .         .         .         .
10326 104I         .         .         .         .         .        S         .         .         .         .         .         .
10328 105I         .         .         .         .         .        S         .         .         .         .         .         .
10330 106I         .         .         .         .         .        S         .         .         .         .         .         .
10332 107I         .         .         .         .         .        S         .         .         .         .         .         .
10334 108I         .         .         .         .         .        S         .         .         .         .         .         .
10336 109I         .         .         .         .         .        S         .         .         .         .         .         .
10338 110I         .         .         .         .         .        S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I         .         .         .         .         .        S         .         .         .         .         .         .
10344 113I         .         .         .         .         .        S         .         .         .         .         .         .
10346 114I         .         .         .         .         .        S         .         .         .         .         .         .
10348 115I         .         .         .         .         .        S         .         .         .         .         .         .
10350 116I         .         .         .         .         .        S         .         .         .         .         .         .
10352 117I         .         .         .         .         .        S         .         .         .         .         .         .
10354 118I         .         .         .         .         .        S         .         .         .         .         .         .
10356 119I         .         .         .         .         .        S         .         .         .         .         .         .
10358 120I         .         .         .         .         .        S         .         .         .         .         .         .
10400 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122I         .         .         .         .         .        S         .         .         .         .         .         .
10404 123I         .         .         .         .         .        S         .         .         .         .         .         .
10406 124I         .         .         .         .         .        S         .         .         .         .         .         .
10408 125I         .         .         .         .         .        S         .         .         .         .         .         .
10410 126I         .         .         .         .         .        S         .         .         .         .         .         .
10412 127I         .         .         .         .         .        S         .         .         .         .         .         .
10414 128I         .         .         .         .         .        S         .         .         .         .         .         .
10416 129I         .         .         .         .         .        S         .         .         .         .         .         .
10418 130I         .         .         .         .         .        S         .         .         .         .         .         .
10420 131I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132I         .         .         .         .         .        S         .         .         .         .         .         .
10424 133I         .         .         .         .         .        S         .         .         .         .         .         .
10426 134I         .         .         .         .         .        S         .         .         .         .         .         .
10428 135I         .         .         .         .         .        S         .         .         .         .         .         .
10430 136I         .         .         .         .         .        S         .         .         .         .         .         .
10432 137I         .         .         .         .         .        S         .         .         .         .         .         .
10434 138I         .         .         .         .         .        S         .         .         .         .         .         .
10436 139I         .         .         .         .         .        S         .         .         .         .         .         .
10438 140I         .         .         .         .         .        S         .         .         .         .         .         .
10440 141OI. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142O I       .         .         .         .         .        S         .         .         .         .         .         .
10444 143O  I      .         .         .         .         .        S         .         .         .         .         .         .
10446 144O   I     .         .         .         .         .        S         .         .         .         .         .         .
10448 145.O    I   .         .         .         .         .        S         .         .         .         .         .         .
10450 146.O     I  .         .         .         .         .        S         .         .         .         .         .         .
10452 147. O      .I         .         .         .         .       .S         .         .         .         .         .         .
10454 148. O      .   I      .         .         .         .       .S         .         .         .         .         .         .
10456 149.  O     .      I.         .         .         .       .S         .         .         .         .         .         .
10458 150.   O    .         .  I      .         .         .       . S        .         .         .         .         .         .
10500 151. . .O. . . . . . . . . .I. . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.     O  .         .         . I       .         .       .  S       .         .         .         .         .         .
10504 153.      O .         .         .     I   .         .       .   S      .         .         .         .         .         .
10506 154.        O         .         .         .  I      .       .    S     .         .         .         .         .         .
10508 155.         . O      .         .         .     I   .       .     S    .         .         .         .         .         .
10510 156.         .   O    .         .         .         .  I    .      S   .         .         .         .         .         .
10512 157.         .     O  .         .         .         .     I .       S .         .         .         .         .         .
10514 158.         .       O .         .         .         .       . I     S.         .         .         .         .         .
10516 159.         .        .O         .         .         .       .     I  S         .         .         .         .         .
10518 160.         .         .   O     .         .         .       .        . S      .         .         .         .         .
10520 161. . . . . . . . . . . . . O . . . . . . . . . . . . . . . .S. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.         .         .      O.         .         .       .         .  S   I.         .         .         .         .
10524 163.         .         .        . O      .         .       .         .    S  . I       .         .         .         .
10526 164.         .         .          .   O  .         .       .         .     S .   I     .         .         .         .
10528 165.         .         .            .  O .         .       .         .      S .    I   .         .         .         .
10530 166.         .         .              O  .         .       .         .        S    I   .         .         .         .
10532 167.         .         .            .  O .         .       .         .        .S   I   .         .         .         .
10534 168.         .         .            .    O .       .       .         .        . S  I   .         .         .         .
10536 169.         .         .            .      O .     .       .         .        .  S I   .         .         .         .
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10538 170.        .        .        .       O.       .        .        .   SI    .        .        .
10540 171. . . .
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  10908 275.         .         .         .         .         .    IO   .         .         .      S  .         .         .         .
  10910 276.         .         .         .         .         .    IO   .         .         .      S  .         .         .         .
  10912 277.         .         .         .         .         .   I O   .         .         .      S  .         .         .         .
  10914 278.         .         .         .         .         .   I O   .         .         .      S  .         .         .         .
  10916 279.         .         .         .         .         .   I O   .         .         .      S  .         .         .         .
  10918 280.         .         .         .         .         .   IO    .         .         .      S  .         .         .         .
  10920 281. . . . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . .
  10922 282.         .         .         .         .         .   IO    .         .         .      S  .         .         .         .
  10924 283.         .         .         .         .         .   IO    .         .         .      S  .         .         .         .
  10926 284.         .         .         .         .         .  I O    .         .         .      S  .         .         .         .
  10928 285.         .         .         .         .         .  I O    .         .         .      S  .         .         .         .
  10930 286.         .         .         .         .         .  I O    .         .         .      S  .         .         .         .
  10932 287.         .         .         .         .         . I  O    .         .         .      S  .         .         .         .
  10934 288.         .         .         .         .         .I   O    .         .         .      S  .         .         .         .
  10936 289.         .         .         .         .         .I  O     .         .         .      S  .         .         .         .
  10938 290.         .         .         .         .         I   O     .         .         .      S  .         .         .         .
  10940 291. . . . . . . . . . . . . . . . . . . . . . . . . I . O . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . .
  10942 292.         .         .         .         .        I.   O     .         .         .     S   .         .         .         .
  10944 293.         .         .         .         .        I.  O      .         .         .     S   .         .         .         .
  10946 294.         .         .         .         .       I .  O      .         .         .     S   .         .         .         .
  10948 295.         .         .         .         .       I .  O      .         .         .     S   .         .         .         .
  10950 296.         .         .         .         .      I  .  O      .         .         .     S   .         .         .         .
  10952 297.         .         .         .         .      I  . O       .         .         .     S   .         .         .         .
  10954 298.         .         .         .         .      I  . O       .         .         .     S   .         .         .         .
  10956 299.         .         .         .         .     I   . O       .         .         .    S    .         .         .         .
  10958 300.---------.---------.---------.---------.-----I---.O--------.---------.---------.----S----.---------.---------.---------.
1
1                                                          STATION      300

                          (O) OUTFLOW
          0.        10.        20.        30.        40.        50.        60.        70.        80.        90.         0.         0.         0.
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .02       .01       .01       .00       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10102  32O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10104  33O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10106  34O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10108  35O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10110  36O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10112  37O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10114  38O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10118  40O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
  10122  42O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10124  43O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10126  44O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10128  45O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10130  46O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10132  47O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10134  48O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10136  49O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10138  50O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10142  52O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10144  53O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10146  54O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10148  55O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10150  56O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10152  57O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10154  58O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10156  59O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10158  60O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
  10202  62O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10204  63O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10206  64O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10208  65O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10210  66O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10212  67O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10214  68O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10216  69O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10218  70O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
  10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
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10222  720         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10224  730         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10226  740         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10228  750         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10230  760         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10232  770         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10234  780         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10236  790         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10238  800         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10240  810 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10242  820         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10244  830         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10246  840         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10248  850         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10250  860         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10252  870         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10254  880         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10256  890         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10258  900         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10300  910 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10302  920         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10304  930         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10306  940         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10308  950         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10310  960         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10312  970         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10314  980         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10316  990         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10318 1000         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10320 1010 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10322 1020         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10324 1030         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10326 1040         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10328 1050         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10330 1060         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10332 1070         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10334 1080         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10336 1090         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10338 1100         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10340 1110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLL.
10342 1120         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10344 1130         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10346 1140         .         .         .         .         .         .         .         .         .         .         LLLLLLLLLL.
10348 1150         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLL.
10350 1160         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLL.
10352 1170         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLL.
10354 1180         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLL.
10356 1190         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLL.
10358 1200         .         .         .         .         .         .         .         .         .         .        LLLLLLLLLLL.
10400 1210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLL.
10402 1220         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10404 1230         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10406 1240         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10408 1250         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10410 1260         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10412 1270         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10414 1280         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10416 1290         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLL.
10418 1300         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10420 1310 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLL.
10422 1320         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10424 1330         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10426 1340         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10428 1350         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10430 1360         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10432 1370         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10434 1380         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10436 1390         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10438 1400         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10440 1410 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10442 1420         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10444 1430         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLX.
10446 1440         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLX.
10448 1450         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10450 146.O        .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10452 147.O        .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLXX.
10454 148. O       .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10456 149.  O      .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10458 150.    O    .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXX.
10500 151. . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLXXXX.
10502 152.        O.         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLXXXX.
10504 153.         . O       .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLXXXX.
10506 154.         .     O   .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLXXXXX.
10508 155.         .         O         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLXXXXX.
10510 156.         .         .    O    .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLXXXXX.
10512 157.         .         .         O         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLXXXXX.
10514 158.         .         .         .    O    .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLXXXXXX.
10516 159.         .         .         .         O         .         .         .         .         .       LLLLLLLLLLLLLLLLLLXXXX.
10518 160.         .         .         .     O   .         .         .         .         .         .    LLLLLLLLLLLLXXX.
10520 161. . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLXXX.
10522 162.         .         .         .         .      O  .         .         .         .         .    LLLLLLLLLLLLXXX.
10524 163.         .         .         .         .         .  O      .         .         .         .    LLLLLLLLLLLLXXX.
10526 164.         .         .         .         .         .       O .         .         .         .    LLLLLLLLLLLLXXX.
10528 165.         .         .         .         .         .         .  O      .         .         .    LLLLLLLLLLLLXXX.
10530 166.         .         .         .         .         .         .      O  .         .         .    LLLLLLLLLLLLXXX.
10532 167.         .         .         .         .         .         .         O         .         .         LLLLLLLLXX.
10534 168.         .         .         .         .         .         .         .  O      .         .         LLLLLLLLXX.
10536 169.         .         .         .         .         .         .         .    O    .         .         LLLLLLLLXX.
10538 170.         .         .         .         .         .         .         .     O   .         .         LLLLLLLLXX.
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . LLLLLLLLXX.
10542 172.         .         .         .         .         .         .         .       O .         .         LLLLLLLLXX.
10544 173.         .         .         .         .         .         .         .       O .         .         LLLLLLLLXX.
10546 174.         .         .         .         .         .         .         .      O  .         .         .LLLLLLLXX.
10548 175.         .         .         .         .         .         .         .     O   .         .         . LLLLLLXX.
10550 176.         .         .         .         .         .         .         .    O    .         .         . LLLLLLXX.
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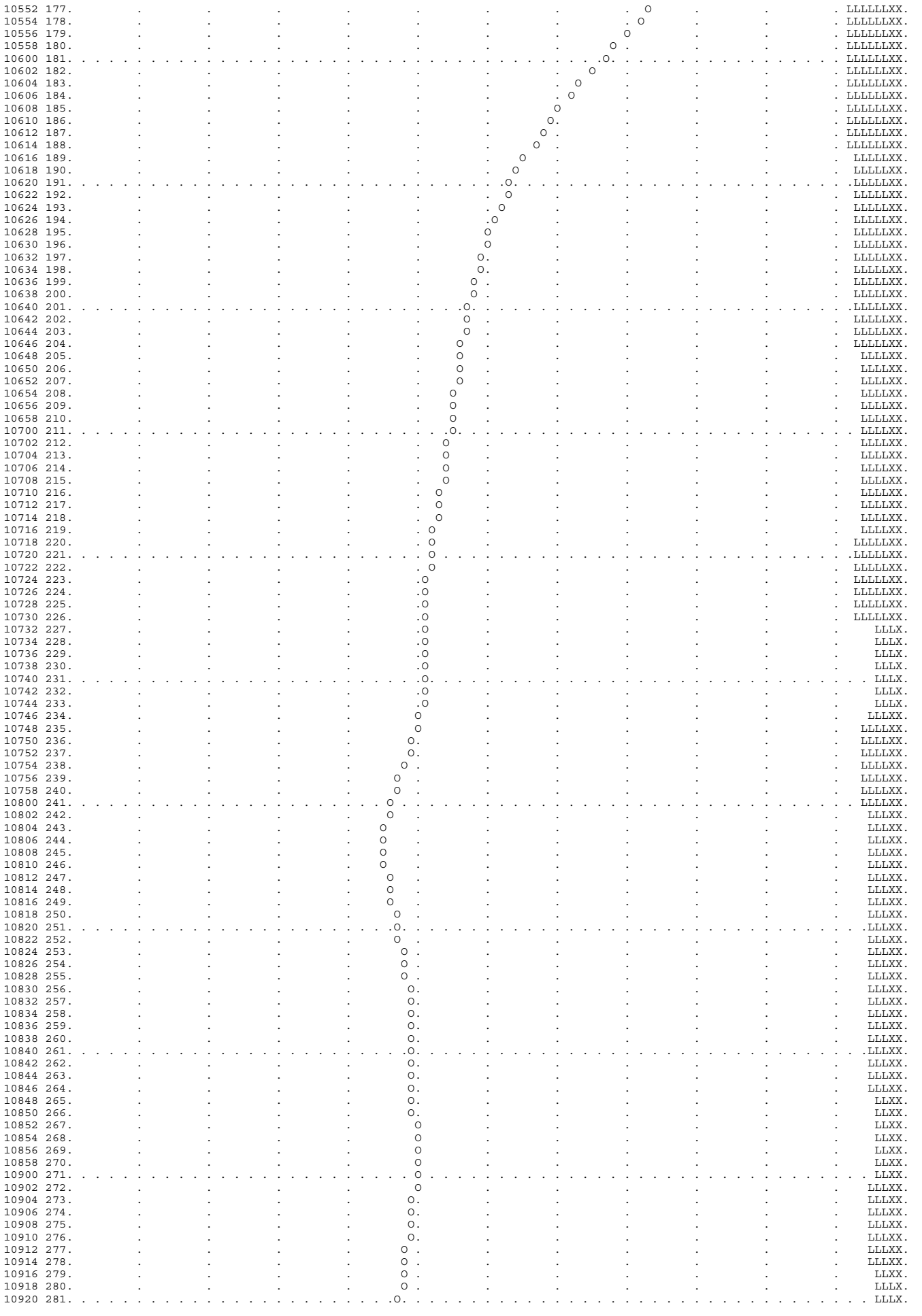

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  10922 282.         .         .         .         .      O  .         .         .         .         .         .         .     LLLX.
  10924 283.         .         .         .         .      O  .         .         .         .         .         .         .     LLLX.
  10926 284.         .         .         .         .      O  .         .         .         .         .         .         .     LLLX.
  10928 285.         .         .         .         .     O   .         .         .         .         .         .         .     LLLX.
  10930 286.         .         .         .         .     O   .         .         .         .         .         .         .     LLLX.
  10932 287.         .         .         .         .     O   .         .         .         .         .         .         .     LLLX.
  10934 288.         .         .         .         .    O    .         .         .         .         .         .         .     LLLX.
  10936 289.         .         .         .         .    O    .         .         .         .         .         .         .     LLLX.
  10938 290.         .         .         .         .    O    .         .         .         .         .         .         .     LLLX.
  10940 291. . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLX.
  10942 292.         .         .         .         .   O     .         .         .         .         .         .         .     LLLX.
  10944 293.         .         .         .         .  O      .         .         .         .         .         .         .     LLLX.
  10946 294.         .         .         .         .  O      .         .         .         .         .         .         .      LLX.
  10948 295.         .         .         .         . O       .         .         .         .         .         .         .      LLX.
  10950 296.         .         .         .         . O       .         .         .         .         .         .         .      LLX.
  10952 297.         .         .         .         .O        .         .         .         .         .         .         .      LLX.
  10954 298.         .         .         .         .O        .         .         .         .         .         .         .      LLX.
  10956 299.         .         .         .         O         .         .         .         .         .         .         .      LLX.
  10958 300.---------.---------.---------.---------O---------.---------.---------.---------.---------.---------.---------.------LLX.
1
1                                                          STATION        B

                          (O) OUTFLOW
          0.       20.       40.       60.       80.      100.      120.      140.      160.      180.      200.      220.        0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
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  10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
  10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
  10132  47O         .         .         .         .         .         .         .         .         .         .         .         .
  10134  48O         .         .         .         .         .         .         .         .         .         .         .         .
  10136  49O         .         .         .         .         .         .         .         .         .         .         .         .
  10138  50O         .         .         .         .         .         .         .         .         .         .         .         .
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  10148  55O         .         .         .         .         .         .         .         .         .         .         .         .
  10150  56O         .         .         .         .         .         .         .         .         .         .         .         .
  10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
  10154  58O         .         .         .         .         .         .         .         .         .         .         .         .
  10156  59O         .         .         .         .         .         .         .         .         .         .         .         .
  10158  60O         .         .         .         .         .         .         .         .         .         .         .         .
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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  10204  63O         .         .         .         .         .         .         .         .         .         .         .         .
  10206  64O         .         .         .         .         .         .         .         .         .         .         .         .
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  10218  70O         .         .         .         .         .         .         .         .         .         .         .         .
  10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10222  72O         .         .         .         .         .         .         .         .         .         .         .         .
  10224  73O         .         .         .         .         .         .         .         .         .         .         .         .
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  10228  75O         .         .         .         .         .         .         .         .         .         .         .         .
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  10232  77O         .         .         .         .         .         .         .         .         .         .         .         .
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  10236  79O         .         .         .         .         .         .         .         .         .         .         .         .
  10238  80O         .         .         .         .         .         .         .         .         .         .         .         .
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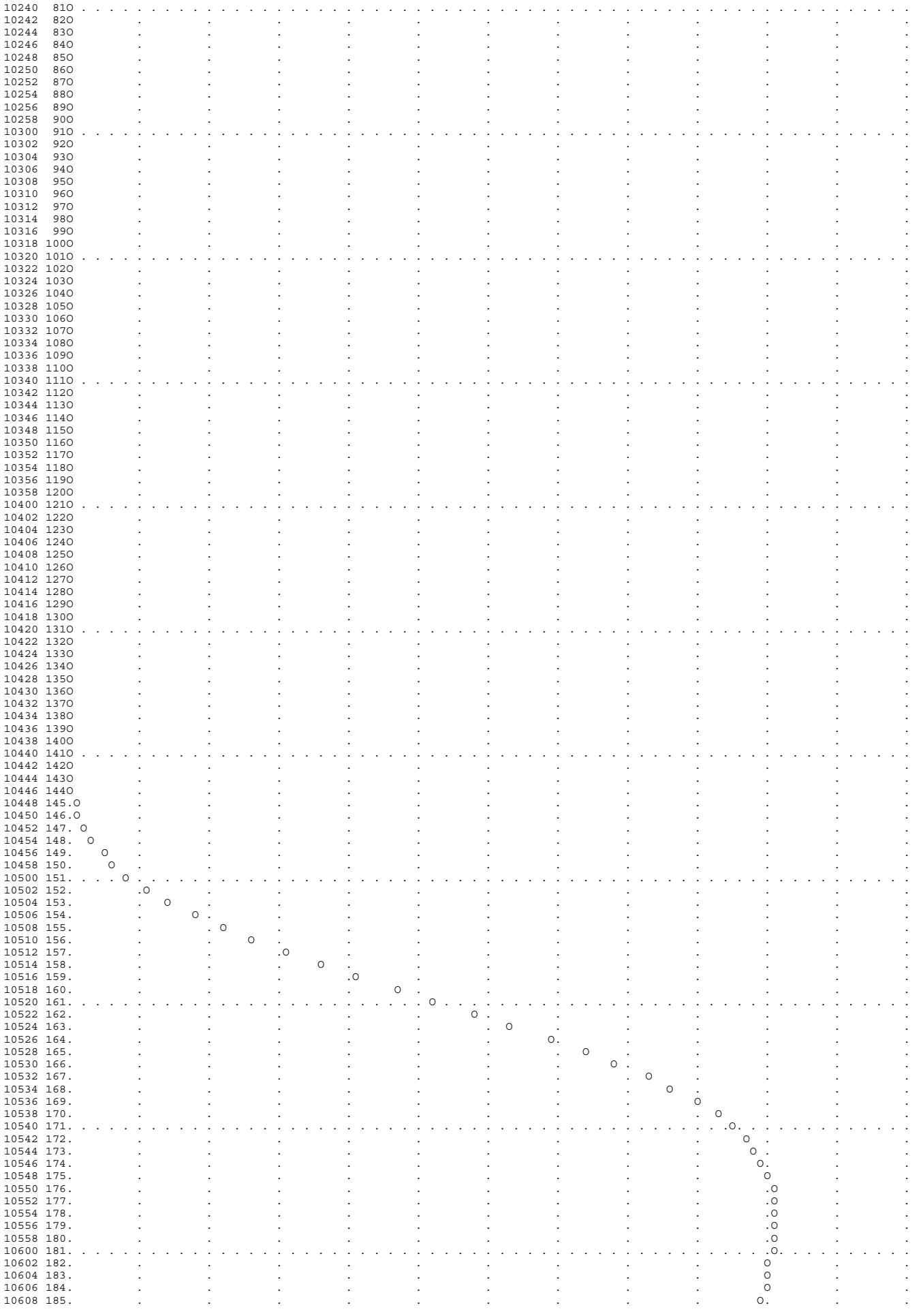

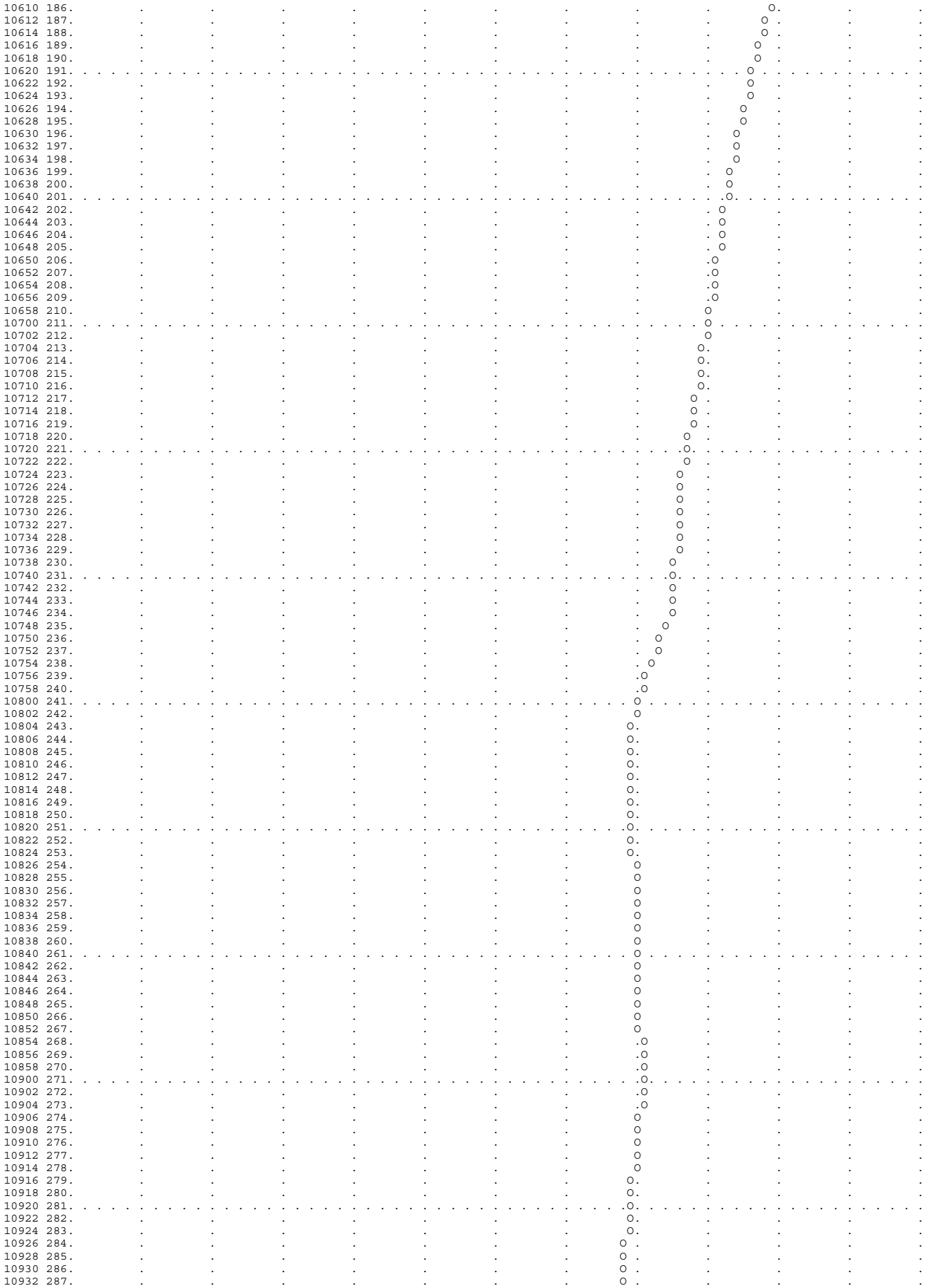

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  10956 299.         .         .         .         .         .         .         . O       .         .         .         .         .
  10958 300.---------.---------.---------.---------.---------.---------.---------.O--------.---------.---------.---------.---------.
1
1                                                          STATION      400

                          (O) OUTFLOW
          0.       40.       80.      120.      160.      200.      240.        0.        0.        0.        0.        0.        0.
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .02       .01       .01       .00       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
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  10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
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  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
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  10156  59O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
  10158  60O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
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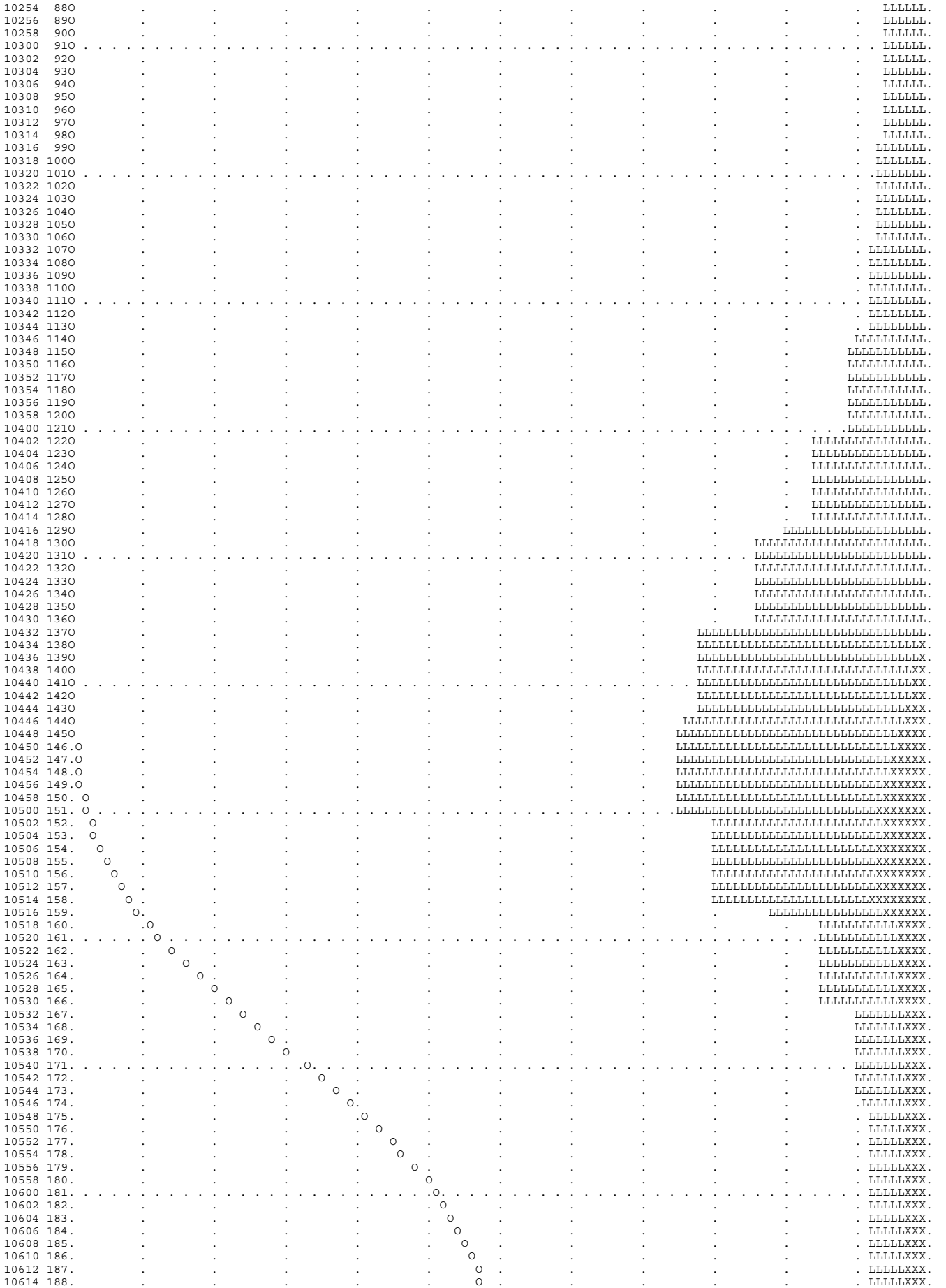

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10842 262.         .         .         .      O .         .         .         .         .         .         .         .    LLLXX.
10844 263.         .         .         .      O .         .         .         .         .         .         .         .    LLLXX.
10846 264.         .         .         .      O .         .         .         .         .         .         .         .    LLLXX.
10848 265.         .         .         .      O .         .         .         .         .         .         .         .     LLXX.
10850 266.         .         .         .      O .         .         .         .         .         .         .         .     LLXX.
10852 267.         .         .         .      O .         .         .         .         .         .         .         .     LLXX.
10854 268.         .         .         .      O .         .         .         .         .         .         .         .     LLXX.
10856 269.         .         .         .      O .         .         .         .         .         .         .         .     LLXX.
10858 270.         .         .         .      O .         .         .         .         .         .         .         .     LLXX.
10900 271. . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
10902 272.         .         .         .     O  .         .         .         .         .         .         .         .    LLLXX.
10904 273.         .         .         .     O  .         .         .         .         .         .         .         .    LLLXX.
10906 274.         .         .         .     O  .         .         .         .         .         .         .         .    LLLXX.
10908 275.         .         .         .     O  .         .         .         .         .         .         .         .    LLLXX.
10910 276.         .         .         .     O  .         .         .         .         .         .         .         .    LLLXX.
10912 277.         .         .         .     O  .         .         .         .         .         .         .         .    LLLXX.
10914 278.         .         .         .     O  .         .         .         .         .         .         .         .    LLLXX.
10916 279.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10918 280.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10920 281. . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
10922 282.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10924 283.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10926 284.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10928 285.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10930 286.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10932 287.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10934 288.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10936 289.         .         .         .     O  .         .         .         .         .         .         .         .     LLXX.
10938 290.         .         .         .    O   .         .         .         .         .         .         .         .     LLXX.
10940 291. . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLXX.
10942 292.         .         .         .    O   .         .         .         .         .         .         .         .     LLXX.
10944 293.         .         .         .    O   .         .         .         .         .         .         .         .     LLXX.
10946 294.         .         .         .    O   .         .         .         .         .         .         .         .      LXX.
10948 295.         .         .         .    O   .         .         .         .         .         .         .         .      LXX.
10950 296.         .         .         .    O   .         .         .         .         .         .         .         .      LXX.
10952 297.         .         .         .   O    .         .         .         .         .         .         .         .      LXX.
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  10954 298.         .         .         .    O    .         .         .         .         .         .         .         .      LXX.
  10956 299.         .         .         .    O    .         .         .         .         .         .         .         .      LXX.
  10958 300.---------.---------.---------.----O----.---------.---------.---------.---------.---------.---------.---------.------LXX.
1
1                                                                  STATION        B

                            (O) OUTFLOW
          0.        40.        80.       120.       160.       200.       240.       280.       320.       360.       400.       440.         0.
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .         .
  10018  10O         .         .         .         .         .         .         .         .         .         .         .         .
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10022  12O         .         .         .         .         .         .         .         .         .         .         .         .
  10024  13O         .         .         .         .         .         .         .         .         .         .         .         .
  10026  14O         .         .         .         .         .         .         .         .         .         .         .         .
  10028  15O         .         .         .         .         .         .         .         .         .         .         .         .
  10030  16O         .         .         .         .         .         .         .         .         .         .         .         .
  10032  17O         .         .         .         .         .         .         .         .         .         .         .         .
  10034  18O         .         .         .         .         .         .         .         .         .         .         .         .
  10036  19O         .         .         .         .         .         .         .         .         .         .         .         .
  10038  20O         .         .         .         .         .         .         .         .         .         .         .         .
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10042  22O         .         .         .         .         .         .         .         .         .         .         .         .
  10044  23O         .         .         .         .         .         .         .         .         .         .         .         .
  10046  24O         .         .         .         .         .         .         .         .         .         .         .         .
  10048  25O         .         .         .         .         .         .         .         .         .         .         .         .
  10050  26O         .         .         .         .         .         .         .         .         .         .         .         .
  10052  27O         .         .         .         .         .         .         .         .         .         .         .         .
  10054  28O         .         .         .         .         .         .         .         .         .         .         .         .
  10056  29O         .         .         .         .         .         .         .         .         .         .         .         .
  10058  30O         .         .         .         .         .         .         .         .         .         .         .         .
  10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10102  32O         .         .         .         .         .         .         .         .         .         .         .         .
  10104  33O         .         .         .         .         .         .         .         .         .         .         .         .
  10106  34O         .         .         .         .         .         .         .         .         .         .         .         .
  10108  35O         .         .         .         .         .         .         .         .         .         .         .         .
  10110  36O         .         .         .         .         .         .         .         .         .         .         .         .
  10112  37O         .         .         .         .         .         .         .         .         .         .         .         .
  10114  38O         .         .         .         .         .         .         .         .         .         .         .         .
  10116  39O         .         .         .         .         .         .         .         .         .         .         .         .
  10118  40O         .         .         .         .         .         .         .         .         .         .         .         .
  10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10122  42O         .         .         .         .         .         .         .         .         .         .         .         .
  10124  43O         .         .         .         .         .         .         .         .         .         .         .         .
  10126  44O         .         .         .         .         .         .         .         .         .         .         .         .
  10128  45O         .         .         .         .         .         .         .         .         .         .         .         .
  10130  46O         .         .         .         .         .         .         .         .         .         .         .         .
  10132  47O         .         .         .         .         .         .         .         .         .         .         .         .
  10134  48O         .         .         .         .         .         .         .         .         .         .         .         .
  10136  49O         .         .         .         .         .         .         .         .         .         .         .         .
  10138  50O         .         .         .         .         .         .         .         .         .         .         .         .
  10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10142  52O         .         .         .         .         .         .         .         .         .         .         .         .
  10144  53O         .         .         .         .         .         .         .         .         .         .         .         .
  10146  54O         .         .         .         .         .         .         .         .         .         .         .         .
  10148  55O         .         .         .         .         .         .         .         .         .         .         .         .
  10150  56O         .         .         .         .         .         .         .         .         .         .         .         .
  10152  57O         .         .         .         .         .         .         .         .         .         .         .         .
  10154  58O         .         .         .         .         .         .         .         .         .         .         .         .
  10156  59O         .         .         .         .         .         .         .         .         .         .         .         .
  10158  60O         .         .         .         .         .         .         .         .         .         .         .         .
  10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10202  62O         .         .         .         .         .         .         .         .         .         .         .         .
  10204  63O         .         .         .         .         .         .         .         .         .         .         .         .
  10206  64O         .         .         .         .         .         .         .         .         .         .         .         .
  10208  65O         .         .         .         .         .         .         .         .         .         .         .         .
  10210  66O         .         .         .         .         .         .         .         .         .         .         .         .
  10212  67O         .         .         .         .         .         .         .         .         .         .         .         .
  10214  68O         .         .         .         .         .         .         .         .         .         .         .         .
  10216  69O         .         .         .         .         .         .         .         .         .         .         .         .
  10218  70O         .         .         .         .         .         .         .         .         .         .         .         .
  10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10222  72O         .         .         .         .         .         .         .         .         .         .         .         .
  10224  73O         .         .         .         .         .         .         .         .         .         .         .         .
  10226  74O         .         .         .         .         .         .         .         .         .         .         .         .
  10228  75O         .         .         .         .         .         .         .         .         .         .         .         .
  10230  76O         .         .         .         .         .         .         .         .         .         .         .         .
  10232  77O         .         .         .         .         .         .         .         .         .         .         .         .
  10234  78O         .         .         .         .         .         .         .         .         .         .         .         .
  10236  79O         .         .         .         .         .         .         .         .         .         .         .         .
  10238  80O         .         .         .         .         .         .         .         .         .         .         .         .
  10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10242  82O         .         .         .         .         .         .         .         .         .         .         .         .
  10244  83O         .         .         .         .         .         .         .         .         .         .         .         .
  10246  84O         .         .         .         .         .         .         .         .         .         .         .         .
  10248  85O         .         .         .         .         .         .         .         .         .         .         .         .
  10250  86O         .         .         .         .         .         .         .         .         .         .         .         .
  10252  87O         .         .         .         .         .         .         .         .         .         .         .         .
  10254  88O         .         .         .         .         .         .         .         .         .         .         .         .
  10256  89O         .         .         .         .         .         .         .         .         .         .         .         .
  10258  90O         .         .         .         .         .         .         .         .         .         .         .         .
  10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
  10302  92O         .         .         .         .         .         .         .         .         .         .         .         .
  10304  93O         .         .         .         .         .         .         .         .         .         .         .         .
  10306  94O         .         .         .         .         .         .         .         .         .         .         .         .
  10308  95O         .         .         .         .         .         .         .         .         .         .         .         .
  10310  96O         .         .         .         .         .         .         .         .         .         .         .         .
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10312  97O        .        .        .        .        .        .        .        .        .        .        .        .
10314  98O        .        .        .        .        .        .        .        .        .        .        .        .
10316  99O        .        .        .        .        .        .        .        .        .        .        .        .
10318 100O        .        .        .        .        .        .        .        .        .        .        .        .
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102O        .        .        .        .        .        .        .        .        .        .        .        .
10324 103O        .        .        .        .        .        .        .        .        .        .        .        .
10326 104O        .        .        .        .        .        .        .        .        .        .        .        .
10328 105O        .        .        .        .        .        .        .        .        .        .        .        .
10330 106O        .        .        .        .        .        .        .        .        .        .        .        .
10332 107O        .        .        .        .        .        .        .        .        .        .        .        .
10334 108O        .        .        .        .        .        .        .        .        .        .        .        .
10336 109O        .        .        .        .        .        .        .        .        .        .        .        .
10338 110O        .        .        .        .        .        .        .        .        .        .        .        .
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112O        .        .        .        .        .        .        .        .        .        .        .        .
10344 113O        .        .        .        .        .        .        .        .        .        .        .        .
10346 114O        .        .        .        .        .        .        .        .        .        .        .        .
10348 115O        .        .        .        .        .        .        .        .        .        .        .        .
10350 116O        .        .        .        .        .        .        .        .        .        .        .        .
10352 117O        .        .        .        .        .        .        .        .        .        .        .        .
10354 118O        .        .        .        .        .        .        .        .        .        .        .        .
10356 119O        .        .        .        .        .        .        .        .        .        .        .        .
10358 120O        .        .        .        .        .        .        .        .        .        .        .        .
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122O        .        .        .        .        .        .        .        .        .        .        .        .
10404 123O        .        .        .        .        .        .        .        .        .        .        .        .
10406 124O        .        .        .        .        .        .        .        .        .        .        .        .
10408 125O        .        .        .        .        .        .        .        .        .        .        .        .
10410 126O        .        .        .        .        .        .        .        .        .        .        .        .
10412 127O        .        .        .        .        .        .        .        .        .        .        .        .
10414 128O        .        .        .        .        .        .        .        .        .        .        .        .
10416 129O        .        .        .        .        .        .        .        .        .        .        .        .
10418 130O        .        .        .        .        .        .        .        .        .        .        .        .
10420 131O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132O        .        .        .        .        .        .        .        .        .        .        .        .
10424 133O        .        .        .        .        .        .        .        .        .        .        .        .
10426 134O        .        .        .        .        .        .        .        .        .        .        .        .
10428 135O        .        .        .        .        .        .        .        .        .        .        .        .
10430 136O        .        .        .        .        .        .        .        .        .        .        .        .
10432 137O        .        .        .        .        .        .        .        .        .        .        .        .
10434 138O        .        .        .        .        .        .        .        .        .        .        .        .
10436 139O        .        .        .        .        .        .        .        .        .        .        .        .
10438 140O        .        .        .        .        .        .        .        .        .        .        .        .
10440 141O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142O        .        .        .        .        .        .        .        .        .        .        .        .
10444 143O        .        .        .        .        .        .        .        .        .        .        .        .
10446 144O        .        .        .        .        .        .        .        .        .        .        .        .
10448 145.O       .        .        .        .        .        .        .        .        .        .        .        .
10450 146.O       .        .        .        .        .        .        .        .        .        .        .        .
10452 147. O      .        .        .        .        .        .        .        .        .        .        .        .
10454 148.  O     .        .        .        .        .        .        .        .        .        .        .        .
10456 149.   O    .        .        .        .        .        .        .        .        .        .        .        .
10458 150.    O   .        .        .        .        .        .        .        .        .        .        .        .
10500 151. . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.      O .        .        .        .        .        .        .        .        .        .        .        .
10504 153.        O        .        .        .        .        .        .        .        .        .        .        .
10506 154.        .  O     .        .        .        .        .        .        .        .        .        .        .
10508 155.        .    O   .        .        .        .        .        .        .        .        .        .        .
10510 156.        .       O.        .        .        .        .        .        .        .        .        .        .
10512 157.        .        . O      .        .        .        .        .        .        .        .        .        .
10514 158.        .        .    O   .        .        .        .        .        .        .        .        .        .
10516 159.        .        .        O        .        .        .        .        .        .        .        .        .
10518 160.        .        .         .  O    .        .        .        .        .        .        .        .        .
10520 161. . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.        .        .        .  O     .        .        .        .        .        .        .        .        .
10524 163.        .        .        .     O  .        .        .        .        .        .        .        .        .
10526 164.        .        .        .       . O      .        .        .        .        .        .        .        .
10528 165.        .        .        .        .    O  .        .        .        .        .        .        .        .
10530 166.        .        .        .        .       .O        .        .        .        .        .        .        .
10532 167.        .        .        .        .        .   O    .        .        .        .        .        .        .
10534 168.        .        .        .        .        .     O. .        .        .        .        .        .        .
10536 169.        .        .        .        .        .        .  O     .        .        .        .        .        .
10538 170.        .        .        .        .        .        .    O  .        .        .        .        .        .
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . . . . . . . . . . . . .
10542 172.        .        .        .        .        .        .        .  O     .        .        .        .        .
10544 173.        .        .        .        .        .        .        .    O  .        .        .        .        .
10546 174.        .        .        .        .        .        .        .      O.        .        .        .        .
10548 175.        .        .        .        .        .        .        .       .O        .        .        .        .
10550 176.        .        .        .        .        .        .        .        .  O     .        .        .        .
10552 177.        .        .        .        .        .        .        .        .   O    .        .        .        .
10554 178.        .        .        .        .        .        .        .        .     O  .        .        .        .
10556 179.        .        .        .        .        .        .        .        .       O.        .        .        .
10558 180.        .        .        .        .        .        .        .        .        O        .        .        .
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10602 182.        .        .        .        .        .        .        .        .        .        .        .        .
10604 183.        .        .        .        .        .        .        .        .        .        .        .        .
10606 184.        .        .        .        .        .        .        .        .        .        .        .        .
10608 185.        .        .        .        .        .        .        .        .        .        .        .        .
10610 186.        .        .        .        .        .        .        .        .        .        .        .        .
10612 187.        .        .        .        .        .        .        .        .        .        .        .        .
10614 188.        .        .        .        .        .        .        .        .        .        .        .        .
10616 189.        .        .        .        .        .        .        .        .        .        .        .        .
10618 190.        .        .        .        .        .        .        .        .        .        .        .        .
10620 191. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10622 192.        .        .        .        .        .        .        .        .        .        .        .        .
10624 193.        .        .        .        .        .        .        .        .        .        .        .        .
10626 194.        .        .        .        .        .        .        .        .        .        .        .        .
10628 195.        .        .        .        .        .        .        .        .        .        .        .        .
10630 196.        .        .        .        .        .        .        .        .        .        .        .        .
10632 197.        .        .        .        .        .        .        .        .        .        .        .        .
10634 198.        .        .        .        .        .        .        .        .        .        .        .        .
10636 199.        .        .        .        .        .        .        .        .        .        .        .        .
10638 200.        .        .        .        .        .        .        .        .        .        .        .        .
10640 201. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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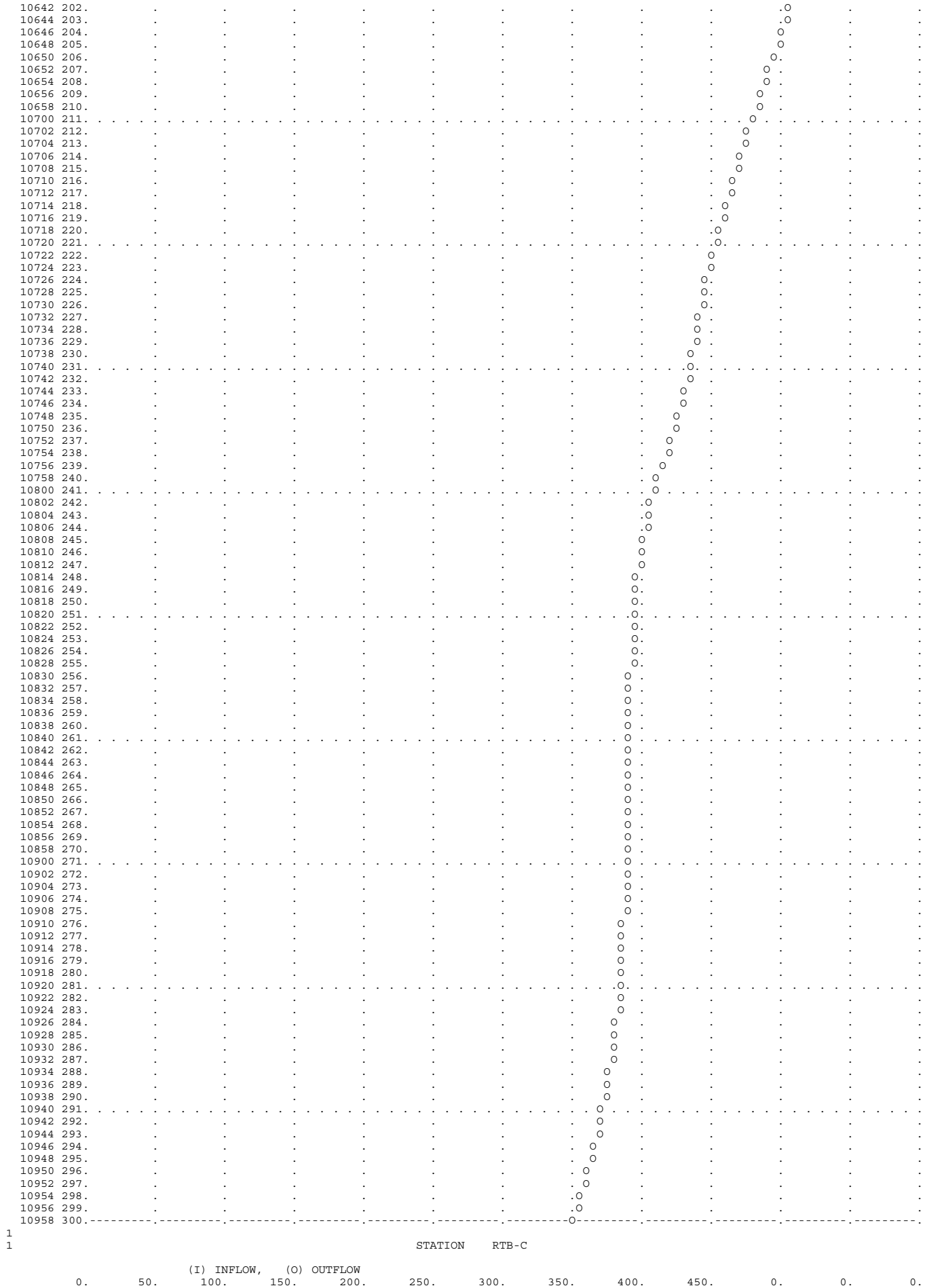
10642 202.
10644 203.
10646 204.
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10650 206.
10652 207.
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10700 211.
10702 212.
10704 213.
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10842 262.
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10900 271.
10902 272.
10904 273.
10906 274.
10908 275.
10910 276.
10912 277.
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10916 279.
10918 280.
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10922 282.
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10930 286.
10932 287.
10934 288.
10936 289.
10938 290.
10940 291.
10942 292.
10944 293.
10946 294.
10948 295.
10950 296.
10952 297.
10954 298.
10956 299.
10958 300.
1
1
STATION RTB-C
(I) INFLOW, (O) OUTFLOW
0. 50. 100. 150. 200. 250. 300. 350. 400. 450. 0. 0. 0.
(S) STORAGE

```
         0.        0.        0.        0.        0.        0.        0.        1.        2.        3.        0.        0.        0.
DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
 10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
 10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
 10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  12I         .         .         .         .         .         S         .         .         .         .         .         .
 10024  13I         .         .         .         .         .         S         .         .         .         .         .         .
 10026  14I         .         .         .         .         .         S         .         .         .         .         .         .
 10028  15I         .         .         .         .         .         S         .         .         .         .         .         .
 10030  16I         .         .         .         .         .         S         .         .         .         .         .         .
 10032  17I         .         .         .         .         .         S         .         .         .         .         .         .
 10034  18I         .         .         .         .         .         S         .         .         .         .         .         .
 10036  19I         .         .         .         .         .         S         .         .         .         .         .         .
 10038  20I         .         .         .         .         .         S         .         .         .         .         .         .
 10040  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10042  22I         .         .         .         .         .         S         .         .         .         .         .         .
 10044  23I         .         .         .         .         .         S         .         .         .         .         .         .
 10046  24I         .         .         .         .         .         S         .         .         .         .         .         .
 10048  25I         .         .         .         .         .         S         .         .         .         .         .         .
 10050  26I         .         .         .         .         .         S         .         .         .         .         .         .
 10052  27I         .         .         .         .         .         S         .         .         .         .         .         .
 10054  28I         .         .         .         .         .         S         .         .         .         .         .         .
 10056  29I         .         .         .         .         .         S         .         .         .         .         .         .
 10058  30I         .         .         .         .         .         S         .         .         .         .         .         .
 10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10102  32I         .         .         .         .         .         S         .         .         .         .         .         .
 10104  33I         .         .         .         .         .         S         .         .         .         .         .         .
 10106  34I         .         .         .         .         .         S         .         .         .         .         .         .
 10108  35I         .         .         .         .         .         S         .         .         .         .         .         .
 10110  36I         .         .         .         .         .         S         .         .         .         .         .         .
 10112  37I         .         .         .         .         .         S         .         .         .         .         .         .
 10114  38I         .         .         .         .         .         S         .         .         .         .         .         .
 10116  39I         .         .         .         .         .         S         .         .         .         .         .         .
 10118  40I         .         .         .         .         .         S         .         .         .         .         .         .
 10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10122  42I         .         .         .         .         .         S         .         .         .         .         .         .
 10124  43I         .         .         .         .         .         S         .         .         .         .         .         .
 10126  44I         .         .         .         .         .         S         .         .         .         .         .         .
 10128  45I         .         .         .         .         .         S         .         .         .         .         .         .
 10130  46I         .         .         .         .         .         S         .         .         .         .         .         .
 10132  47I         .         .         .         .         .         S         .         .         .         .         .         .
 10134  48I         .         .         .         .         .         S         .         .         .         .         .         .
 10136  49I         .         .         .         .         .         S         .         .         .         .         .         .
 10138  50I         .         .         .         .         .         S         .         .         .         .         .         .
 10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10142  52I         .         .         .         .         .         S         .         .         .         .         .         .
 10144  53I         .         .         .         .         .         S         .         .         .         .         .         .
 10146  54I         .         .         .         .         .         S         .         .         .         .         .         .
 10148  55I         .         .         .         .         .         S         .         .         .         .         .         .
 10150  56I         .         .         .         .         .         S         .         .         .         .         .         .
 10152  57I         .         .         .         .         .         S         .         .         .         .         .         .
 10154  58I         .         .         .         .         .         S         .         .         .         .         .         .
 10156  59I         .         .         .         .         .         S         .         .         .         .         .         .
 10158  60I         .         .         .         .         .         S         .         .         .         .         .         .
 10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10202  62I         .         .         .         .         .         S         .         .         .         .         .         .
 10204  63I         .         .         .         .         .         S         .         .         .         .         .         .
 10206  64I         .         .         .         .         .         S         .         .         .         .         .         .
 10208  65I         .         .         .         .         .         S         .         .         .         .         .         .
 10210  66I         .         .         .         .         .         S         .         .         .         .         .         .
 10212  67I         .         .         .         .         .         S         .         .         .         .         .         .
 10214  68I         .         .         .         .         .         S         .         .         .         .         .         .
 10216  69I         .         .         .         .         .         S         .         .         .         .         .         .
 10218  70I         .         .         .         .         .         S         .         .         .         .         .         .
 10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10222  72I         .         .         .         .         .         S         .         .         .         .         .         .
 10224  73I         .         .         .         .         .         S         .         .         .         .         .         .
 10226  74I         .         .         .         .         .         S         .         .         .         .         .         .
 10228  75I         .         .         .         .         .         S         .         .         .         .         .         .
 10230  76I         .         .         .         .         .         S         .         .         .         .         .         .
 10232  77I         .         .         .         .         .         S         .         .         .         .         .         .
 10234  78I         .         .         .         .         .         S         .         .         .         .         .         .
 10236  79I         .         .         .         .         .         S         .         .         .         .         .         .
 10238  80I         .         .         .         .         .         S         .         .         .         .         .         .
 10240  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10242  82I         .         .         .         .         .         S         .         .         .         .         .         .
 10244  83I         .         .         .         .         .         S         .         .         .         .         .         .
 10246  84I         .         .         .         .         .         S         .         .         .         .         .         .
 10248  85I         .         .         .         .         .         S         .         .         .         .         .         .
 10250  86I         .         .         .         .         .         S         .         .         .         .         .         .
 10252  87I         .         .         .         .         .         S         .         .         .         .         .         .
 10254  88I         .         .         .         .         .         S         .         .         .         .         .         .
 10256  89I         .         .         .         .         .         S         .         .         .         .         .         .
 10258  90I         .         .         .         .         .         S         .         .         .         .         .         .
 10300  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10302  92I         .         .         .         .         .         S         .         .         .         .         .         .
 10304  93I         .         .         .         .         .         S         .         .         .         .         .         .
 10306  94I         .         .         .         .         .         S         .         .         .         .         .         .
 10308  95I         .         .         .         .         .         S         .         .         .         .         .         .
 10310  96I         .         .         .         .         .         S         .         .         .         .         .         .
 10312  97I         .         .         .         .         .         S         .         .         .         .         .         .
 10314  98I         .         .         .         .         .         S         .         .         .         .         .         .
 10316  99I         .         .         .         .         .         S         .         .         .         .         .         .
 10318 100I         .         .         .         .         .         S         .         .         .         .         .         .
 10320 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10322 102I         .         .         .         .         .         S         .         .         .         .         .         .
 10324 103I         .         .         .         .         .         S         .         .         .         .         .         .
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10326 104I         .         .         .         .         .        S         .         .         .         .         .         .
10328 105I         .         .         .         .         .        S         .         .         .         .         .         .
10330 106I         .         .         .         .         .        S         .         .         .         .         .         .
10332 107I         .         .         .         .         .        S         .         .         .         .         .         .
10334 108I         .         .         .         .         .        S         .         .         .         .         .         .
10336 109I         .         .         .         .         .        S         .         .         .         .         .         .
10338 110I         .         .         .         .         .        S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I         .         .         .         .         .        S         .         .         .         .         .         .
10344 113I         .         .         .         .         .        S         .         .         .         .         .         .
10346 114I         .         .         .         .         .        S         .         .         .         .         .         .
10348 115I         .         .         .         .         .        S         .         .         .         .         .         .
10350 116I         .         .         .         .         .        S         .         .         .         .         .         .
10352 117I         .         .         .         .         .        S         .         .         .         .         .         .
10354 118I         .         .         .         .         .        S         .         .         .         .         .         .
10356 119I         .         .         .         .         .        S         .         .         .         .         .         .
10358 120I         .         .         .         .         .        S         .         .         .         .         .         .
10400 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122I         .         .         .         .         .        S         .         .         .         .         .         .
10404 123I         .         .         .         .         .        S         .         .         .         .         .         .
10406 124I         .         .         .         .         .        S         .         .         .         .         .         .
10408 125I         .         .         .         .         .        S         .         .         .         .         .         .
10410 126I         .         .         .         .         .        S         .         .         .         .         .         .
10412 127I         .         .         .         .         .        S         .         .         .         .         .         .
10414 128I         .         .         .         .         .        S         .         .         .         .         .         .
10416 129I         .         .         .         .         .        S         .         .         .         .         .         .
10418 130I         .         .         .         .         .        S         .         .         .         .         .         .
10420 131I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132I         .         .         .         .         .        S         .         .         .         .         .         .
10424 133I         .         .         .         .         .        S         .         .         .         .         .         .
10426 134I         .         .         .         .         .        S         .         .         .         .         .         .
10428 135I         .         .         .         .         .        S         .         .         .         .         .         .
10430 136I         .         .         .         .         .        S         .         .         .         .         .         .
10432 137I         .         .         .         .         .        S         .         .         .         .         .         .
10434 138I         .         .         .         .         .        S         .         .         .         .         .         .
10436 139I         .         .         .         .         .        S         .         .         .         .         .         .
10438 140I         .         .         .         .         .        S         .         .         .         .         .         .
10440 141I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142I         .         .         .         .         .        S         .         .         .         .         .         .
10444 143I         .         .         .         .         .        S         .         .         .         .         .         .
10446 144I         .         .         .         .         .        S         .         .         .         .         .         .
10448 145OI        .         .         .         .         .        S         .         .         .         .         .         .
10450 146.I        .         .         .         .         .        S         .         .         .         .         .         .
10452 147.I        .         .         .         .         .        S         .         .         .         .         .         .
10454 148.OI       .         .         .         .         .        S         .         .         .         .         .         .
10456 149. OI      .         .         .         .         .        S         .         .         .         .         .         .
10458 150. O I     .         .         .         .         .        .S        .         .         .         .         .         .
10500 151. .O.I. . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.   O  I  .         .         .         .         .        .S        .         .         .         .         .         .
10504 153.     O I .         .         .         .         .        .S        .         .         .         .         .         .
10506 154.      O  I         .         .         .         .        . S       .         .         .         .         .         .
10508 155.        O. I       .         .         .         .        . S       .         .         .         .         .         .
10510 156.         .O   I    .         .         .         .        .  S      .         .         .         .         .         .
10512 157.         .  O    I .         .         .         .        .  S      .         .         .         .         .         .
10514 158.         .     O   .I        .         .         .        .   S     .         .         .         .         .         .
10516 159.         .       O.   I      .         .         .        .    S    .         .         .         .         .         .
10518 160.         .         .O     I  .         .         .        .     S   .         .         .         .         .         .
10520 161. . . . . . . . . . .O. . .I. . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.         .         .      O .   I     .         .        .      S  .         .         .         .         .         .
10524 163.         .         .        .O     I .         .         .       S .         .         .         .         .         .
10526 164.         .         .         .    O    . I      .         .        S.         .         .         .         .         .
10528 165.         .         .         .      O .    I    .         .         S         .         .         .         .         .
10530 166.         .         .         .         . O     I.         .         .S        .         .         .         .         .
10532 167.         .         .         .         .    O   . I       .         . S       .         .         .         .         .
10534 168.         .         .         .         .       O.    I     .         .  S      .         .         .         .         .
10536 169.         .         .         .         .         . O    I .         .   S     .         .         .         .         .
10538 170.         .         .         .         .         .    O   .I        .   S     .         .         .         .         .
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . . O . . I . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . .
10542 172.         .         .         .         .         .        .O    I     .     S   .         .         .         .         .
10544 173.         .         .         .         .         .        .   O    I.      S  .         .         .         .         .
10546 174.         .         .         .         .         .        .     O   .I     S  .         .         .         .         .
10548 175.         .         .         .         .         .        .       O.  I    S .         .         .         .         .
10550 176.         .         .         .         .         .        .         .O   I  S .         .         .         .         .
10552 177.         .         .         .         .         .        .         .  O  I  S.         .         .         .         .
10554 178.         .         .         .         .         .        .         .    O  IS.         .         .         .         .
10556 179.         .         .         .         .         .        .         .     O  IS         .         .         .         .
10558 180.         .         .         .         .         .        .         .       O S         .         .         .         .
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .OSI. . . . . . . . . . . . . . . . . . . .
10602 182.         .         .         .         .         .        .         .        OSI         .         .         .         .
10604 183.         .         .         .         .         .        .         .        .S I        .         .         .         .
10606 184.         .         .         .         .         .        .         .        .SOI        .         .         .         .
10608 185.         .         .         .         .         .        .         .        .S OI       .         .         .         .
10610 186.         .         .         .         .         .        .         .        . SOI       .         .         .         .
10612 187.         .         .         .         .         .        .         .        . S OI      .         .         .         .
10614 188.         .         .         .         .         .        .         .        . S OI      .         .         .         .
10616 189.         .         .         .         .         .        .         .        . S OI      .         .         .         .
10618 190.         .         .         .         .         .        .         .        . S  I      .         .         .         .
10620 191. . . . . . . . . . . . . . . . . . . .
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 10656 209.         .         .         .         .         .         .         .       IOS         .         .         .         .
 10658 210.         .         .         .         .         .         .         .         .     IO S         .         .         .         .
 10700 211. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .IO S . . . . . . . . . . . . . . . . . . .
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10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
10016   9O         .         .         .         .         .         .         .         .         .         .         .        LL.
10018  10O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10022  12O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10024  13O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10026  14O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10028  15O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10030  16O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10032  17O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10034  18O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10036  19O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10038  20O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10042  22O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10044  23O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10046  24O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10048  25O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10050  26O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10052  27O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10054  28O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10056  29O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10058  30O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10102  32O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10104  33O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10106  34O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10108  35O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10110  36O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10112  37O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10114  38O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10116  39O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10118  40O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10122  42O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10124  43O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10126  44O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10128  45O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10130  46O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10132  47O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10134  48O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10136  49O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .       LLL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .      LLLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .     LLLLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .    LLLLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .   LLLLLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .   LLLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .   LLLLLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .   LLLLLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .   LLLLLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .   LLLLLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .   LLLLLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
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10340 111O . . . . . LLLLLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         LLLLLLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10352 117O         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10354 118O         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10356 119O         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10358 120O         .         .         .         .         .         .         .         .         .        LLLLLLLLLL.
10400 121O . . . . . .LLLLLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10404 123O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10406 124O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10408 125O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10410 126O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10412 127O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10414 128O         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLL.
10416 129O         .         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLLL.
10418 130O         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10420 131O . . . . . LLLLLLLLLLLLLLLLLLLLLLLL.
10422 132O         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10424 133O         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10426 134O         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10428 135O         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10430 136O         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLL.
10432 137O         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10434 138O         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10436 139O         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10438 140O         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10440 141O . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10442 142O         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10444 143O         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10446 144O         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10448 145O         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10450 146O         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10452 147O         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10454 148O         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10456 149O         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10458 150O         .         .         .         .         .         .         .   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10500 151O . . . . . .LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10502 152O         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10504 153O         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10506 154O         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10508 155O         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10510 156O         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10512 157O         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10514 158O         .         .         .         .         .         .         .        LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10516 159O         .         .         .         .         .         .         .       .       LLLLLLLLLLLLLLLLLLLLL.
10518 160O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLL.
10520 161O . . . . . .LLLLLLLLLLLLLLL.
10522 162O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLL.
10524 163O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLL.
10526 164O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLL.
10528 165O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLL.
10530 166O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLL.
10532 167O         .         .         .         .         .         .         .         .         LLLLLLLLLL.
10534 168O         .         .         .         .         .         .         .         .         LLLLLLLLLL.
10536 169O         .         .         .         .         .         .         .         .         LLLLLLLLLL.
10538 170O         .         .         .         .         .         .         .         .         LLLLLLLLLL.
10540 171O . . . . . LLLLLLLLLL.
10542 172O         .         .         .         .         .         .         .         .         LLLLLLLLLL.
10544 173O         .         .         .         .         .         .         .         .         LLLLLLLLLL.
10546 174O         .         .         .         .         .         .         .         .         .LLLLLLLLL.
10548 175O         .         .         .         .         .         .         .         .         . LLLLLLLL.
10550 176O         .         .         .         .         .         .         .         .         . LLLLLLLL.
10552 177O         .         .         .         .         .         .         .         .         . LLLLLLLL.
10554 178O         .         .         .         .         .         .         .         .         . LLLLLLLL.
10556 179O         .         .         .         .         .         .         .         .         . LLLLLLLL.
10558 180O         .         .         .         .         .         .         .         .         . LLLLLLLL.
10600 181O . . . . . LLLLLLLL.
10602 182O         .         .         .         .         .         .         .         .         . LLLLLLLL.
10604 183O         .         .         .         .         .         .         .         .         . LLLLLLLL.
10606 184.O        .         .         .         .         .         .         .         .         . LLLLLLLL.
10608 185.O        .         .         .         .         .         .         .         .         . LLLLLLLL.
10610 186.O        .         .         .         .         .         .         .         .         . LLLLLLLL.
10612 187.O        .         .         .         .         .         .         .         .         . LLLLLLLL.
10614 188.O        .         .         .         .         .         .         .         .         . LLLLLLLL.
10616 189. O       .         .         .         .         .         .         .         .         .  LLLLLLL.
10618 190. O       .         .         .         .         .         .         .         .         .  LLLLLLL.
10620 191. O . . . . . .LLLLLLL.
10622 192.  O      .         .         .         .         .         .         .         .         .  LLLLLLL.
10624 193.  O      .         .         .         .         .         .         .         .         .  LLLLLLL.
10626 194.   O     .         .         .         .         .         .         .         .         .  LLLLLLL.
10628 195.   O     .         .         .         .         .         .         .         .         .  LLLLLLL.
10630 196.    O    .         .         .         .         .         .         .         .         .  LLLLLLL.
10632 197.    O    .         .         .         .         .         .         .         .         .  LLLLLLL.
10634 198.     O   .         .         .         .         .         .         .         .         .  LLLLLLL.
10636 199.     O   .         .         .         .         .         .         .         .         .  LLLLLLL.
10638 200.      O  .         .         .         .         .         .         .         .         .  LLLLLLL.
10640 201. . . . O . . . . . .LLLLLLL.
10642 202.       O .         .         .         .         .         .         .         .         .  LLLLLLL.
10644 203.        O.         .         .         .         .         .         .         .         .  LLLLLLL.
10646 204.         O         .         .         .         .         .         .         .         .  LLLLLLL.
10648 205.         .O        .         .         .         .         .         .         .         .   LLLLLL.
10650 206.         . O       .         .         .         .         .         .         .         .   LLLLLL.
10652 207.         . O       .         .         .         .         .         .         .         .   LLLLLL.
10654 208.         .  O      .         .         .         .         .         .         .         .   LLLLLL.
10656 209.         .   O     .         .         .         .         .         .         .         .   LLLLLL.
10658 210.         .    O    .         .         .         .         .         .         .         .   LLLLLL.
10700 211. . . . . . . O . . . . . LLLLLL.
10702 212.         .     O   .         .         .         .         .         .         .         .   LLLLLL.
10704 213.         .      O  .         .         .         .         .         .         .         .   LLLLLL.
10706 214.         .       O.         .         .         .         .         .         .         .   LLLLLL.
10708 215.         .        O         .         .         .         .         .         .         .   LLLLLL.
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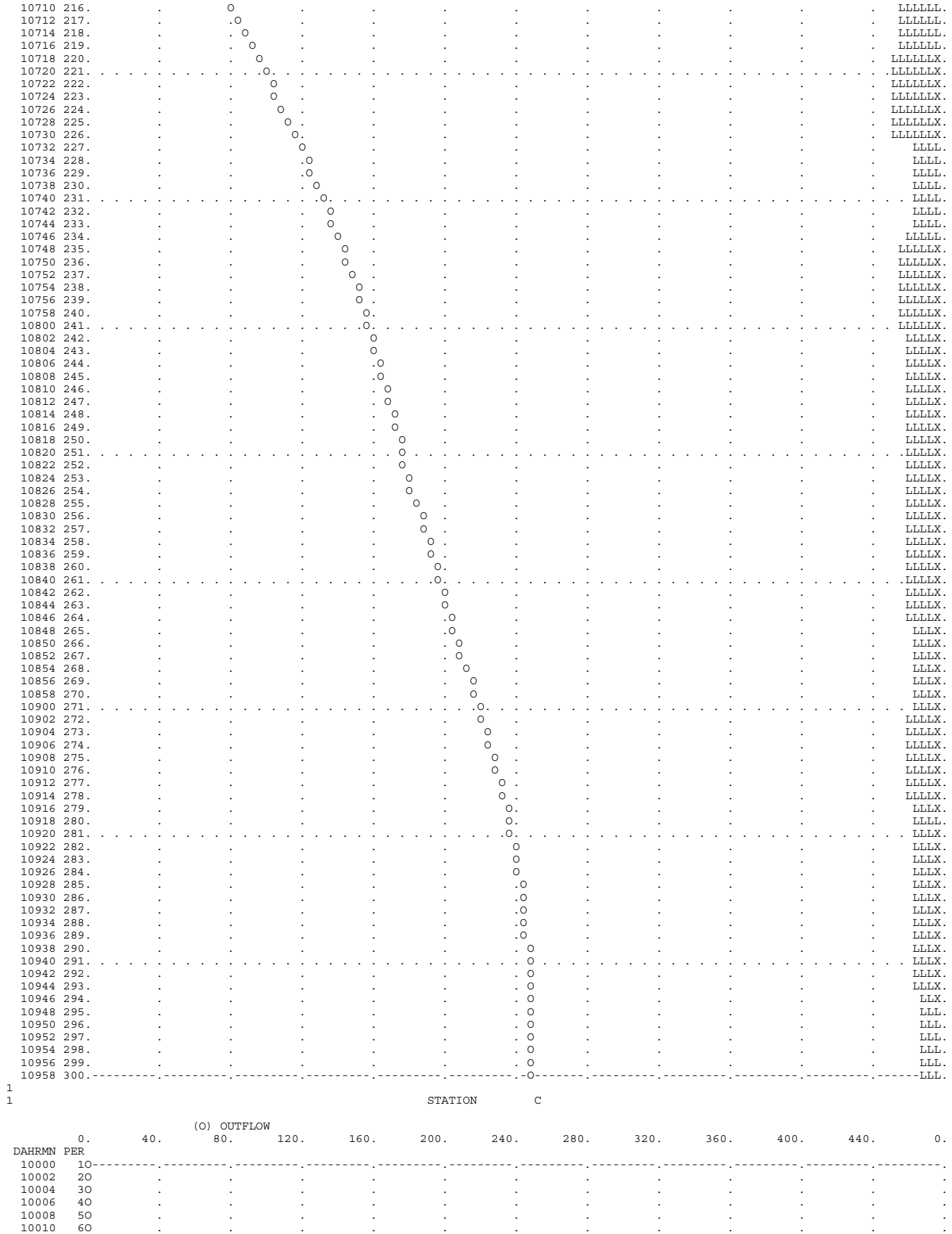
STATION C
(O) OUTFLOW
0. 40. 80. 120. 160. 200. 240. 280. 320. 360. 400. 440. 0.
DAHRMN PER

10028 15O
10030 16O
10032 17O
10034 18O
10036 19O
10038 20O
10040 21O
10042 22O
10044 23O
10046 24O
10048 25O
10050 26O
10052 27O
10054 28O
10056 29O
10058 30O
10100 31O
10102 32O
10104 33O
10106 34O
10108 35O
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10340 111O
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10344 113O
10346 114O
10348 115O
10350 116O
10352 117O
10354 118O
10356 119O

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10358 120O         .         .         .         .         .         .         .         .         .         .         .         .
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122O         .         .         .         .         .         .         .         .         .         .         .         .
10404 123O         .         .         .         .         .         .         .         .         .         .         .         .
10406 124O         .         .         .         .         .         .         .         .         .         .         .         .
10408 125O         .         .         .         .         .         .         .         .         .         .         .         .
10410 126O         .         .         .         .         .         .         .         .         .         .         .         .
10412 127O         .         .         .         .         .         .         .         .         .         .         .         .
10414 128O         .         .         .         .         .         .         .         .         .         .         .         .
10416 129O         .         .         .         .         .         .         .         .         .         .         .         .
10418 130O         .         .         .         .         .         .         .         .         .         .         .         .
10420 131O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132O         .         .         .         .         .         .         .         .         .         .         .         .
10424 133O         .         .         .         .         .         .         .         .         .         .         .         .
10426 134O         .         .         .         .         .         .         .         .         .         .         .         .
10428 135O         .         .         .         .         .         .         .         .         .         .         .         .
10430 136O         .         .         .         .         .         .         .         .         .         .         .         .
10432 137O         .         .         .         .         .         .         .         .         .         .         .         .
10434 138O         .         .         .         .         .         .         .         .         .         .         .         .
10436 139O         .         .         .         .         .         .         .         .         .         .         .         .
10438 140O         .         .         .         .         .         .         .         .         .         .         .         .
10440 141O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142O         .         .         .         .         .         .         .         .         .         .         .         .
10444 143O         .         .         .         .         .         .         .         .         .         .         .         .
10446 144O         .         .         .         .         .         .         .         .         .         .         .         .
10448 145O         .         .         .         .         .         .         .         .         .         .         .         .
10450 146.O        .         .         .         .         .         .         .         .         .         .         .         .
10452 147.O        .         .         .         .         .         .         .         .         .         .         .         .
10454 148.O        .         .         .         .         .         .         .         .         .         .         .         .
10456 149. O       .         .         .         .         .         .         .         .         .         .         .         .
10458 150.  O      .         .         .         .         .         .         .         .         .         .         .         .
10500 151. . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152.    O    .         .         .         .         .         .         .         .         .         .         .         .
10504 153.      O  .         .         .         .         .         .         .         .         .         .         .         .
10506 154.        O.         .         .         .         .         .         .         .         .         .         .         .
10508 155.         .O        .         .         .         .         .         .         .         .         .         .         .
10510 156.         .   O     .         .         .         .         .         .         .         .         .         .         .
10512 157.         .      O  .         .         .         .         .         .         .         .         .         .         .
10514 158.         .         O         .         .         .         .         .         .         .         .         .         .
10516 159.         .         .  O      .         .         .         .         .         .         .         .         .         .
10518 160.         .         .      O  .         .         .         .         .         .         .         .         .         .
10520 161. . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.         .         .         .    O    .         .         .         .         .         .         .         .         .
10524 163.         .         .         .        O.         .         .         .         .         .         .         .         .
10526 164.         .         .         .         .   O     .         .         .         .         .         .         .         .
10528 165.         .         .         .         .       O .         .         .         .         .         .         .         .
10530 166.         .         .         .         .         .  O      .         .         .         .         .         .         .
10532 167.         .         .         .         .         .      O  .         .         .         .         .         .         .
10534 168.         .         .         .         .         .         .O        .         .         .         .         .         .
10536 169.         .         .         .         .         .         .    O    .         .         .         .         .         .
10538 170.         .         .         .         .         .         .        O.         .         .         .         .         .
10540 171. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . . . . . .
10542 172.         .         .         .         .         .         .         .      O  .         .         .         .         .
10544 173.         .         .         .         .         .         .         .         O         .         .         .         .
10546 174.         .         .         .         .         .         .         .         .  O      .         .         .         .
10548 175.         .         .         .         .         .         .         .         .     O   .         .         .         .
10550 176.         .         .         .         .         .         .         .         .        O.         .         .         .
10552 177.         .         .         .         .         .         .         .         .         .O        .         .         .
10554 178.         .         .         .         .         .         .         .         .         .  O      .         .         .
10556 179.         .         .         .         .         .         .         .         .         .    O    .         .         .
10558 180.         .         .         .         .         .         .         .         .         .      O  .         .         .
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . .
10602 182.         .         .         .         .         .         .         .         .         .         O         .         .
10604 183.         .         .         .         .         .         .         .         .         .         .O        .         .
10606 184.         .         .         .         .         .         .         .         .         .         . O       .         .
10608 185.         .         .         .         .         .         .         .         .         .         .  O      .         .
10610 186.         .         .         .         .         .         .         .         .         .         .   O     .         .
10612 187.         .         .         .         .         .         .         .         .         .         .    O    .         .
10614 188.         .         .         .         .         .         .         .         .         .         .     O   .         .
10616 189.         .         .         .         .         .         .         .         .         .         .     O   .         .
10618 190.         .         .         .         .         .         .         .         .         .         .     O   .         .
10620 191. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . .
10622 192.         .         .         .         .         .         .         .         .         .         .      O  .         .
10624 193.         .         .         .         .         .         .         .         .         .         .      O  .         .
10626 194.         .         .         .         .         .         .         .         .         .         .      O  .         .
10628 195.         .         .         .         .         .         .         .         .         .         .      O  .         .
10630 196.         .         .         .         .         .         .         .         .         .         .      O  .         .
10632 197.         .         .         .         .         .         .         .         .         .         .     O   .         .
10634 198.         .         .         .         .         .         .         .         .         .         .     O   .         .
10636 199.         .         .         .         .         .         .         .         .         .         .     O   .         .
10638 200.         .         .         .         .         .         .         .         .         .         .    O    .         .
10640 201. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . .
10642 202.         .         .         .         .         .         .         .         .         .         .    O    .         .
10644 203.         .         .         .         .         .         .         .         .         .         .   O     .         .
10646 204.         .         .         .         .         .         .         .         .         .         .   O     .         .
10648 205.         .         .         .         .         .         .         .         .         .         .  O      .         .
10650 206.         .         .         .         .         .         .         .         .         .         .  O      .         .
10652 207.         .         .         .         .         .         .         .         .         .         .  O      .         .
10654 208.         .         .         .         .         .         .         .         .         .         . O       .         .
10656 209.         .         .         .         .         .         .         .         .         .         . O       .         .
10658 210.         .         .         .         .         .         .         .         .         .         .O        .         .
10700 211. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . .
10702 212.         .         .         .         .         .         .         .         .         .         .O        .         .
10704 213.         .         .         .         .         .         .         .         .         .         O         .         .
10706 214.         .         .         .         .         .         .         .         .         .         O         .         .
10708 215.         .         .         .         .         .         .         .         .         .         O         .         .
10710 216.         .         .         .         .         .         .         .         .         .        O.         .         .
10712 217.         .         .         .         .         .         .         .         .         .        O.         .         .
10714 218.         .         .         .         .         .         .         .         .         .        O.         .         .
10716 219.         .         .         .         .         .         .         .         .         .       O .         .         .
10718 220.         .         .         .         .         .         .         .         .         .       O .         .         .
10720 221. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . .
10722 222.         .         .         .         .         .         .         .         .         .       O .         .         .
10724 223.         .         .         .         .         .         .         .         .         .      O  .         .         .
10726 224.         .         .         .         .         .         .         .         .         .      O  .         .         .
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 10728 225.         .         .         .         .         .         .         .         .         O  .         .         .
 10730 226.         .         .         .         .         .         .         .         .         O  .         .         .
 10732 227.         .         .         .         .         .         .         .         .        O   .         .         .
 10734 228.         .         .         .         .         .         .         .         .        O   .         .         .
 10736 229.         .         .         .         .         .         .         .         .        O   .         .         .
 10738 230.         .         .         .         .         .         .         .         .        O   .         .         .
 10740 231. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . .
 10742 232.         .         .         .         .         .         .         .         .        O   .         .         .
 10744 233.         .         .         .         .         .         .         .         .       O    .         .         .
 10746 234.         .         .         .         .         .         .         .         .       O    .         .         .
 10748 235.         .         .         .         .         .         .         .         .       O    .         .         .
 10750 236.         .         .         .         .         .         .         .         .       O    .         .         .
 10752 237.         .         .         .         .         .         .         .         .      O     .         .         .
 10754 238.         .         .         .         .         .         .         .         .      O     .         .         .
 10756 239.         .         .         .         .         .         .         .         .      O     .         .         .
 10758 240.         .         .         .         .         .         .         .         .     O      .         .         .
 10800 241. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . .
 10802 242.         .         .         .         .         .         .         .         . O      .         .         .
 10804 243.         .         .         .         .         .         .         .         . O      .         .         .
 10806 244.         .         .         .         .         .         .         .         . O      .         .         .
 10808 245.         .         .         .         .         .         .         .         .O       .         .         .
 10810 246.         .         .         .         .         .         .         .         .O       .         .         .
 10812 247.         .         .         .         .         .         .         .         .O       .         .         .
 10814 248.         .         .         .         .         .         .         .         .O       .         .         .
 10816 249.         .         .         .         .         .         .         .         O        .         .         .
 10818 250.         .         .         .         .         .         .         .         O        .         .         .
 10820 251. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . .
 10822 252.         .         .         .         .         .         .         .         O        .         .         .
 10824 253.         .         .         .         .         .         .         .         O        .         .         .
 10826 254.         .         .         .         .         .         .         .         O        .         .         .
 10828 255.         .         .         .         .         .         .         .         O        .         .         .
 10830 256.         .         .         .         .         .         .         .         O        .         .         .
 10832 257.         .         .         .         .         .         .         .         O        .         .         .
 10834 258.         .         .         .         .         .         .         .         O        .         .         .
 10836 259.         .         .         .         .         .         .         .         O        .         .         .
 10838 260.         .         .         .         .         .         .         .         O        .         .         .
 10840 261. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . .
 10842 262.         .         .         .         .         .         .         .         .O       .         .         .
 10844 263.         .         .         .         .         .         .         .         .O       .         .         .
 10846 264.         .         .         .         .         .         .         .         .O       .         .         .
 10848 265.         .         .         .         .         .         .         .         .O       .         .         .
 10850 266.         .         .         .         .         .         .         .         .O       .         .         .
 10852 267.         .         .         .         .         .         .         .         .O       .         .         .
 10854 268.         .         .         .         .         .         .         .         .O       .         .         .
 10856 269.         .         .         .         .         .         .         .         .O       .         .         .
 10858 270.         .         .         .         .         .         .         .         .O       .         .         .
 10900 271. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . .
 10902 272.         .         .         .         .         .         .         .         . O      .         .         .
 10904 273.         .         .         .         .         .         .         .         . O      .         .         .
 10906 274.         .         .         .         .         .         .         .         . O      .         .         .
 10908 275.         .         .         .         .         .         .         .         . O      .         .         .
 10910 276.         .         .         .         .         .         .         .         . O      .         .         .
 10912 277.         .         .         .         .         .         .         .         . O      .         .         .
 10914 278.         .         .         .         .         .         .         .         . O      .         .         .
 10916 279.         .         .         .         .         .         .         .         . O      .         .         .
 10918 280.         .         .         .         .         .         .         .         . O      .         .         .
 10920 281. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . .
 10922 282.         .         .         .         .         .         .         .         . O      .         .         .
 10924 283.         .         .         .         .         .         .         .         . O      .         .         .
 10926 284.         .         .         .         .         .         .         .         . O      .         .         .
 10928 285.         .         .         .         .         .         .         .         . O      .         .         .
 10930 286.         .         .         .         .         .         .         .         . O      .         .         .
 10932 287.         .         .         .         .         .         .         .         .O       .         .         .
 10934 288.         .         .         .         .         .         .         .         .O       .         .         .
 10936 289.         .         .         .         .         .         .         .         .O       .         .         .
 10938 290.         .         .         .         .         .         .         .         .O       .         .         .
 10940 291. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . . . . . . . . . . . . .
 10942 292.         .         .         .         .         .         .         .         O        .         .         .
 10944 293.         .         .         .         .         .         .         .         O        .         .         .
 10946 294.         .         .         .         .         .         .         .        O.        .         .         .
 10948 295.         .         .         .         .         .         .         .        O.        .         .         .
 10950 296.         .         .         .         .         .         .         .        O.        .         .         .
 10952 297.         .         .         .         .         .         .         .       O .        .         .         .
 10954 298.         .         .         .         .         .         .         .       O .        .         .         .
 10956 299.         .         .         .         .         .         .         .      O  .        .         .         .
 10958 300.---------.---------.---------.---------.---------.---------.---------.---------.------O--.---------.---------.---------.
1
1                                                    STATION    RTC-D

                        (I) INFLOW,   (O) OUTFLOW
          0.       50.      100.      150.      200.      250.      300.      350.      400.      450.        0.        0.        0.
                                                                                   (S) STORAGE
          0.        0.        0.        0.        0.        0.        0.        1.        2.        3.        4.        0.        0.
 DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10002   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10004   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10006   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10008   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10010   6I         .         .         .         .         .         S         .         .         .         .         .         .
 10012   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10014   8I         .         .         .         .         .         S         .         .         .         .         .         .
 10016   9I         .         .         .         .         .         S         .         .         .         .         .         .
 10018  10I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10022  12I         .         .         .         .         .         S         .         .         .         .         .         .
 10024  13I         .         .         .         .         .         S         .         .         .         .         .         .
 10026  14I         .         .         .         .         .         S         .         .         .         .         .         .
 10028  15I         .         .         .         .         .         S         .         .         .         .         .         .
 10030  16I         .         .         .         .         .         S         .         .         .         .         .         .
 10032  17I         .         .         .         .         .         S         .         .         .         .         .         .
 10034  18I         .         .         .         .         .         S         .         .         .         .         .         .
 10036  19I         .         .         .         .         .         S         .         .         .         .         .         .
 10038  20I         .         .         .         .         .         S         .         .         .         .         .         .
 10040  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
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10042  22I        .         .         .         .         .         S         .         .         .         .         .         .
10044  23I        .         .         .         .         .         S         .         .         .         .         .         .
10046  24I        .         .         .         .         .         S         .         .         .         .         .         .
10048  25I        .         .         .         .         .         S         .         .         .         .         .         .
10050  26I        .         .         .         .         .         S         .         .         .         .         .         .
10052  27I        .         .         .         .         .         S         .         .         .         .         .         .
10054  28I        .         .         .         .         .         S         .         .         .         .         .         .
10056  29I        .         .         .         .         .         S         .         .         .         .         .         .
10058  30I        .         .         .         .         .         S         .         .         .         .         .         .
10100  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10102  32I        .         .         .         .         .         S         .         .         .         .         .         .
10104  33I        .         .         .         .         .         S         .         .         .         .         .         .
10106  34I        .         .         .         .         .         S         .         .         .         .         .         .
10108  35I        .         .         .         .         .         S         .         .         .         .         .         .
10110  36I        .         .         .         .         .         S         .         .         .         .         .         .
10112  37I        .         .         .         .         .         S         .         .         .         .         .         .
10114  38I        .         .         .         .         .         S         .         .         .         .         .         .
10116  39I        .         .         .         .         .         S         .         .         .         .         .         .
10118  40I        .         .         .         .         .         S         .         .         .         .         .         .
10120  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10122  42I        .         .         .         .         .         S         .         .         .         .         .         .
10124  43I        .         .         .         .         .         S         .         .         .         .         .         .
10126  44I        .         .         .         .         .         S         .         .         .         .         .         .
10128  45I        .         .         .         .         .         S         .         .         .         .         .         .
10130  46I        .         .         .         .         .         S         .         .         .         .         .         .
10132  47I        .         .         .         .         .         S         .         .         .         .         .         .
10134  48I        .         .         .         .         .         S         .         .         .         .         .         .
10136  49I        .         .         .         .         .         S         .         .         .         .         .         .
10138  50I        .         .         .         .         .         S         .         .         .         .         .         .
10140  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10142  52I        .         .         .         .         .         S         .         .         .         .         .         .
10144  53I        .         .         .         .         .         S         .         .         .         .         .         .
10146  54I        .         .         .         .         .         S         .         .         .         .         .         .
10148  55I        .         .         .         .         .         S         .         .         .         .         .         .
10150  56I        .         .         .         .         .         S         .         .         .         .         .         .
10152  57I        .         .         .         .         .         S         .         .         .         .         .         .
10154  58I        .         .         .         .         .         S         .         .         .         .         .         .
10156  59I        .         .         .         .         .         S         .         .         .         .         .         .
10158  60I        .         .         .         .         .         S         .         .         .         .         .         .
10200  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10202  62I        .         .         .         .         .         S         .         .         .         .         .         .
10204  63I        .         .         .         .         .         S         .         .         .         .         .         .
10206  64I        .         .         .         .         .         S         .         .         .         .         .         .
10208  65I        .         .         .         .         .         S         .         .         .         .         .         .
10210  66I        .         .         .         .         .         S         .         .         .         .         .         .
10212  67I        .         .         .         .         .         S         .         .         .         .         .         .
10214  68I        .         .         .         .         .         S         .         .         .         .         .         .
10216  69I        .         .         .         .         .         S         .         .         .         .         .         .
10218  70I        .         .         .         .         .         S         .         .         .         .         .         .
10220  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10222  72I        .         .         .         .         .         S         .         .         .         .         .         .
10224  73I        .         .         .         .         .         S         .         .         .         .         .         .
10226  74I        .         .         .         .         .         S         .         .         .         .         .         .
10228  75I        .         .         .         .         .         S         .         .         .         .         .         .
10230  76I        .         .         .         .         .         S         .         .         .         .         .         .
10232  77I        .         .         .         .         .         S         .         .         .         .         .         .
10234  78I        .         .         .         .         .         S         .         .         .         .         .         .
10236  79I        .         .         .         .         .         S         .         .         .         .         .         .
10238  80I        .         .         .         .         .         S         .         .         .         .         .         .
10240  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10242  82I        .         .         .         .         .         S         .         .         .         .         .         .
10244  83I        .         .         .         .         .         S         .         .         .         .         .         .
10246  84I        .         .         .         .         .         S         .         .         .         .         .         .
10248  85I        .         .         .         .         .         S         .         .         .         .         .         .
10250  86I        .         .         .         .         .         S         .         .         .         .         .         .
10252  87I        .         .         .         .         .         S         .         .         .         .         .         .
10254  88I        .         .         .         .         .         S         .         .         .         .         .         .
10256  89I        .         .         .         .         .         S         .         .         .         .         .         .
10258  90I        .         .         .         .         .         S         .         .         .         .         .         .
10300  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10302  92I        .         .         .         .         .         S         .         .         .         .         .         .
10304  93I        .         .         .         .         .         S         .         .         .         .         .         .
10306  94I        .         .         .         .         .         S         .         .         .         .         .         .
10308  95I        .         .         .         .         .         S         .         .         .         .         .         .
10310  96I        .         .         .         .         .         S         .         .         .         .         .         .
10312  97I        .         .         .         .         .         S         .         .         .         .         .         .
10314  98I        .         .         .         .         .         S         .         .         .         .         .         .
10316  99I        .         .         .         .         .         S         .         .         .         .         .         .
10318 100I        .         .         .         .         .         S         .         .         .         .         .         .
10320 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10322 102I        .         .         .         .         .         S         .         .         .         .         .         .
10324 103I        .         .         .         .         .         S         .         .         .         .         .         .
10326 104I        .         .         .         .         .         S         .         .         .         .         .         .
10328 105I        .         .         .         .         .         S         .         .         .         .         .         .
10330 106I        .         .         .         .         .         S         .         .         .         .         .         .
10332 107I        .         .         .         .         .         S         .         .         .         .         .         .
10334 108I        .         .         .         .         .         S         .         .         .         .         .         .
10336 109I        .         .         .         .         .         S         .         .         .         .         .         .
10338 110I        .         .         .         .         .         S         .         .         .         .         .         .
10340 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10342 112I        .         .         .         .         .         S         .         .         .         .         .         .
10344 113I        .         .         .         .         .         S         .         .         .         .         .         .
10346 114I        .         .         .         .         .         S         .         .         .         .         .         .
10348 115I        .         .         .         .         .         S         .         .         .         .         .         .
10350 116I        .         .         .         .         .         S         .         .         .         .         .         .
10352 117I        .         .         .         .         .         S         .         .         .         .         .         .
10354 118I        .         .         .         .         .         S         .         .         .         .         .         .
10356 119I        .         .         .         .         .         S         .         .         .         .         .         .
10358 120I        .         .         .         .         .         S         .         .         .         .         .         .
10400 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10402 122I        .         .         .         .         .         S         .         .         .         .         .         .
10404 123I        .         .         .         .         .         S         .         .         .         .         .         .
10406 124I        .         .         .         .         .         S         .         .         .         .         .         .
10408 125I        .         .         .         .         .         S         .         .         .         .         .         .
10410 126I        .         .         .         .         .         S         .         .         .         .         .         .
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10412 127I         .         .         .         .         .        S         .         .         .         .         .         .
10414 128I         .         .         .         .         .        S         .         .         .         .         .         .
10416 129I         .         .         .         .         .        S         .         .         .         .         .         .
10418 130I         .         .         .         .         .        S         .         .         .         .         .         .
10420 131I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10422 132I         .         .         .         .         .        S         .         .         .         .         .         .
10424 133I         .         .         .         .         .        S         .         .         .         .         .         .
10426 134I         .         .         .         .         .        S         .         .         .         .         .         .
10428 135I         .         .         .         .         .        S         .         .         .         .         .         .
10430 136I         .         .         .         .         .        S         .         .         .         .         .         .
10432 137I         .         .         .         .         .        S         .         .         .         .         .         .
10434 138I         .         .         .         .         .        S         .         .         .         .         .         .
10436 139I         .         .         .         .         .        S         .         .         .         .         .         .
10438 140I         .         .         .         .         .        S         .         .         .         .         .         .
10440 141I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10442 142I         .         .         .         .         .        S         .         .         .         .         .         .
10444 143I         .         .         .         .         .        S         .         .         .         .         .         .
10446 144I         .         .         .         .         .        S         .         .         .         .         .         .
10448 145I         .         .         .         .         .        S         .         .         .         .         .         .
10450 146OI        .         .         .         .         .        S         .         .         .         .         .         .
10452 147OI        .         .         .         .         .        S         .         .         .         .         .         .
10454 148.I        .         .         .         .         .        S         .         .         .         .         .         .
10456 149.OI       .         .         .         .         .        S         .         .         .         .         .         .
10458 150.OI       .         .         .         .         .        S         .         .         .         .         .         .
10500 151. OI. . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10502 152. O I     .         .         .         .         .        .S        .         .         .         .         .         .
10504 153.  O  I   .         .         .         .         .        .S        .         .         .         .         .         .
10506 154.   O  I  .         .         .         .         .        . S       .         .         .         .         .         .
10508 155.    O   I.         .         .         .         .        . S       .         .         .         .         .         .
10510 156.      O  .I        .         .         .         .        .  S      .         .         .         .         .         .
10512 157.       O .  I      .         .         .         .        .  S      .         .         .         .         .         .
10514 158.         O    I    .         .         .         .        .   S     .         .         .         .         .         .
10516 159.         . O     I.         .         .         .        .    S    .         .         .         .         .         .
10518 160.         .   O     .I        .         .         .        .     S   .         .         .         .         .         .
10520 161. . . . . . . . .O. . . .I. . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10522 162.         .        O      I .         .         .        .      S .         .         .         .         .         .
10524 163.         .         .  O      .I       .         .        .       S.         .         .         .         .         .
10526 164.         .         .    O    .    I   .         .        .        S         .         .         .         .         .
10528 165.         .         .       O.      I .         .        .         . S       .         .         .         .         .
10530 166.         .         .         . O      . I       .        .         .  S      .         .         .         .         .
10532 167.         .         .         .   O     .    I   .        .         .   S     .         .         .         .         .
10534 168.         .         .         .       O.      I.         .         .     S   .         .         .         .         .
10536 169.         .         .         .         . O      . I      .         .      S  .         .         .         .         .
10538 170.         .         .         .         .    O   .    I   .         .       S.         .         .         .         .
10540 171. . . . . . . . . . . . . . . . . . . . . . .O. . . . I . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . .
10542 172.         .         .         .         .         . O      .I        .         .S        .         .         .         .
10544 173.         .         .         .         .         .   O    .  I      .         . S       .         .         .         .
10546 174.         .         .         .         .         .     O .    I    .         .   S     .         .         .         .
10548 175.         .         .         .         .         .        .O      I.         .    S    .         .         .         .
10550 176.         .         .         .         .         .        .  O     .I        .     S   .         .         .         .
10552 177.         .         .         .         .         .        .    O   .  I      .      S  .         .         .         .
10554 178.         .         .         .         .         .        .      O .    I    .       S .         .         .         .
10556 179.         .         .         .         .         .        .        O    I  .        S.         .         .         .
10558 180.         .         .         .         .         .        .         . O    I .        S.         .         .         .
10600 181. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . O . .I. . . . . S . . . . . . . . . . . . . . . .
10602 182.         .         .         .         .         .        .         .   O   I        .S        .         .         .
10604 183.         .         .         .         .         .        .         .     O  .I       .S        .         .         .
10606 184.         .         .         .         .         .        .         .      O . I       . S       .         .         .
10608 185.         .         .         .         .         .        .         .       O.  I      . S       .         .         .
10610 186.         .         .         .         .         .        .         .        O  I      .  S      .         .         .
10612 187.         .         .         .         .         .        .         .        .O  I     .  S      .         .         .
10614 188.         .         .         .         .         .        .         .        . O I     .   S     .         .         .
10616 189.         .         .         .         .         .        .         .        .  O I    .   S     .         .         .
10618 190.         .         .         .         .         .        .         .        .  O I    .   S     .         .         .
10620 191. . . . . . . . . . . . . . . . . . . .
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  10742 232.         .         .         .         .         .         .         .      I  .         .S        .         .         .
  10744 233.         .         .         .         .         .         .         .     IO  .         .S        .         .         .
  10746 234.         .         .         .         .         .         .         .     IO  .         .S        .         .         .
  10748 235.         .         .         .         .         .         .         .     I   .         .S        .         .         .
  10750 236.         .         .         .         .         .         .         .     I   .         .S        .         .         .
  10752 237.         .         .         .         .         .         .         .     I   .         .S        .         .         .
  10754 238.         .         .         .         .         .         .         .    IO   .         .S        .         .         .
  10756 239.         .         .         .         .         .         .         .    IO   .         .S        .         .         .
  10758 240.         .         .         .         .         .         .         .    I    .         .S        .         .         .
  10800 241. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . .S. . . . . . . . . . . . . . .
  10802 242.         .         .         .         .         .         .         .   IO    .         .S        .         .         .
  10804 243.         .         .         .         .         .         .         .   IO    .         S         .         .         .
  10806 244.         .         .         .         .         .         .         .  IO     .         S         .         .         .
  10808 245.         .         .         .         .         .         .         .  IO     .         S         .         .         .
  10810 246.         .         .         .         .         .         .         .  IO     .         S         .         .         .
  10812 247.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10814 248.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10816 249.         .         .         .         .         .         .         . IO      .         S         .         .         .
  10818 250.         .         .         .         .         .         .         . IO      .         S         .         .         .
  10820 251. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . S . . . . . . . . . . . . . . .
  10822 252.         .         .         .         .         .         .         . I       .         S         .         .         .
  10824 253.         .         .         .         .         .         .         . I       .         S         .         .         .
  10826 254.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10828 255.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10830 256.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10832 257.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10834 258.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10836 259.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10838 260.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10840 261. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . I . . . . . . . .S. . . . . . . . . . . . . . . .
  10842 262.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10844 263.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10846 264.         .         .         .         .         .         .         . OI      .         S         .         .         .
  10848 265.         .         .         .         .         .         .         . OI      .         S         .         .         .
  10850 266.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10852 267.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10854 268.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10856 269.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10858 270.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10900 271. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .I. . . . . . . . S . . . . . . . . . . . . . . .
  10902 272.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10904 273.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10906 274.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10908 275.         .         .         .         .         .         .         .  OI     .         S         .         .         .
  10910 276.         .         .         .         .         .         .         .  OI     .         S         .         .         .
  10912 277.         .         .         .         .         .         .         .  OI     .         S         .         .         .
  10914 278.         .         .         .         .         .         .         .  OI     .         S         .         .         .
  10916 279.         .         .         .         .         .         .         .  OI     .         S         .         .         .
  10918 280.         .         .         .         .         .         .         .   I     .         S         .         .         .
  10920 281. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . I . . . . . . . S . . . . . . . . . . . . . . .
  10922 282.         .         .         .         .         .         .         .   I     .         S         .         .         .
  10924 283.         .         .         .         .         .         .         .  IO     .         S         .         .         .
  10926 284.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10928 285.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10930 286.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10932 287.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10934 288.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10936 289.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10938 290.         .         .         .         .         .         .         .  I      .         S         .         .         .
  10940 291. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . IO. . . . . . . . S . . . . . . . . . . . . . . .
  10942 292.         .         .         .         .         .         .         . IO      .         S         .         .         .
  10944 293.         .         .         .         .         .         .         . I       .         S         .         .         .
  10946 294.         .         .         .         .         .         .         . I       .        S.         .         .         .
  10948 295.         .         .         .         .         .         .         .IO       .        S.         .         .         .
  10950 296.         .         .         .         .         .         .         .IO       .        S.         .         .         .
  10952 297.         .         .         .         .         .         .         .I        .        S.         .         .         .
  10954 298.         .         .         .         .         .         .         IO        .        S.         .         .         .
  10956 299.         .         .         .         .         .         .         IO        .        S.         .         .         .
  10958 300.---------.---------.---------.---------.---------.---------.---------IO--------.--------S.---------.---------.---------.
1
1                                                          STATION      600

                          (O) OUTFLOW
          .0        .1        .2        .3        .4        .5        .6        .7        .0        .0        .0        .0        .0
                                                                                                        (L) PRECIP,   (X) EXCESS
         .00       .00       .00       .00       .00       .00       .00       .00       .02       .01       .01       .00       .00
 DAHRMN PER
  10000   1O---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
  10002   2O         .         .         .         .         .         .         .         .         .         .         .         .
  10004   3O         .         .         .         .         .         .         .         .         .         .         .         .
  10006   4O         .         .         .         .         .         .         .         .         .         .         .         .
  10008   5O         .         .         .         .         .         .         .         .         .         .         .         .
  10010   6O         .         .         .         .         .         .         .         .         .         .         .         .
  10012   7O         .         .         .         .         .         .         .         .         .         .         .         .
  10014   8O         .         .         .         .         .         .         .         .         .         .         .         .
  10016   9O         .         .         .         .         .         .         .         .         .         .         .       LL.
  10018  10O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10020  11O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10022  12O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10024  13O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10026  14O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10028  15O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10030  16O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10032  17O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10034  18O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10036  19O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10038  20O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10040  21O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
  10042  22O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10044  23O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10046  24O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10048  25O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10050  26O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10052  27O         .         .         .         .         .         .         .         .         .         .         .      LLL.
  10054  28O         .         .         .         .         .         .         .         .         .         .         .      LLL.
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10056  29O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10058  30O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10100  31O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10102  32O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10104  33O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10106  34O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10108  35O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10110  36O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10112  37O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10114  38O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10116  39O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10118  40O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10120  41O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10122  42O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10124  43O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10126  44O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10128  45O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10130  46O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10132  47O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10134  48O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10136  49O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10138  50O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10140  51O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLL.
10142  52O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10144  53O         .         .         .         .         .         .         .         .         .         .         .      LLL.
10146  54O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10148  55O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10150  56O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10152  57O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10154  58O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10156  59O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10158  60O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10200  61O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLL.
10202  62O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10204  63O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10206  64O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10208  65O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10210  66O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10212  67O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10214  68O         .         .         .         .         .         .         .         .         .         .         .     LLLL.
10216  69O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10218  70O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10220  71O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10222  72O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10224  73O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10226  74O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10228  75O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10230  76O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10232  77O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10234  78O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10236  79O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10238  80O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10240  81O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLL.
10242  82O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10244  83O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10246  84O         .         .         .         .         .         .         .         .         .         .         .    LLLLL.
10248  85O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10250  86O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10252  87O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10254  88O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10256  89O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10258  90O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10300  91O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLL.
10302  92O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10304  93O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10306  94O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10308  95O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10310  96O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10312  97O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10314  98O         .         .         .         .         .         .         .         .         .         .         .   LLLLLL.
10316  99O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10318 100O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10320 101O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLL.
10322 102O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10324 103O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10326 104O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10328 105O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10330 106O         .         .         .         .         .         .         .         .         .         .         .  LLLLLLL.
10332 107O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10334 108O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10336 109O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10338 110O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10340 111O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLL.
10342 112O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10344 113O         .         .         .         .         .         .         .         .         .         .         . LLLLLLLL.
10346 114O         .         .         .         .         .         .         .         .         .         .        LLLLLLLLL.
10348 115O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10350 116O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10352 117O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10354 118O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10356 119O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10358 120O         .         .         .         .         .         .         .         .         .         .       LLLLLLLLLLL.
10400 121O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLL.
10402 122O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10404 123O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10406 124O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10408 125O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10410 126O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10412 127O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10414 128O         .         .         .         .         .         .         .         .         .         .   LLLLLLLLLLLLLLL.
10416 129O         .         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLL.
10418 130O         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLL.
10420 131O . . . . . . . . . . . . . . . . . . .
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10426 134O         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLL.
10428 135O         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLL.
10430 136O         .         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLL.
10432 137O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10434 138O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10436 139O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10438 140O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10440 141O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10442 142O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10444 143O         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10446 144O         .         .         .         .         .         .         .         .     LLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10448 145O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10450 146O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10452 147O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10454 148O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10456 149O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10458 150O         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10500 151O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10502 152O         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10504 153O         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10506 154O         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10508 155O         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10510 156O         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10512 157O         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10514 158O         .         .         .         .         .         .         .         .         LLLLLLLLLLLLLLLLLLLLLLLLLLLL.
10516 159O         .         .         .         .         .         .         .         .         .       LLLLLLLLLLLLLLLLLLLLL.
10518 160O         .         .         .         .         .         .         .         .         .         .    LLLLLLLLLLLLLLL.
10520 161O . . . . . . . . . . . . . . . . . . .
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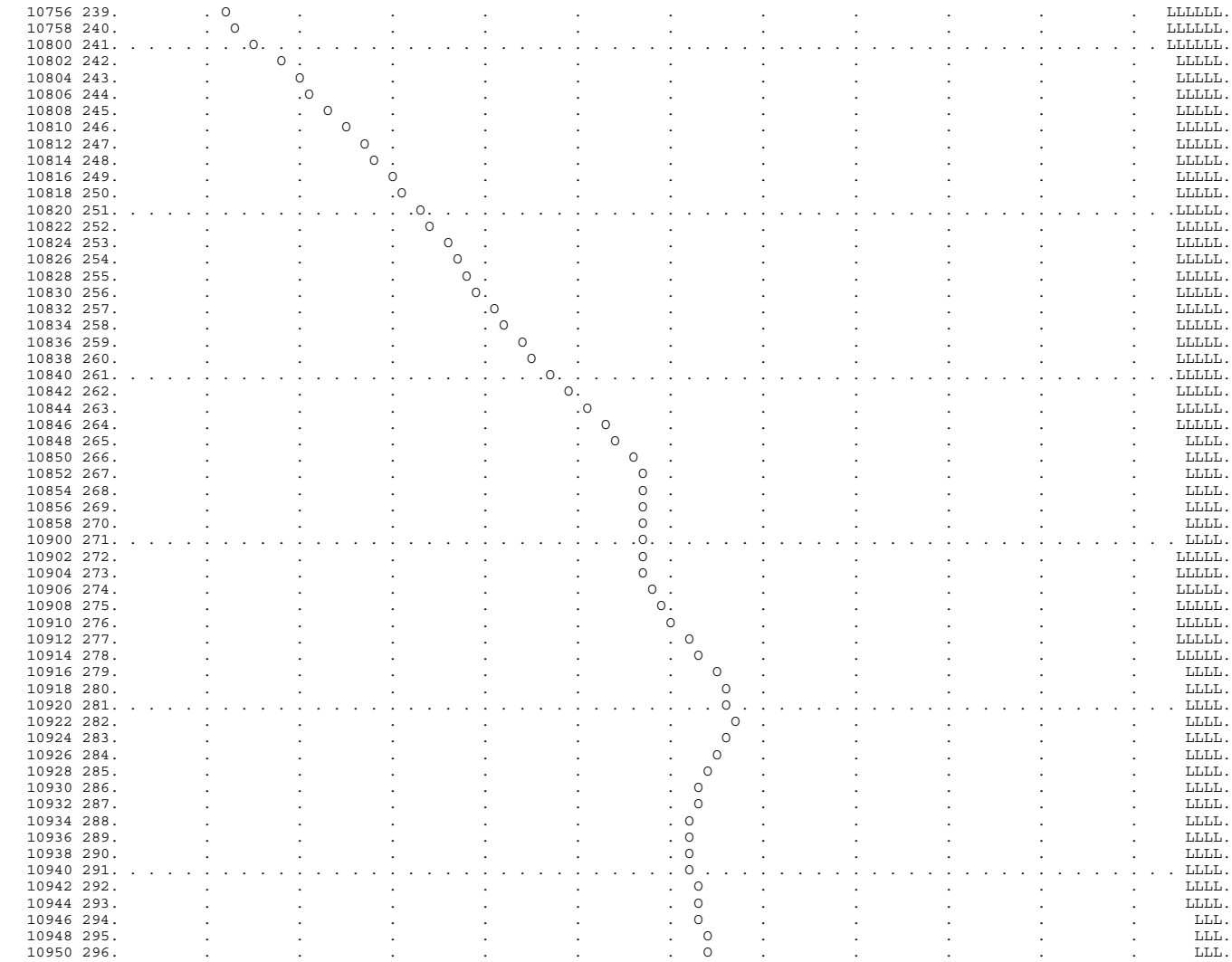

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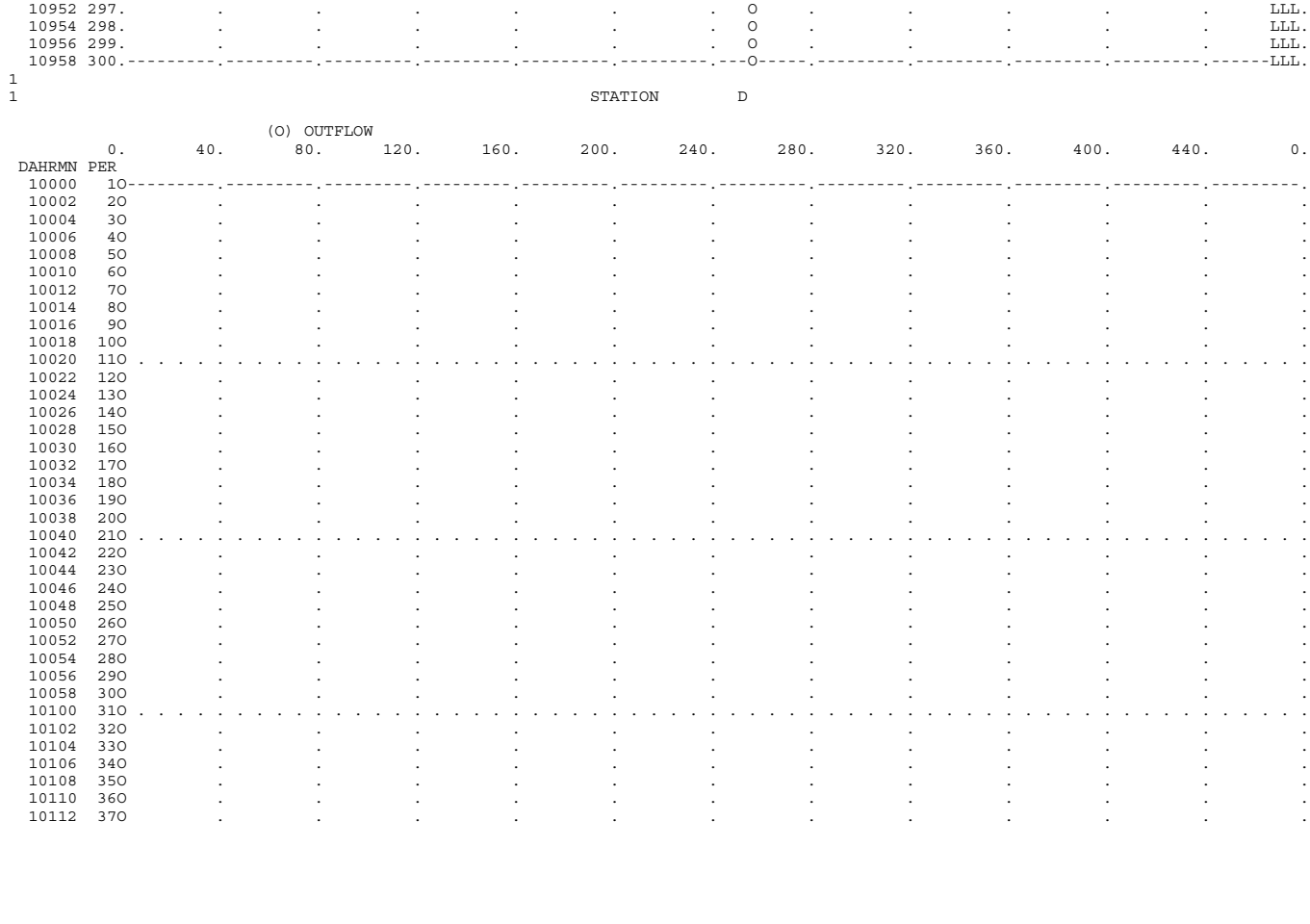
1 STATION D



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10118 40O
10120 41O
10122 42O
10124 43O
10126 44O
10128 45O
10130 46O
10132 47O
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10136 49O
10138 50O
10140 51O
10142 52O
10144 53O
10146 54O
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10316 99O
10318 100O
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10330 106O
10332 107O
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10340 111O
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10350 116O
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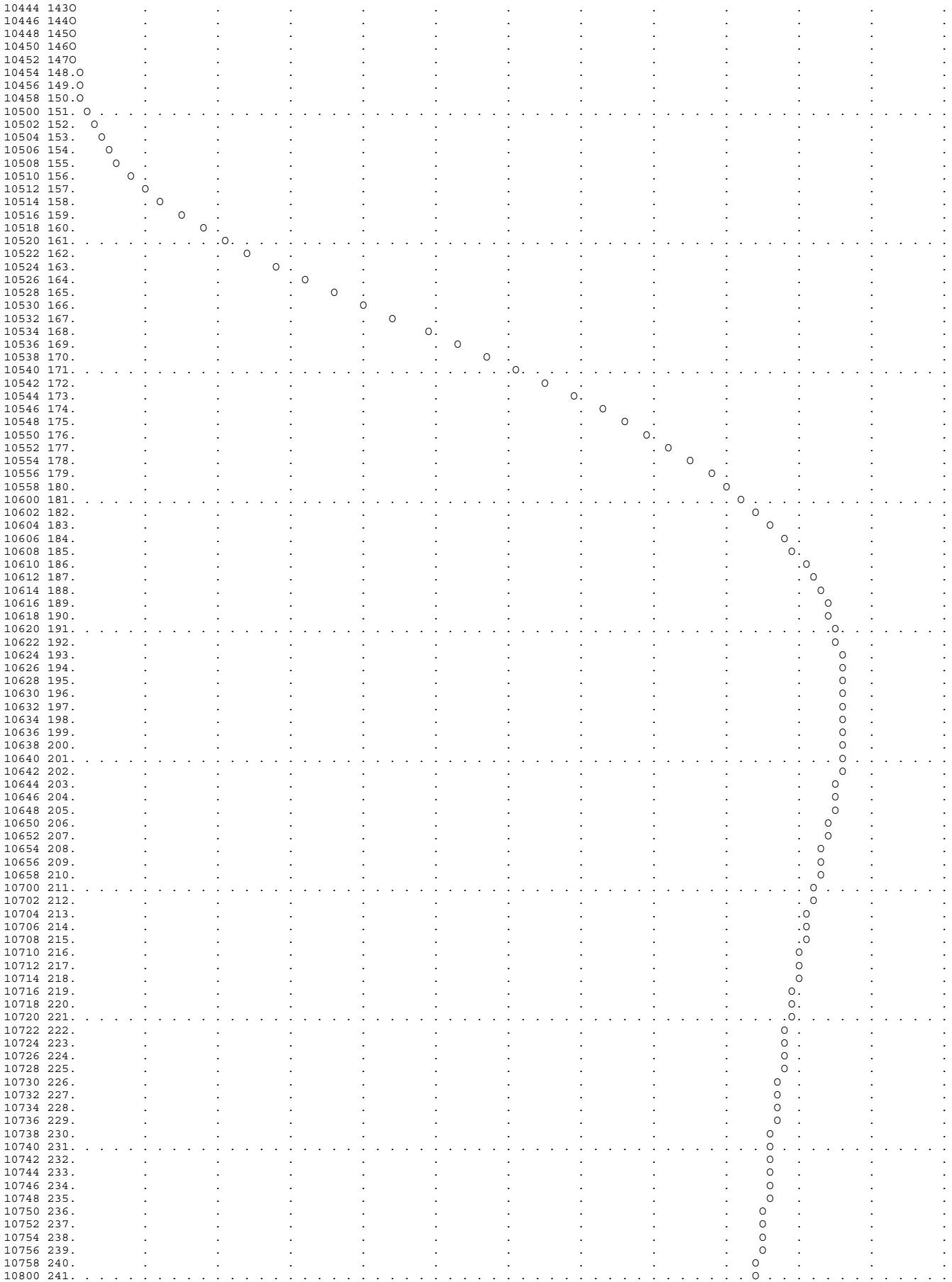

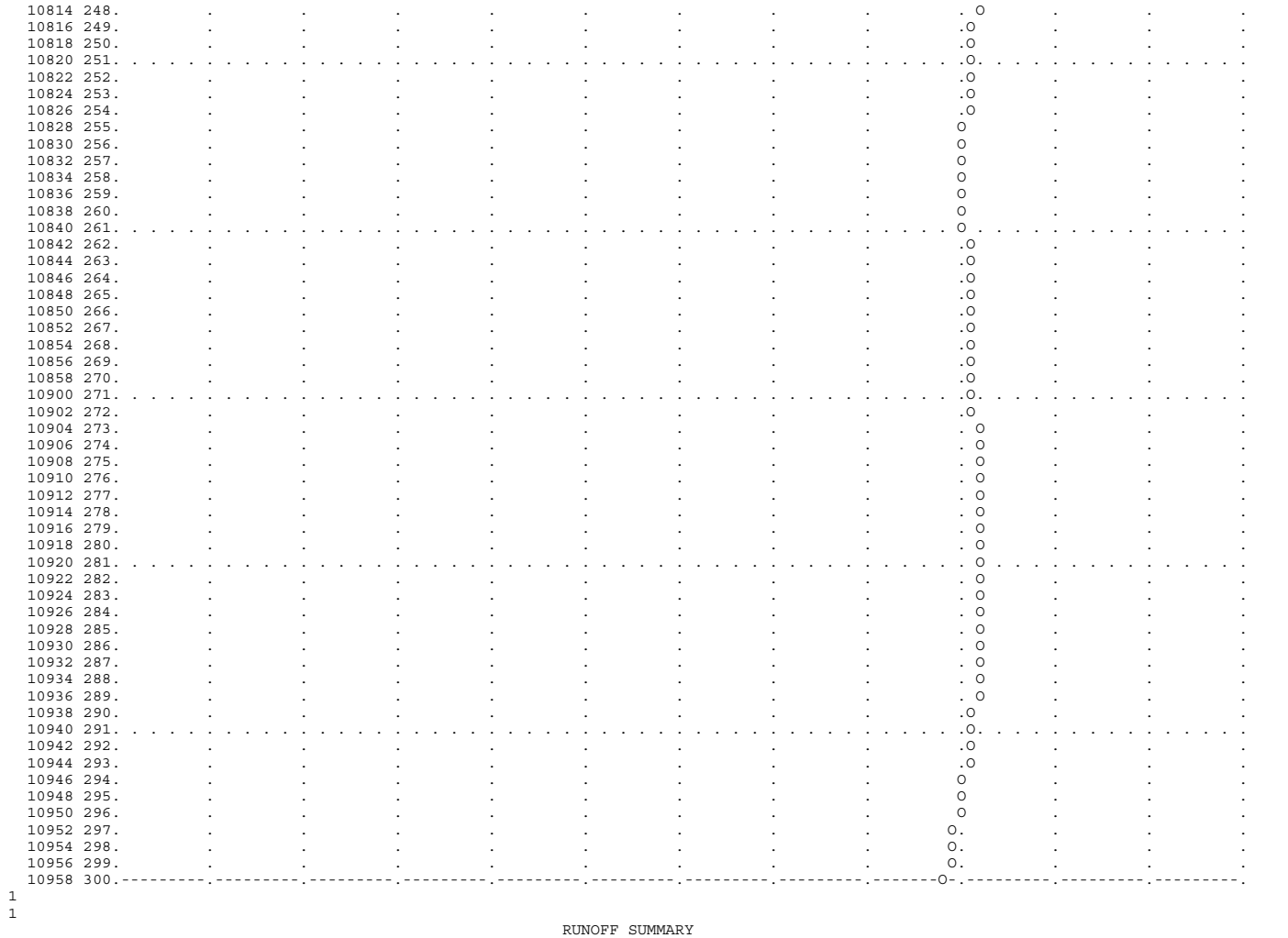

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1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	100(A)	154.	5.43	62.	38.	38.	3.50		
+	HYDROGRAPH AT	200(A)	55.	6.20	38.	23.	23.	4.90		
+	2 COMBINED AT	A	173.	5.53	100.	60.	60.	8.40		
+	ROUTED TO	RTA-B	130.	6.33	90.	54.	54.	8.40		
+									80.09	6.33
+	HYDROGRAPH AT	300	88.	5.70	44.	27.	27.	3.40		
+	2 COMBINED AT	B	203.	5.90	135.	81.	81.	11.80		
+	HYDROGRAPH AT	400	232.	6.37	133.	80.	80.	8.60		
+	2 COMBINED AT	B	425.	6.30	268.	161.	161.	20.40		
+	ROUTED TO	RTB-C	424.	6.37	265.	159.	159.	20.40		
+									30.03	6.37
+	HYDROGRAPH AT	500	62.	9.83	23.	14.	14.	14.10		
+	2 COMBINED AT	C	427.	6.40	288.	173.	173.	34.50		
+	ROUTED TO	RTC-D	426.	6.53	282.	170.	170.	34.50		
+									10.12	6.53
+	HYDROGRAPH AT	600	1.	9.33	0.	0.	0.	.40		

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          2 COMBINED AT
+                              D       426.    6.53         282.        170.        170.      34.90


 *** NORMAL END OF HEC-1 ***
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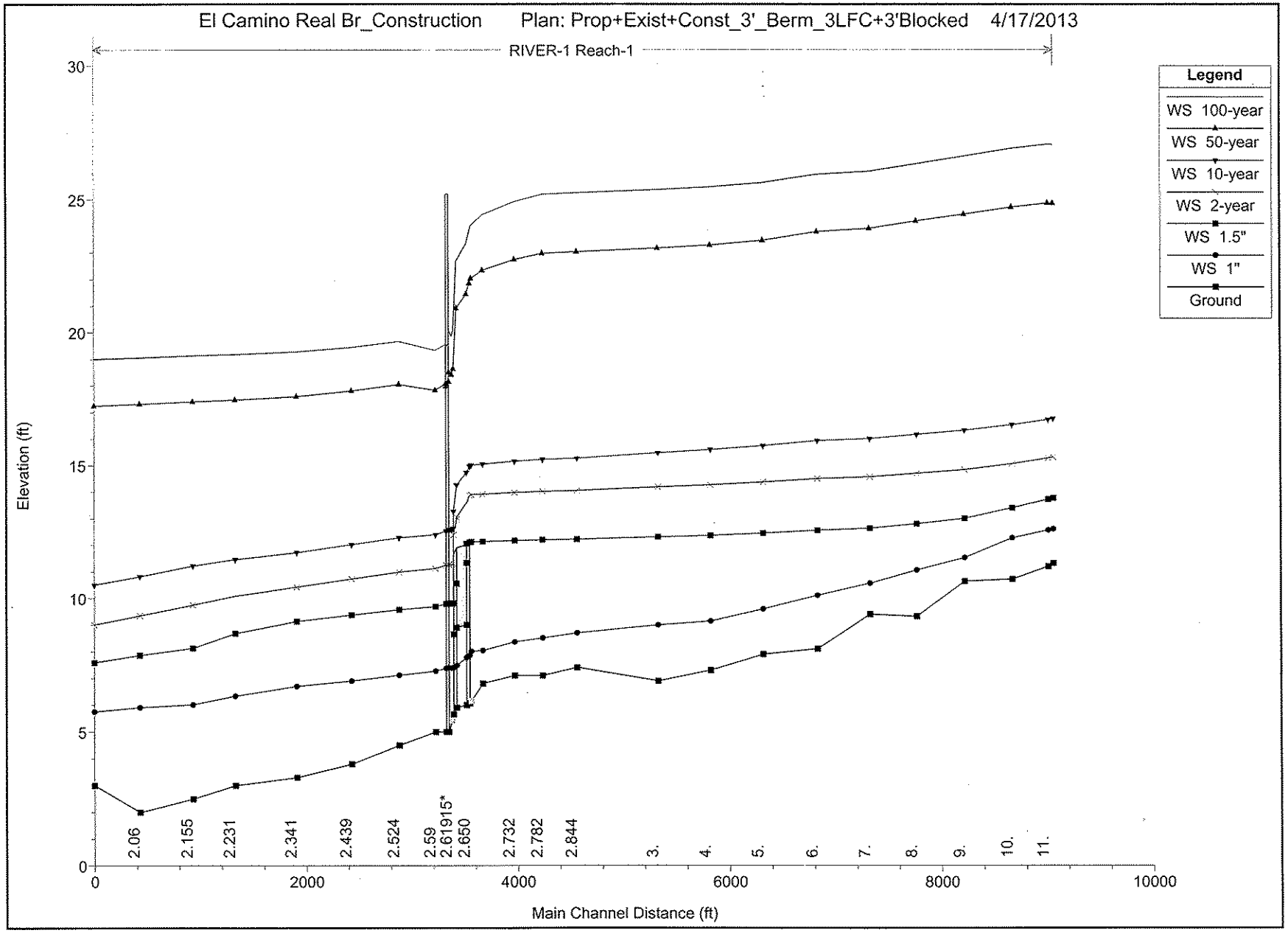
ATTACHMENT 3:

1.0-, 1.3-, 2-, 10-, 50- and 100-Year Construction Phase Condition HEC-RAS Analysis

Option 4 - Temporary Construction Berm


El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RIVER-1 Reach-1
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Elevation (ft)
Main Channel Distance (ft)
0
5
10
15
20
25
30
0
2000
4000
6000
8000
10000
2.06
2.155
2.231
2.341
2.439
2.524
2.59
2.61915*
2.650
2.732
2.782
2.844
3.
4.
5.
6.
7.
8.
9.
10.
11.

HEC-RAS Plan: 3' Fill_3'Blocke River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	12	100-year	42800.00	11.32	27.04		27.25	0.000401	3.99	12244.68	2941.18	0.18
Reach-1	12	50-year	32500.00	11.32	24.85		25.06	0.000502	4.01	9335.95	2315.08	0.20
Reach-1	12	10-year	5900.00	11.32	16.76		16.87	0.000730	2.58	2289.87	465.58	0.20
Reach-1	12	2-year	3450.00	11.32	15.31		15.38	0.000759	2.13	1621.54	452.69	0.20
Reach-1	12	1.5"	1624.00	11.32	13.78		13.82	0.000997	1.73	938.80	439.13	0.21
Reach-1	12	1"	426.00	11.32	12.61		12.62	0.000810	0.98	435.97	411.24	0.17
Reach-1	11.	100-year	42800.00	11.20	27.05		27.21	0.000318	3.56	13902.50	3022.39	0.16
Reach-1	11.	50-year	32500.00	11.20	24.85		25.02	0.000421	3.68	10492.73	2503.95	0.18
Reach-1	11.	10-year	5900.00	11.20	16.73		16.83	0.000721	2.55	2313.81	475.81	0.20
Reach-1	11.	2-year	3450.00	11.20	15.27		15.34	0.000757	2.11	1633.19	460.06	0.20
Reach-1	11.	1.5"	1624.00	11.20	13.73		13.77	0.001040	1.74	933.08	446.26	0.21
Reach-1	11.	1"	426.00	11.20	12.57		12.58	0.000935	1.00	424.19	427.54	0.18
Reach-1	10.	100-year	42800.00	10.72	26.90		27.08	0.000324	3.65	12894.96	2987.55	0.16
Reach-1	10.	50-year	32500.00	10.72	24.70		24.87	0.000363	3.48	10269.64	2400.31	0.17
Reach-1	10.	10-year	5900.00	10.72	16.53		16.61	0.000564	2.28	2592.83	532.33	0.18
Reach-1	10.	2-year	3450.00	10.72	15.06		15.11	0.000588	1.89	1830.04	505.65	0.17
Reach-1	10.	1.5"	1624.00	10.72	13.40		13.44	0.000910	1.61	1007.37	488.90	0.20
Reach-1	10.	1"	426.00	10.72	12.27		12.28	0.000816	0.92	461.79	477.46	0.17
Reach-1	9.	100-year	42800.00	10.64	26.61		26.89	0.000453	4.35	10384.83	2242.49	0.20
Reach-1	9.	50-year	32500.00	10.64	24.43		24.67	0.000466	3.98	8589.08	1874.20	0.19
Reach-1	9.	10-year	5900.00	10.64	16.32		16.38	0.000429	2.03	2915.58	588.13	0.16
Reach-1	9.	2-year	3450.00	10.64	14.83		14.88	0.000444	1.67	2067.57	558.04	0.15
Reach-1	9.	1.5"	1624.00	10.64	13.01		13.04	0.000856	1.52	1065.97	537.77	0.19
Reach-1	9.	1"	426.00	10.64	11.53		11.56	0.004465	1.49	285.17	511.90	0.35
Reach-1	8.	100-year	42800.00	9.32	26.32		26.66	0.000517	4.72	9245.08	1947.78	0.21
Reach-1	8.	50-year	32500.00	9.32	24.18		24.45	0.000490	4.17	7898.20	1782.38	0.20
Reach-1	8.	10-year	5900.00	9.32	16.17		16.22	0.000291	1.84	3211.17	544.79	0.13
Reach-1	8.	2-year	3450.00	9.32	14.70		14.73	0.000247	1.43	2419.48	530.69	0.12
Reach-1	8.	1.5"	1624.00	9.32	12.80		12.82	0.000300	1.13	1432.65	512.55	0.12
Reach-1	8.	1"	426.00	9.32	11.06		11.07	0.000479	0.77	550.93	497.61	0.13
Reach-1	7.	100-year	42800.00	9.40	26.05		26.42	0.000572	5.00	9219.90	2350.76	0.22
Reach-1	7.	50-year	32500.00	9.40	23.90		24.21	0.000577	4.56	7570.86	2231.88	0.22
Reach-1	7.	10-year	5900.00	9.40	16.01		16.07	0.000366	2.06	2876.18	958.80	0.15

HEC-RAS Plan: 3' Fill_3'Blocke River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7.	2-year	3450.00	9.40	14.56		14.60	0.000322	1.60	2155.74	773.15	0.13
Reach-1	7.	1.5"	1624.00	9.40	12.63		12.66	0.000454	1.33	1225.52	649.55	0.15
Reach-1	7.	1"	426.00	9.40	10.57		10.60	0.003619	1.55	274.03	489.32	0.33
Reach-1	6.	100-year	42800.00	8.10	25.93		26.18	0.000314	3.81	11035.36	2150.68	0.16
Reach-1	6.	50-year	32500.00	8.10	23.78		23.98	0.000300	3.40	9375.31	2031.38	0.16
Reach-1	6.	10-year	5900.00	8.10	15.93		15.97	0.000129	1.32	4090.82	1570.43	0.09
Reach-1	6.	2-year	3450.00	8.10	14.50		14.52	0.000098	0.98	3193.07	1262.30	0.08
Reach-1	6.	1.5"	1624.00	8.10	12.56		12.57	0.000098	0.72	2003.58	1150.97	0.07
Reach-1	6.	1"	426.00	8.10	10.11		10.12	0.000450	0.60	544.12	1038.49	0.12
Reach-1	5.	100-year	42800.00	7.90	25.63		25.96	0.000528	4.97	9378.32	2205.34	0.21
Reach-1	5.	50-year	32500.00	7.90	23.46		23.76	0.000573	4.72	7679.62	2120.38	0.22
Reach-1	5.	10-year	5900.00	7.90	15.74		15.84	0.000472	2.60	2310.62	1059.52	0.17
Reach-1	5.	2-year	3450.00	7.90	14.37		14.43	0.000345	1.92	1820.67	911.87	0.14
Reach-1	5.	1.5"	1624.00	7.90	12.45		12.48	0.000323	1.40	1167.54	737.43	0.13
Reach-1	5.	1"	426.00	7.90	9.60		9.64	0.002958	1.63	262.07	583.96	0.31
Reach-1	4.	100-year	42800.00	7.30	25.47		25.68	0.000321	3.94	11700.72	2839.86	0.17
Reach-1	4.	50-year	32500.00	7.30	23.28		23.46	0.000345	3.73	9633.62	2710.50	0.17
Reach-1	4.	10-year	5900.00	7.30	15.59		15.66	0.000271	2.07	2902.81	1357.02	0.13
Reach-1	4.	2-year	3450.00	7.30	14.27		14.30	0.000180	1.48	2345.39	1110.07	0.10
Reach-1	4.	1.5"	1624.00	7.30	12.36		12.38	0.000135	1.01	1610.34	857.97	0.09
Reach-1	4.	1"	426.00	7.30	9.14		9.15	0.000470	0.91	470.41	514.40	0.13
Reach-1	3.	100-year	42800.00	6.90	25.37		25.53	0.000237	3.44	13474.80	2934.24	0.14
Reach-1	3.	50-year	32500.00	6.90	23.16		23.30	0.000256	3.27	11062.64	2761.35	0.15
Reach-1	3.	10-year	5900.00	6.90	15.47		15.53	0.000229	1.97	3070.51	1899.17	0.12
Reach-1	3.	2-year	3450.00	6.90	14.19		14.22	0.000142	1.38	2516.54	1249.18	0.09
Reach-1	3.	1.5"	1624.00	6.90	12.31		12.32	0.000093	0.91	1790.75	866.03	0.07
Reach-1	3.	1"	426.00	6.90	9.00		9.01	0.000198	0.69	614.80	642.69	0.09
Reach-1	2.844	100-year	42800.00	7.40	25.25		25.36	0.000168	2.80	15938.87	2848.10	0.12
Reach-1	2.844	50-year	32500.00	7.40	23.02		23.12	0.000185	2.68	13074.18	2825.56	0.12
Reach-1	2.844	10-year	5900.00	7.40	15.26		15.33	0.000305	2.10	3125.45	2362.92	0.14
Reach-1	2.844	2-year	3450.00	7.40	14.05		14.09	0.000208	1.53	2262.30	1139.84	0.11
Reach-1	2.844	1.5"	1624.00	7.40	12.22		12.24	0.000134	1.02	1589.80	684.57	0.09
Reach-1	2.844	1"	426.00	7.40	8.70		8.72	0.000983	1.14	373.98	484.78	0.19

HEC-RAS Plan: 3' Fill_3'Blocke River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.782	100-year	42800.00	7.10	25.19		25.30	0.000161	2.84	15495.14	2822.41	0.12
Reach-1	2.782	50-year	32500.00	7.10	22.97		23.07	0.000165	2.63	13011.31	2814.88	0.12
Reach-1	2.782	10-year	5900.00	7.10	15.22		15.26	0.000143	1.54	4335.24	2591.11	0.10
Reach-1	2.782	2-year	3450.00	7.10	14.02		14.04	0.000100	1.15	3063.36	1871.70	0.08
Reach-1	2.782	1.5"	1624.00	7.10	12.20		12.20	0.000067	0.76	2142.42	854.74	0.06
Reach-1	2.782	1"	426.00	7.10	8.51		8.52	0.000412	0.79	537.11	530.47	0.12
Reach-1	2.732	100-year	42800.00	7.10	24.91		25.22	0.000423	4.51	9701.59	2810.39	0.19
Reach-1	2.732	50-year	32500.00	7.10	22.74		22.98	0.000414	4.08	8219.49	2762.43	0.19
Reach-1	2.732	10-year	5900.00	7.10	15.15		15.21	0.000232	1.92	3275.23	2448.77	0.12
Reach-1	2.732	2-year	3450.00	7.10	13.98		14.00	0.000147	1.38	2536.78	1940.46	0.10
Reach-1	2.732	1.5"	1624.00	7.10	12.17		12.18	0.000094	0.91	1784.85	641.01	0.07
Reach-1	2.732	1"	426.00	7.10	8.36		8.37	0.000741	1.02	418.81	434.96	0.16
Reach-1	2.675	100-year	42800.00	6.80	24.42		25.01	0.000874	6.17	7000.57	2842.29	0.27
Reach-1	2.675	50-year	32500.00	6.80	22.33		22.79	0.000829	5.47	5990.01	2696.06	0.26
Reach-1	2.675	10-year	5900.00	6.80	15.04		15.12	0.000367	2.24	2674.23	2342.44	0.15
Reach-1	2.675	2-year	3450.00	6.80	13.91		13.95	0.000221	1.60	2198.12	1952.89	0.12
Reach-1	2.675	1.5"	1624.00	6.80	12.13		12.15	0.000150	1.09	1494.69	576.21	0.09
Reach-1	2.675	1"	426.00	6.80	8.04		8.07	0.001498	1.39	305.88	268.77	0.23
Reach-1	2.65388*	100-year	42800.00	6.15	24.02		24.88	0.001082	7.47	5727.56	371.86	0.34
Reach-1	2.65388*	50-year	32500.00	6.15	22.02		22.68	0.000946	6.51	4995.87	361.53	0.31
Reach-1	2.65388*	10-year	5900.00	6.15	15.00		15.08	0.000241	2.28	2584.79	325.36	0.14
Reach-1	2.65388*	2-year	3450.00	6.15	13.89		13.93	0.000132	1.55	2227.24	319.02	0.10
Reach-1	2.65388*	1.5"	1624.00	6.15	12.12		12.14	0.000071	0.97	1671.18	302.46	0.07
Reach-1	2.65388*	1"	426.00	6.15	8.00		8.01	0.000244	0.86	494.81	273.27	0.11
Reach-1	2.65095	100-year	42800.00	6.06	23.80	16.60	24.85	0.001423	8.20	5217.95	366.54	0.38
Reach-1	2.65095	50-year	32500.00	6.06	21.84	15.20	22.65	0.001298	7.21	4505.58	358.93	0.36
Reach-1	2.65095	10-year	5900.00	6.06	14.96	10.43	15.08	0.000457	2.78	2125.91	332.35	0.19
Reach-1	2.65095	2-year	3450.00	6.06	13.87	9.73	13.93	0.000280	1.95	1766.23	328.03	0.15
Reach-1	2.65095	1.5"	1624.00	6.06	12.10	8.43	12.13	0.000201	1.35	1201.50	309.09	0.12
Reach-1	2.65095	1"	426.00	6.06	7.86	7.09	7.99	0.003582	2.88	147.80	98.37	0.41
Reach-1	2.650		Bridge									

HEC-RAS Plan: 3' Fill_3'Blocke River: RIVER-1 Reach: Reach-1 (Continued)

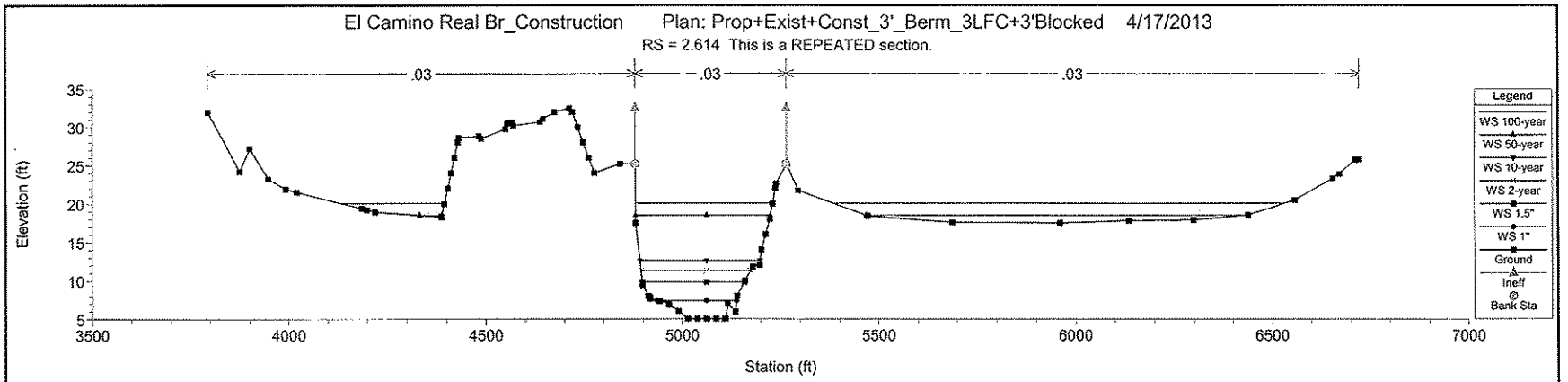
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.649	100-year	42800.00	6.00	23.32	16.59	24.49	0.001144	8.67	4935.66	350.17	0.41
Reach-1	2.649	50-year	32500.00	6.00	21.43	15.22	22.33	0.001013	7.60	4279.10	344.46	0.38
Reach-1	2.649	10-year	5900.00	6.00	14.72	10.37	14.86	0.000331	2.90	2036.45	324.21	0.20
Reach-1	2.649	2-year	3450.00	6.00	13.59	9.67	13.65	0.000212	2.07	1669.80	320.77	0.16
Reach-1	2.649	1.5"	1624.00	6.00	11.33	8.36	11.37	0.000252	1.67	974.70	301.99	0.16
Reach-1	2.649	1"	426.00	6.00	7.77	7.03	7.91	0.002117	2.93	145.34	97.92	0.42
Reach-1	2.637		Bridge									
Reach-1	2.625	100-year	42800.00	5.90	22.68	16.84	24.12	0.001477	9.62	4448.26	324.21	0.46
Reach-1	2.625	50-year	32500.00	5.90	20.90	15.39	21.99	0.001290	8.39	3875.03	319.59	0.42
Reach-1	2.625	10-year	5900.00	5.90	14.26	10.32	14.42	0.000449	3.26	1808.66	302.36	0.24
Reach-1	2.625	2-year	3450.00	5.90	12.97	9.58	13.06	0.000313	2.43	1422.21	287.01	0.19
Reach-1	2.625	1.5"	1624.00	5.90	10.55	8.26	10.63	0.000571	2.20	737.36	279.83	0.24
Reach-1	2.625	1"	426.00	5.90	7.48	6.93	7.65	0.003213	3.37	126.29	94.35	0.51
Reach-1	2.624		Bridge									
Reach-1	2.622	100-year	42800.00	5.65	20.08		21.99	0.003648	11.09	3860.13	342.52	0.58
Reach-1	2.622	50-year	32500.00	5.65	18.61		20.07	0.003259	9.67	3361.52	337.28	0.54
Reach-1	2.622	10-year	5900.00	5.65	12.63		12.88	0.001506	4.06	1451.68	301.46	0.33
Reach-1	2.622	2-year	3450.00	5.65	11.30		11.47	0.001450	3.27	1054.91	295.50	0.31
Reach-1	2.622	1.5"	1624.00	5.65	9.81		9.92	0.001796	2.61	621.65	287.20	0.31
Reach-1	2.622	1"	426.00	5.65	7.39		7.52	0.003874	2.91	146.23	101.88	0.43
Reach-1	2.61915*	100-year	42800.00	5.42	19.85		21.89	0.004164	11.47	3731.31	353.01	0.62
Reach-1	2.61915*	50-year	32500.00	5.42	18.40		19.97	0.003683	10.07	3227.77	339.20	0.58
Reach-1	2.61915*	10-year	5900.00	5.42	12.56		12.85	0.001655	4.31	1368.48	283.07	0.35
Reach-1	2.61915*	2-year	3450.00	5.42	11.26		11.44	0.001355	3.40	1015.30	258.40	0.30
Reach-1	2.61915*	1.5"	1624.00	5.42	9.79		9.89	0.001113	2.47	657.11	232.77	0.26
Reach-1	2.61915*	1"	426.00	5.42	7.38		7.45	0.001948	2.08	204.68	142.81	0.31
Reach-1	2.614	100-year	40100.00	5.00	20.08	15.22	21.53	0.001430	9.65	4155.91	1763.48	0.49
Reach-1	2.614	50-year	32500.00	5.00	18.50	14.14	19.76	0.001466	9.01	3606.58	1370.09	0.49
Reach-1	2.614	10-year	5900.00	5.00	12.59	8.73	12.78	0.000513	3.49	1690.41	305.92	0.26
Reach-1	2.614	2-year	3450.00	5.00	11.28	7.85	11.39	0.000366	2.64	1305.10	278.56	0.22
Reach-1	2.614	1.5"	1624.00	5.00	9.80	6.87	9.85	0.000247	1.79	908.42	259.59	0.17
Reach-1	2.614	1"	426.00	5.00	7.39	5.81	7.41	0.000343	1.28	333.94	202.73	0.18

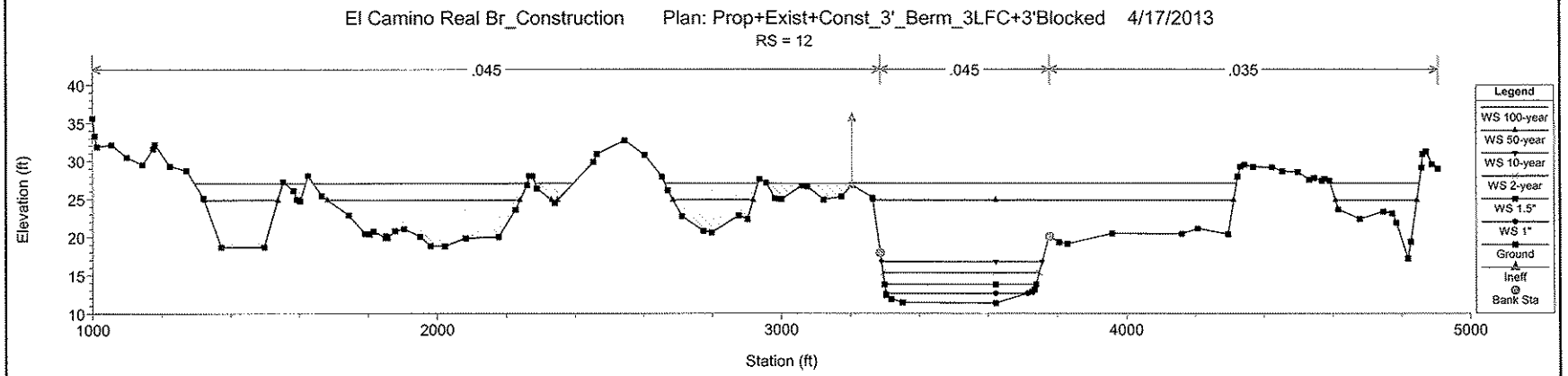
HEC-RAS Plan: 3' Fill_3'Blocke River: RIVER-1 Reach: Reach-1 (Continued)

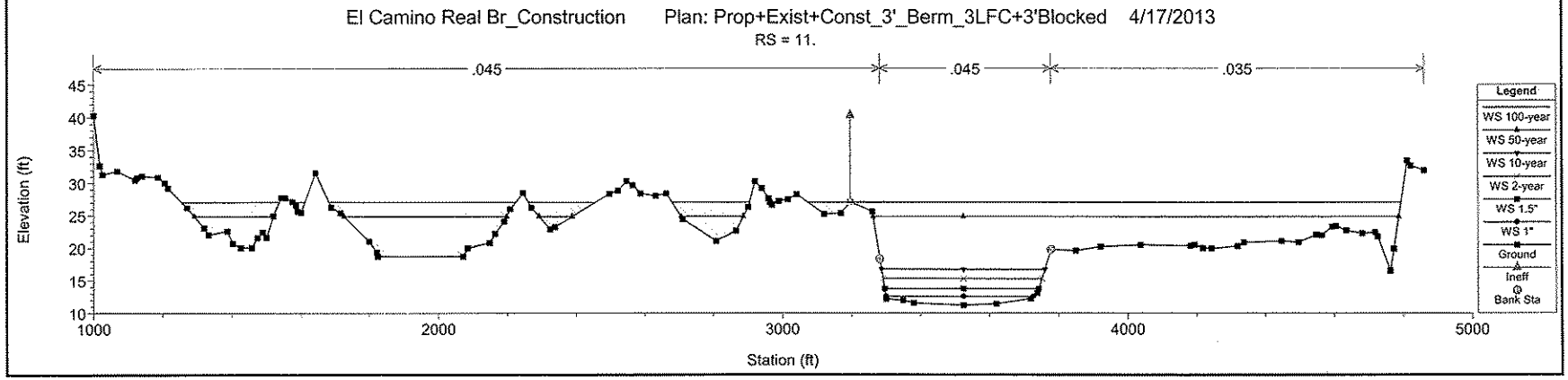
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.6115		Bridge									
Reach-1	2.609	100-year	40100.00	5.00	19.56		21.14	0.002930	10.10	3972.00	1658.02	0.53
Reach-1	2.609	50-year	32500.00	5.00	18.07		19.44	0.002966	9.39	3461.43	1121.47	0.52
Reach-1	2.609	10-year	5900.00	5.00	12.53		12.73	0.000942	3.53	1673.06	305.66	0.27
Reach-1	2.609	2-year	3450.00	5.00	11.24		11.35	0.000666	2.66	1295.41	278.11	0.22
Reach-1	2.609	1.5"	1624.00	5.00	9.79		9.84	0.000446	1.80	903.55	259.35	0.17
Reach-1	2.609	1"	426.00	5.00	7.37		7.39	0.000628	1.29	329.91	201.13	0.18
Reach-1	2.59	100-year	40100.00	5.00	19.33		20.81	0.002643	10.14	4172.39	2025.16	0.51
Reach-1	2.59	50-year	32500.00	5.00	17.81		19.13	0.002774	9.52	3602.64	1952.25	0.51
Reach-1	2.59	10-year	5900.00	5.00	12.39		12.61	0.001150	3.84	1614.64	629.10	0.29
Reach-1	2.59	2-year	3450.00	5.00	11.12		11.26	0.001048	3.05	1163.83	494.77	0.27
Reach-1	2.59	1.5"	1624.00	5.00	9.69		9.76	0.000942	2.25	722.50	260.66	0.24
Reach-1	2.59	1"	426.00	5.00	7.26		7.31	0.000967	1.73	246.20	134.02	0.22
Reach-1	2.524	100-year	33415.00	4.50	19.66		19.97	0.000522	4.49	7516.40	2469.13	0.23
Reach-1	2.524	50-year	27307.00	4.50	18.04		18.32	0.000565	4.24	6486.13	2444.73	0.23
Reach-1	2.524	10-year	5900.00	4.50	12.28		12.34	0.000369	2.05	2887.96	1430.91	0.17
Reach-1	2.524	2-year	3450.00	4.50	10.98		11.03	0.000354	1.65	2093.07	1208.88	0.16
Reach-1	2.524	1.5"	1624.00	4.50	9.57		9.59	0.000249	1.25	1301.79	499.52	0.14
Reach-1	2.524	1"	426.00	4.50	7.11		7.13	0.000297	0.95	447.66	246.73	0.12
Reach-1	2.439	100-year	34115.00	3.80	19.44		19.73	0.000525	4.43	7983.31	2270.74	0.23
Reach-1	2.439	50-year	27307.00	3.80	17.79		18.05	0.000587	4.24	6720.67	2200.10	0.23
Reach-1	2.439	10-year	5900.00	3.80	12.02		12.12	0.000660	2.64	2361.35	1398.96	0.22
Reach-1	2.439	2-year	3450.00	3.80	10.72		10.80	0.000715	2.26	1542.60	1045.41	0.23
Reach-1	2.439	1.5"	1624.00	3.80	9.37		9.42	0.000636	1.84	882.13	392.08	0.22
Reach-1	2.439	1"	426.00	3.80	6.90		6.93	0.000674	1.45	293.90	159.36	0.19
Reach-1	2.341	100-year	34815.00	3.30	19.28		19.48	0.000353	3.96	9741.34	2383.65	0.20
Reach-1	2.341	50-year	27307.00	3.30	17.59		17.78	0.000399	3.83	8031.78	2376.63	0.21
Reach-1	2.341	10-year	5900.00	3.30	11.72		11.83	0.000492	2.65	2400.65	786.52	0.22
Reach-1	2.341	2-year	3450.00	3.30	10.42		10.50	0.000478	2.26	1544.18	549.68	0.22
Reach-1	2.341	1.5"	1624.00	3.30	9.13		9.18	0.000342	1.77	916.33	468.39	0.22
Reach-1	2.341	1"	426.00	3.30	6.70		6.72	0.000257	1.20	353.79	149.18	0.14

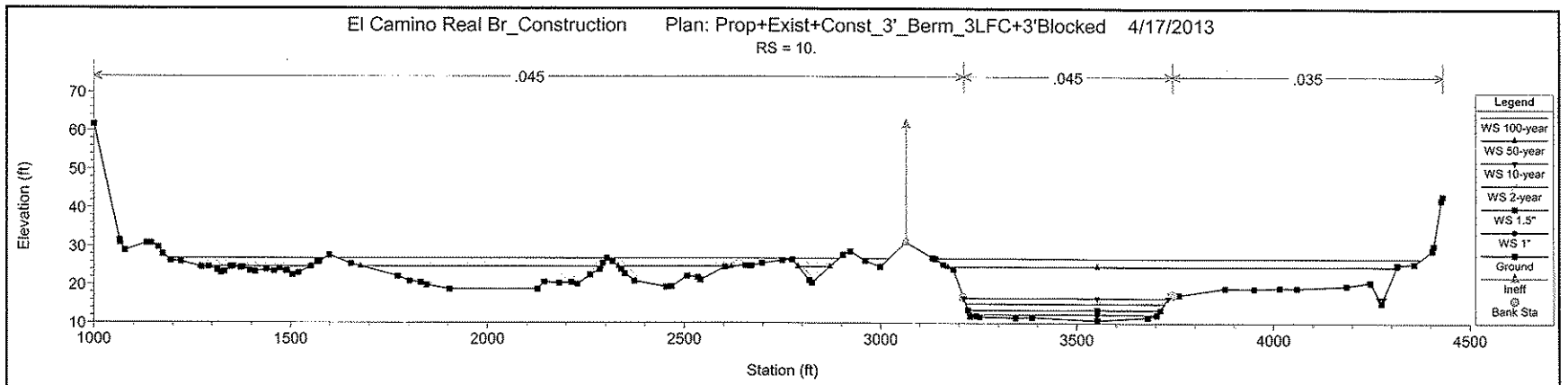
HEC-RAS Plan: 3' Fill_3'Blocke River: RIVER-1 Reach: Reach-1 (Continued)

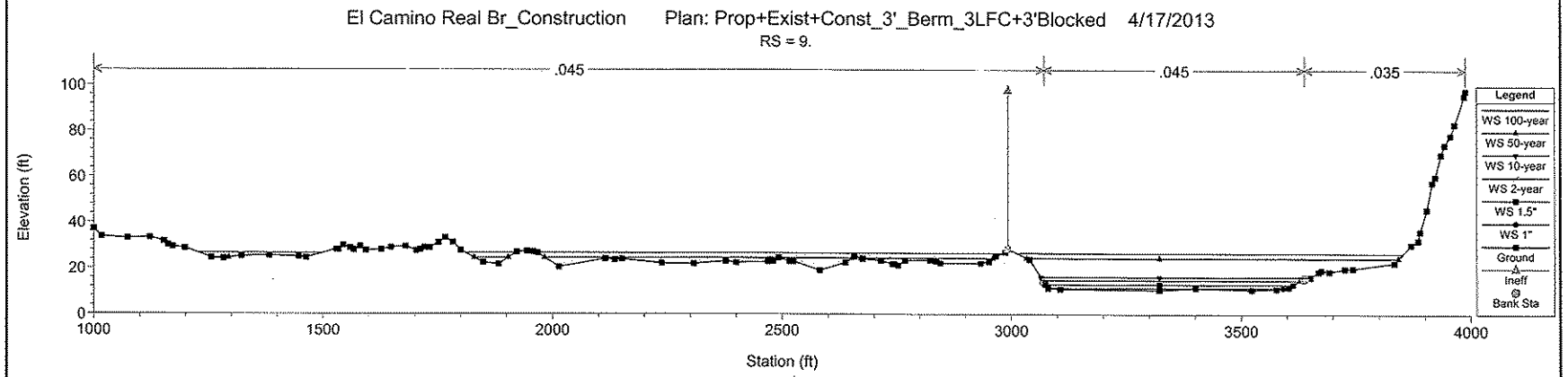
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.231	100-year	42800.00	3.00	19.18		19.30	0.000220	3.19	15687.33	2385.53	0.17
Reach-1	2.231	50-year	32500.00	3.00	17.46		17.58	0.000255	3.08	12516.73	2352.97	0.17
Reach-1	2.231	10-year	5900.00	3.00	11.46		11.54	0.000477	2.22	2703.17	803.13	0.20
Reach-1	2.231	2-year	3450.00	3.00	10.08		10.15	0.000784	2.09	1654.20	716.14	0.24
Reach-1	2.231	1.5"	1624.00	3.00	8.68		8.76	0.002377	2.27	716.36	624.35	0.37
Reach-1	2.231	1"	426.00	3.00	6.34		6.43	0.001278	2.47	172.74	83.01	0.30
Reach-1	2.155	100-year	42800.00	2.50	19.13		19.22	0.000170	2.89	18701.15	2354.14	0.15
Reach-1	2.155	50-year	32500.00	2.50	17.40		17.49	0.000209	2.89	14640.57	2320.43	0.16
Reach-1	2.155	10-year	5900.00	2.50	11.22		11.32	0.000609	2.64	2413.64	813.86	0.23
Reach-1	2.155	2-year	3450.00	2.50	9.74		9.84	0.000750	2.51	1386.78	455.54	0.25
Reach-1	2.155	1.5"	1624.00	2.50	8.12		8.20	0.000937	2.19	742.18	340.73	0.26
Reach-1	2.155	1"	426.00	2.50	6.01		6.07	0.000647	1.86	228.50	100.24	0.22
Reach-1	2.06	100-year	42800.00	2.00	19.05		19.15	0.000169	3.27	18250.76	2197.55	0.15
Reach-1	2.06	50-year	32500.00	2.00	17.31		17.40	0.000201	3.27	14444.66	2160.70	0.16
Reach-1	2.06	10-year	5900.00	2.00	10.82		11.01	0.000638	3.63	2098.57	1097.09	0.26
Reach-1	2.06	2-year	3450.00	2.00	9.35		9.50	0.000617	3.08	1122.88	281.95	0.24
Reach-1	2.06	1.5"	1624.00	2.00	7.86		7.92	0.000353	2.02	804.61	199.11	0.18
Reach-1	2.06	1"	426.00	2.00	5.91		5.93	0.000138	0.95	446.71	168.26	0.10
Reach-1	1.979	100-year	42800.00	3.00	19.00	13.18	19.08	0.000145	2.90	19913.77	2420.18	0.14
Reach-1	1.979	50-year	32500.00	3.00	17.24	12.57	17.32	0.000176	2.91	15682.74	2387.81	0.15
Reach-1	1.979	10-year	5900.00	3.00	10.50	7.56	10.70	0.000844	3.65	1887.90	871.94	0.28
Reach-1	1.979	2-year	3450.00	3.00	9.01	6.66	9.16	0.001001	3.18	1103.61	346.86	0.29
Reach-1	1.979	1.5"	1624.00	3.00	7.59	5.69	7.68	0.001002	2.44	666.55	271.80	0.27
Reach-1	1.979	1"	426.00	3.00	5.75	4.55	5.80	0.001001	1.69	251.84	177.53	0.25

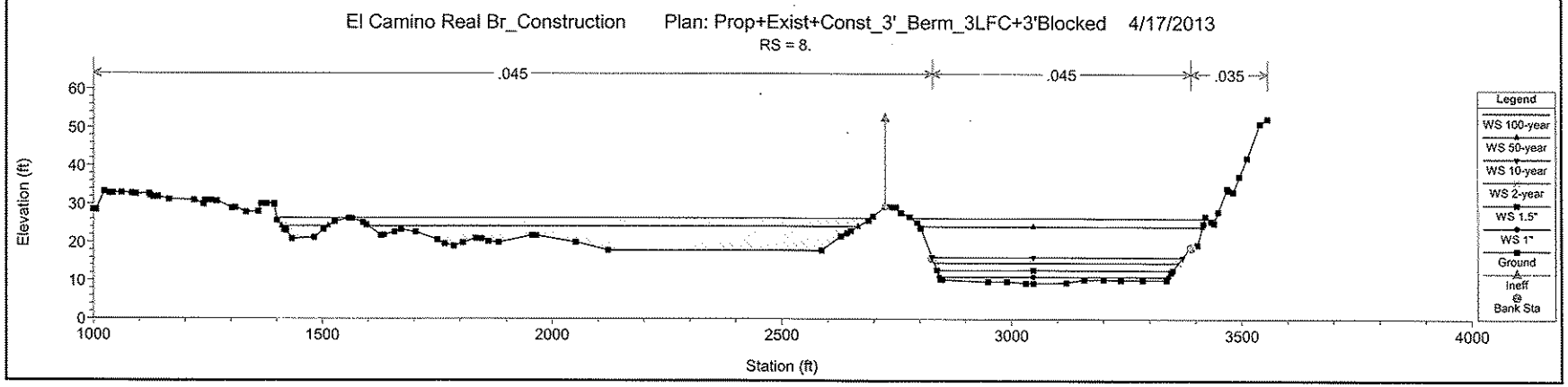

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.614 This is a REPEATED section.
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

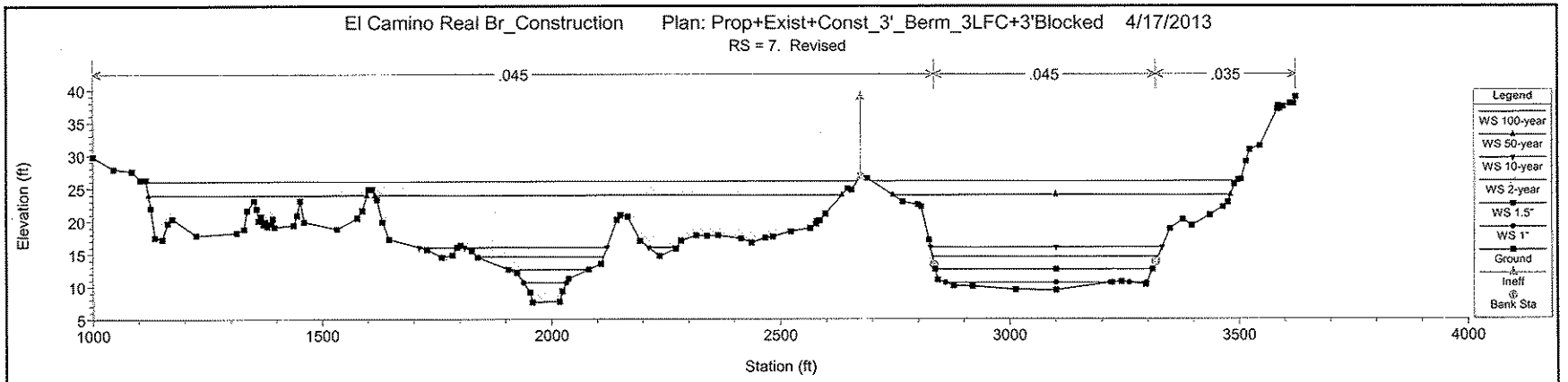

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 12
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

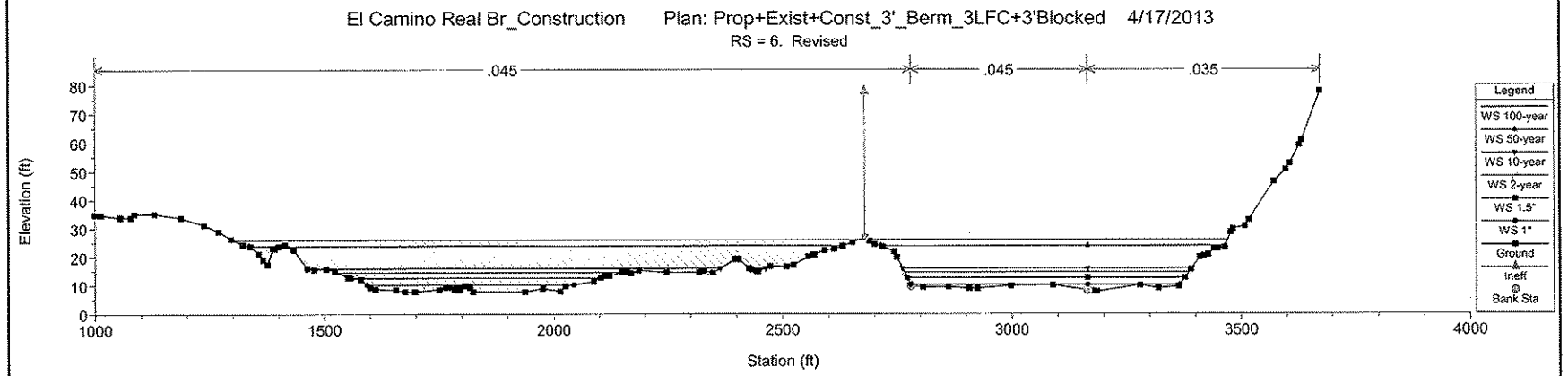

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 11.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

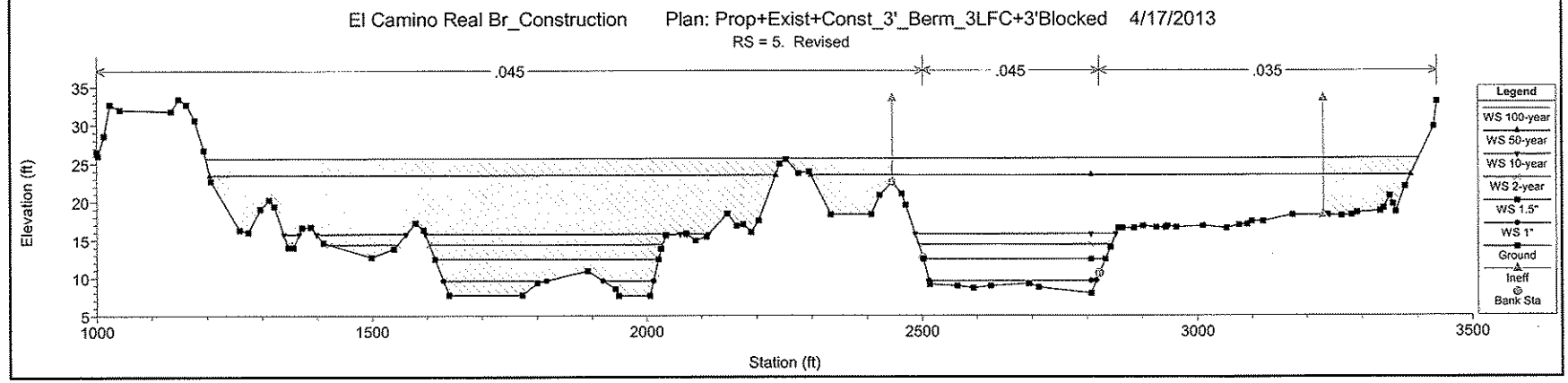

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 10.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

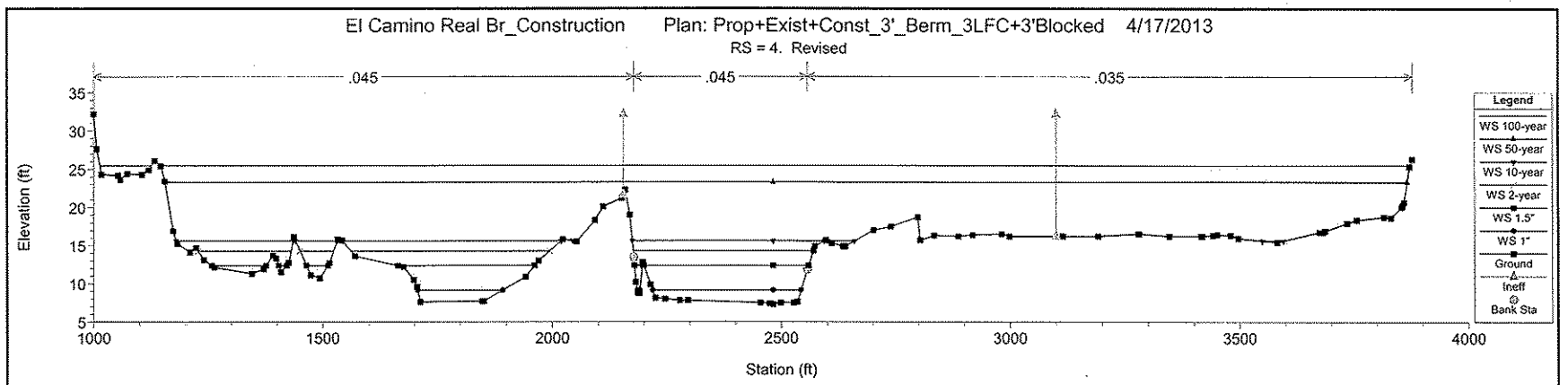

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 9.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

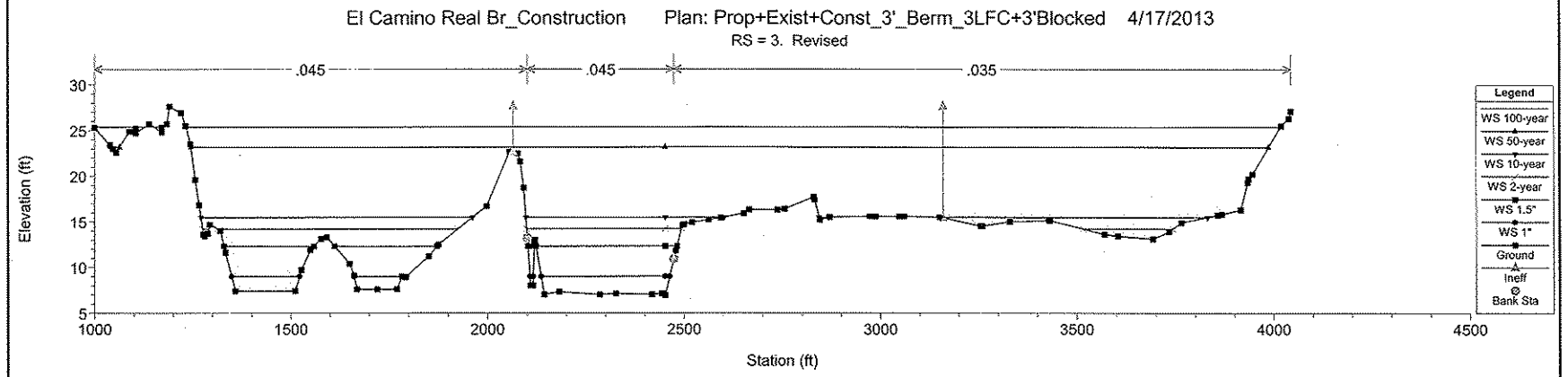

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 8.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

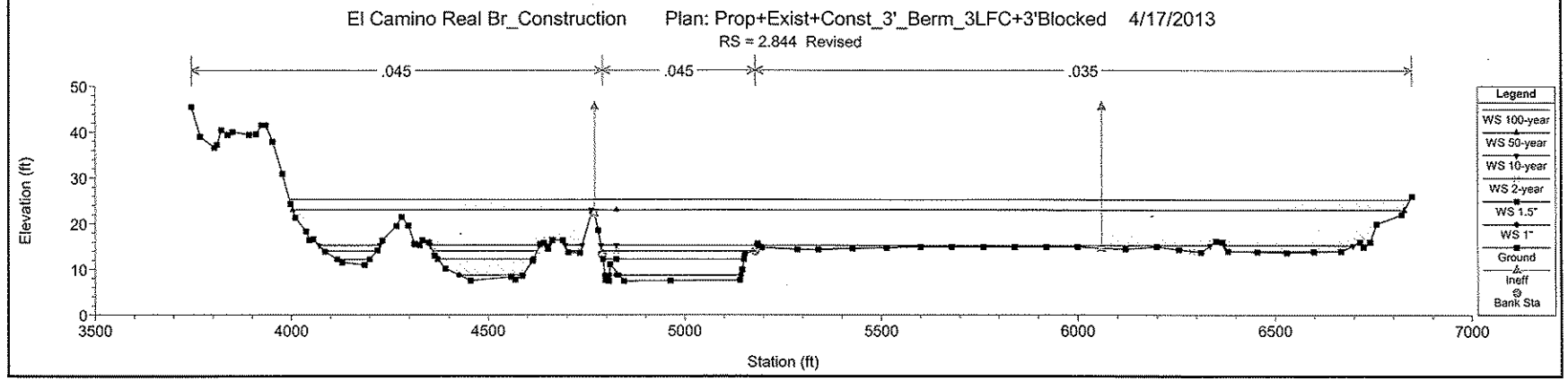

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 7. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

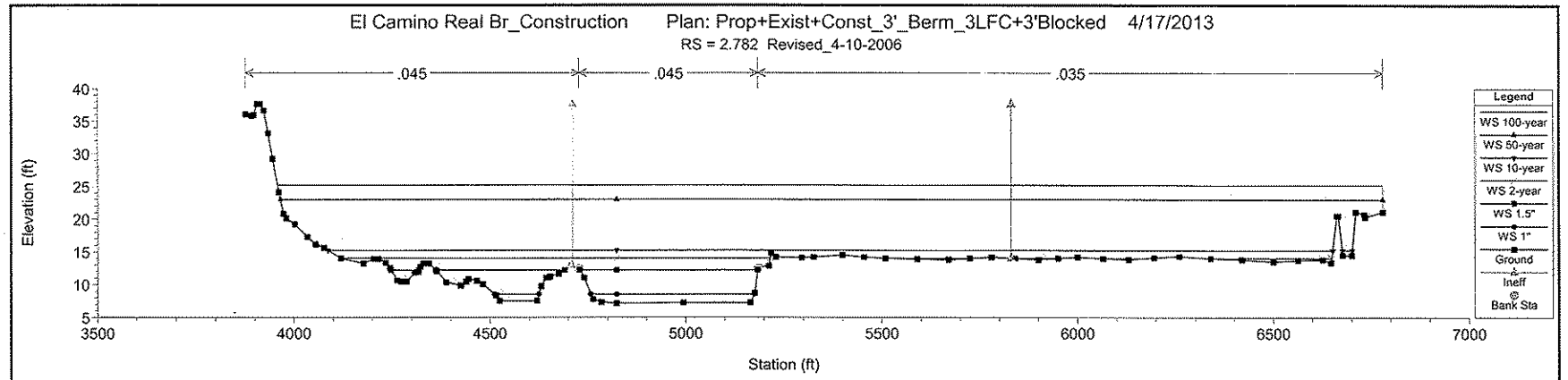

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 6. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

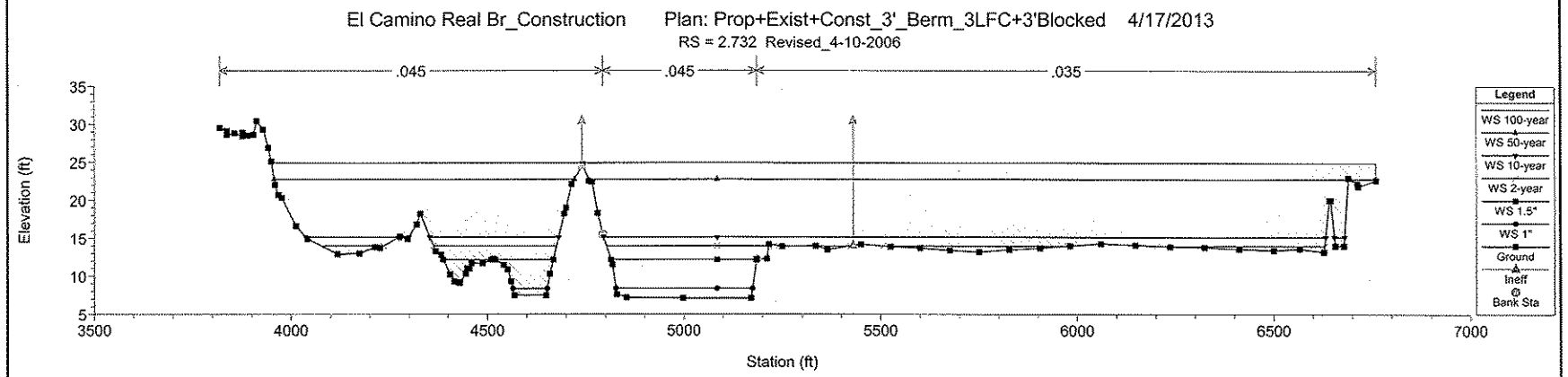

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 5. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

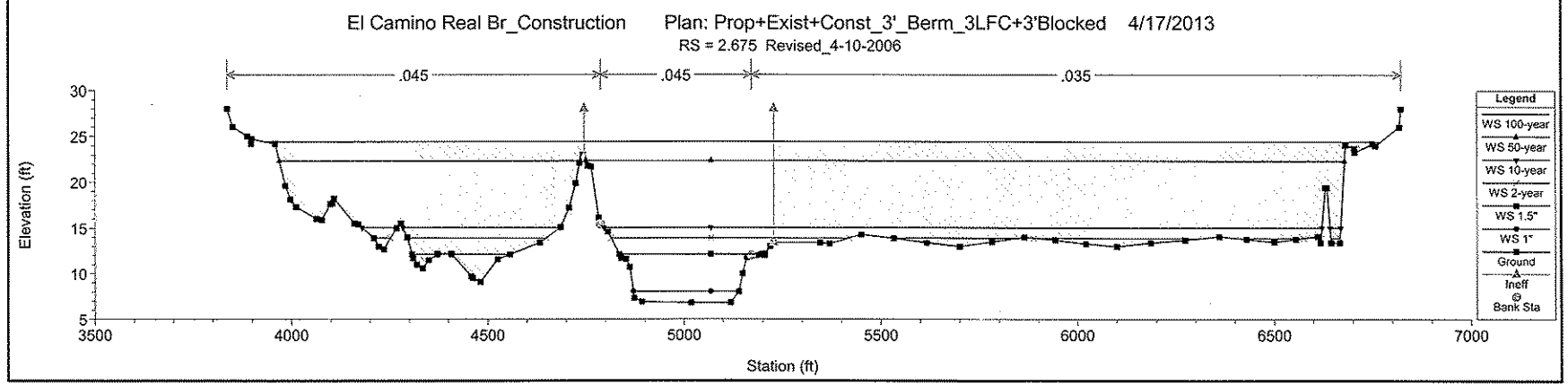

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 4. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

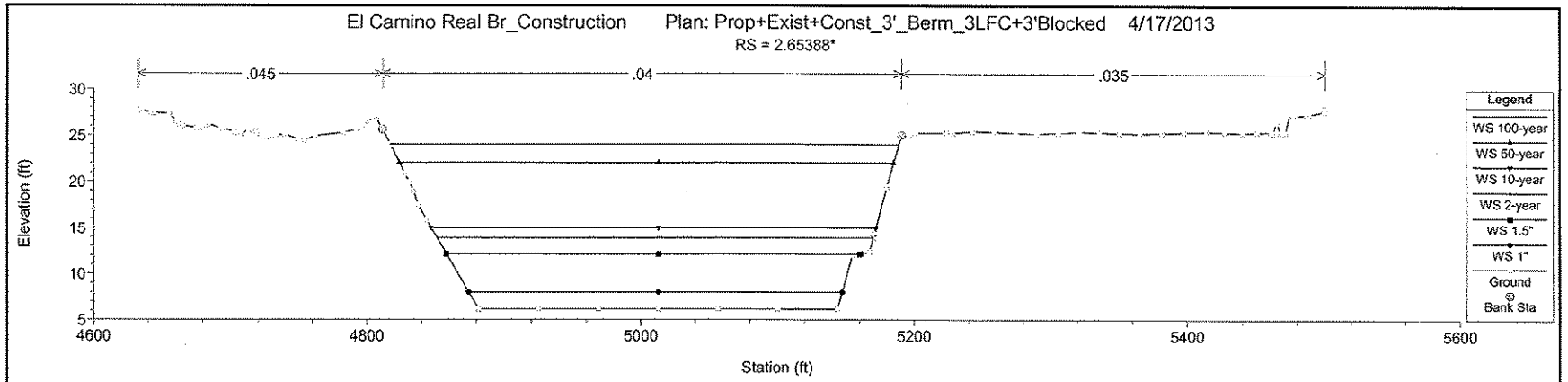

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 3. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

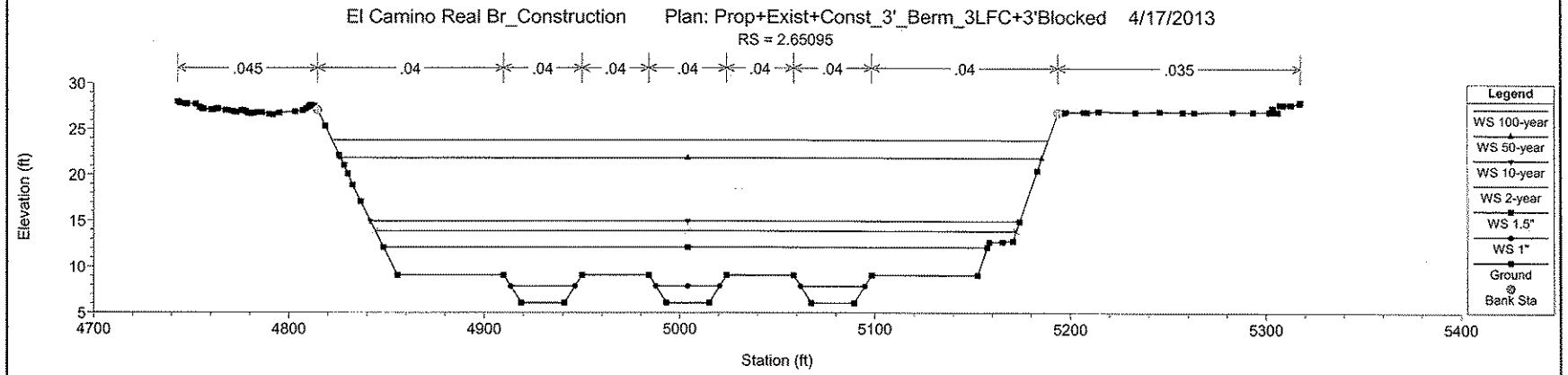

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.844 Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

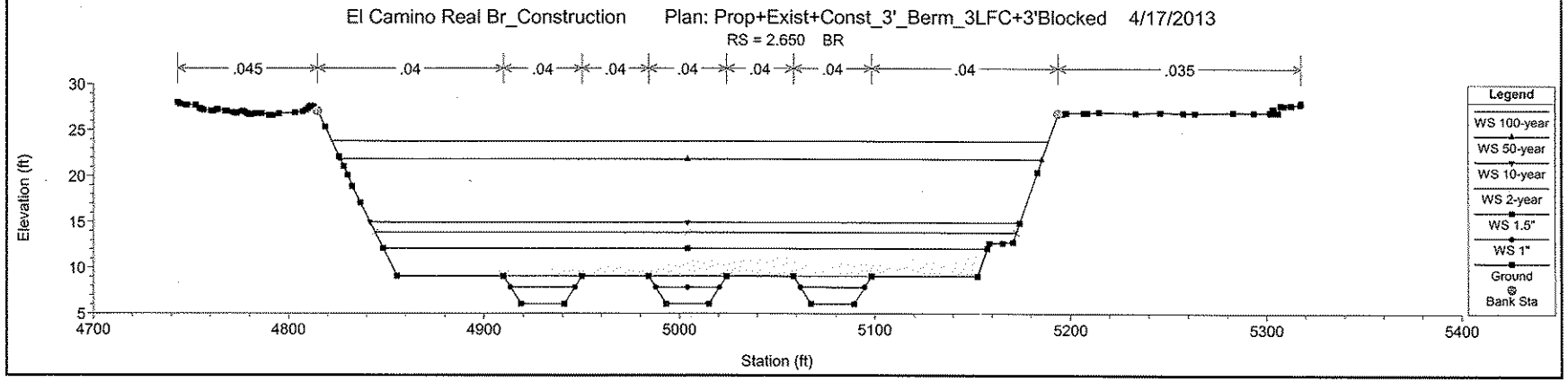

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.782 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

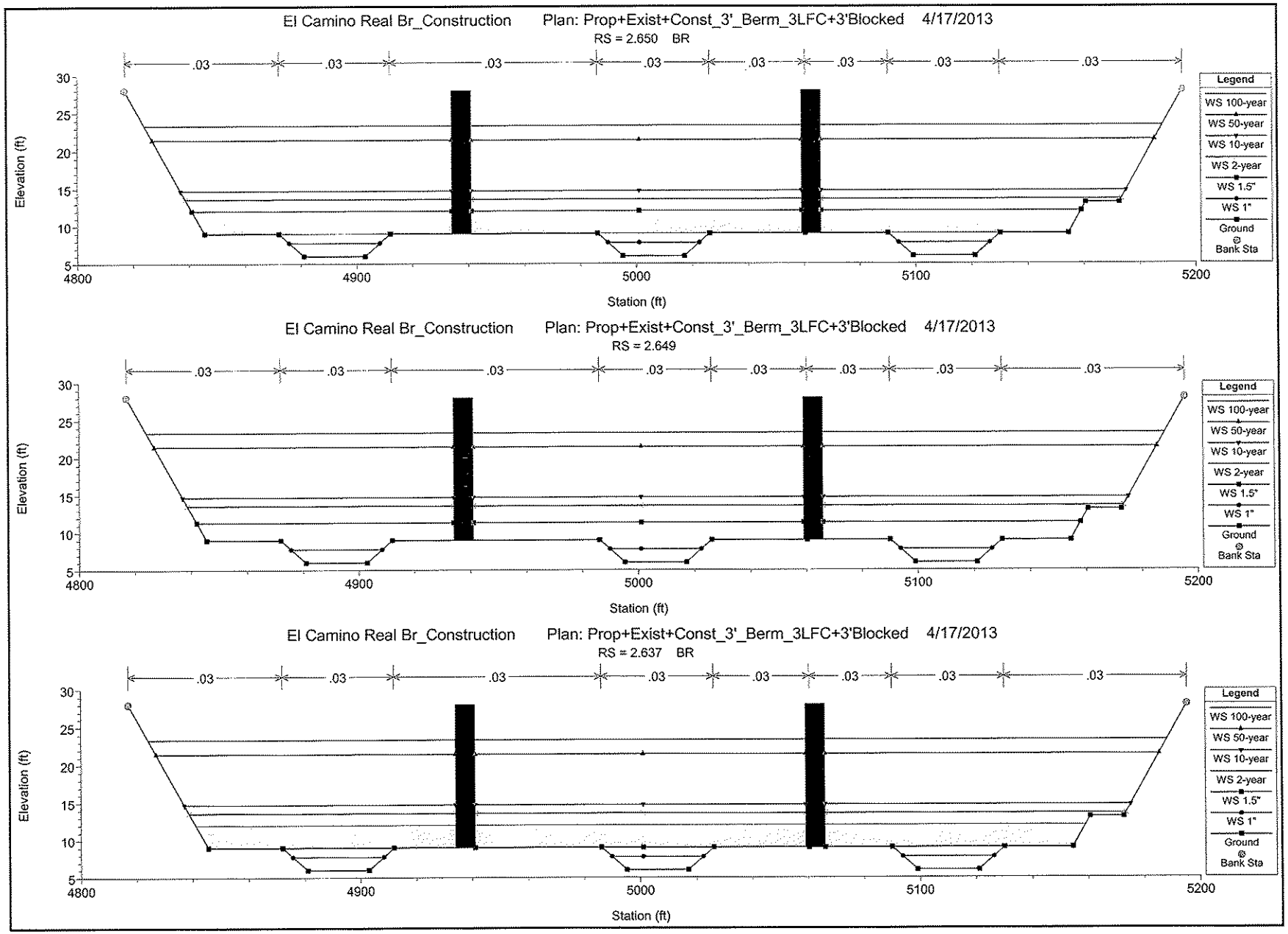

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.732 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

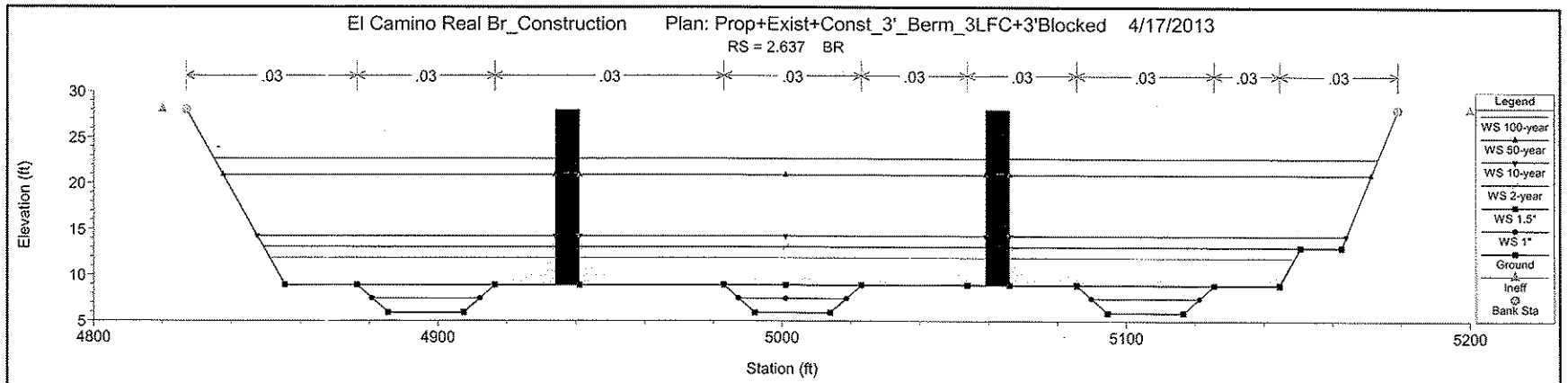

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.675 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

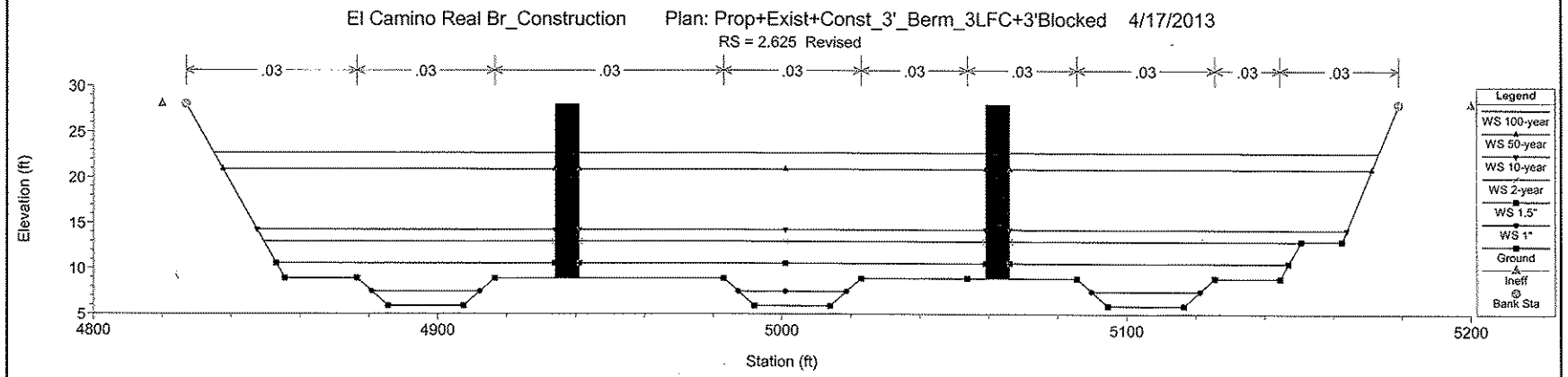

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.65388*
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

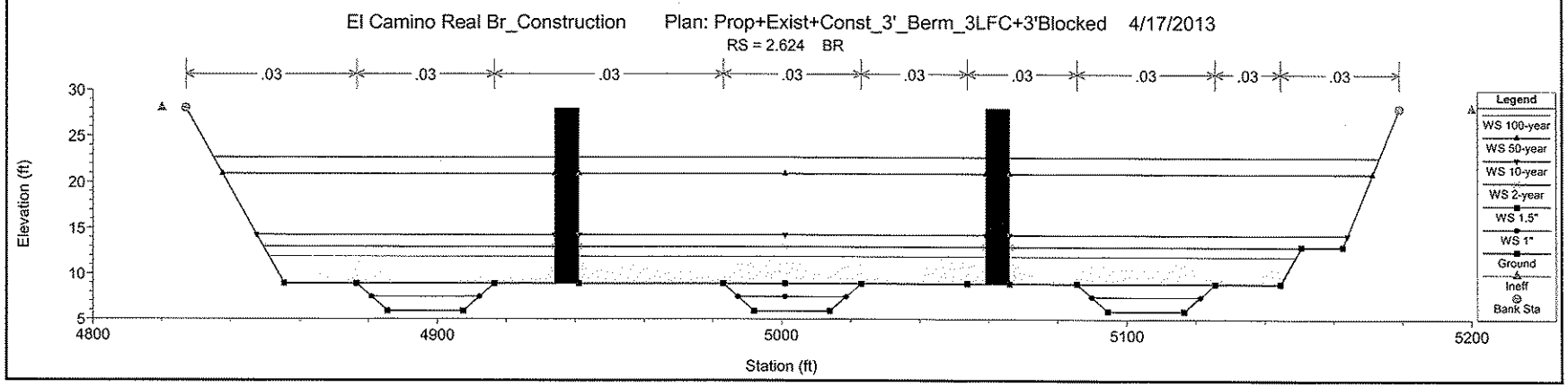

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.65095
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

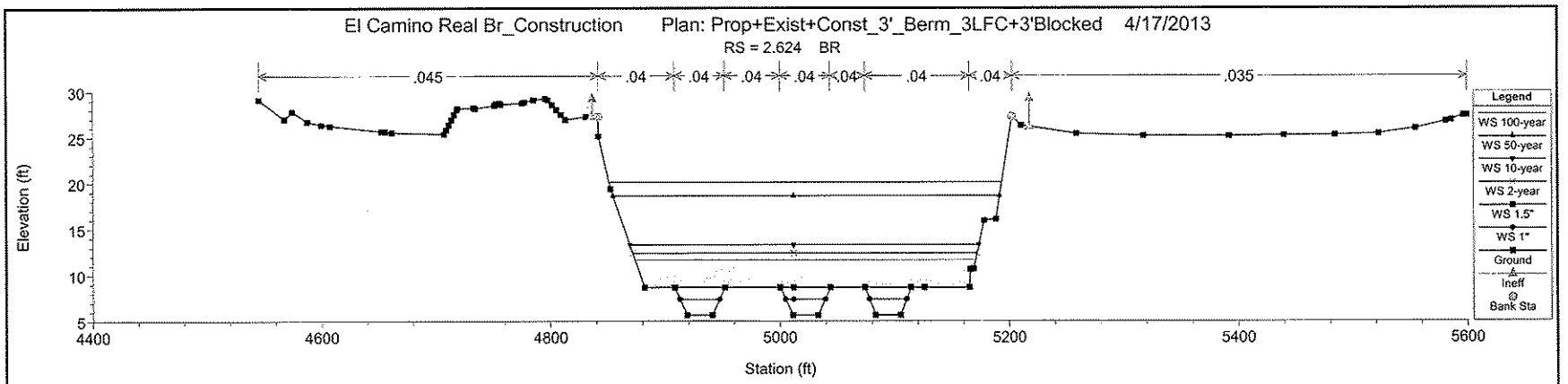

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.650 BR
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

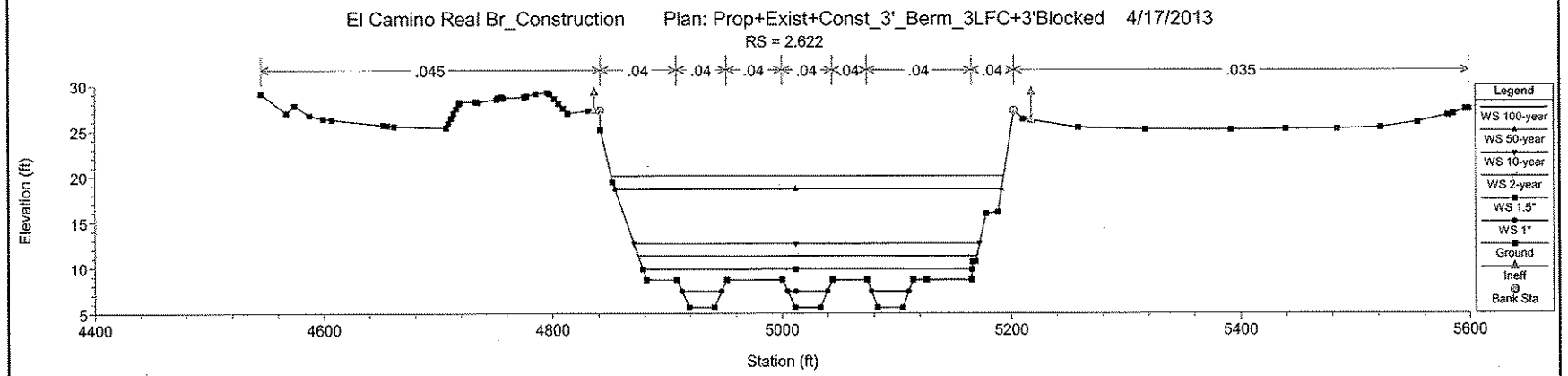

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.650 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta
El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.649
El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.637 BR

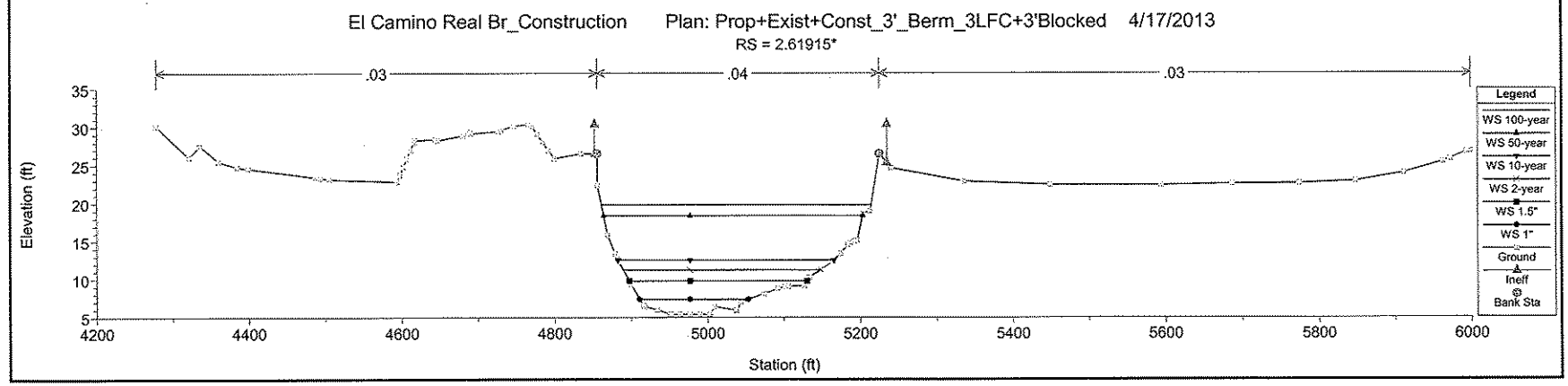

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.637 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

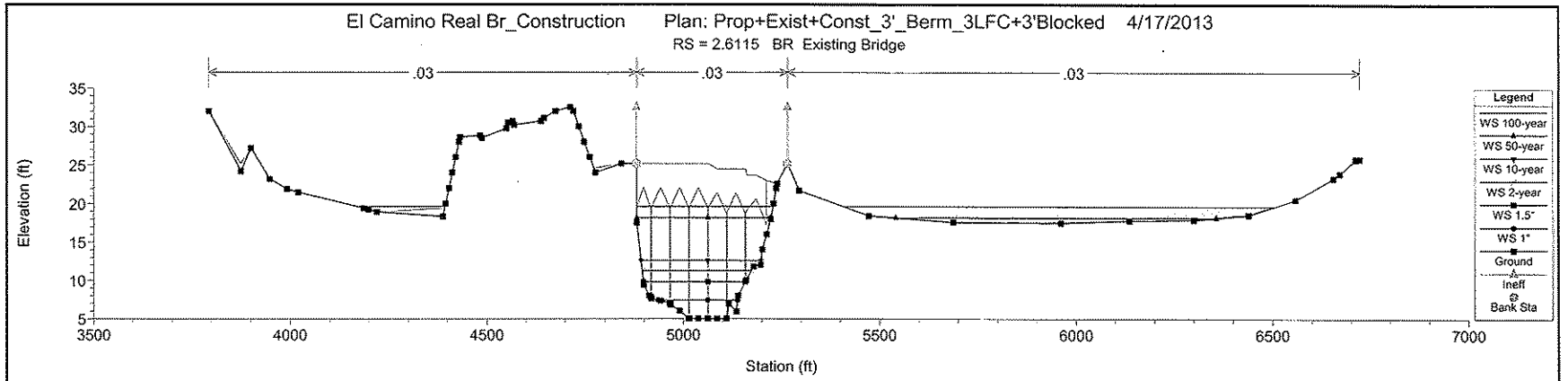

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.625 Revised
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

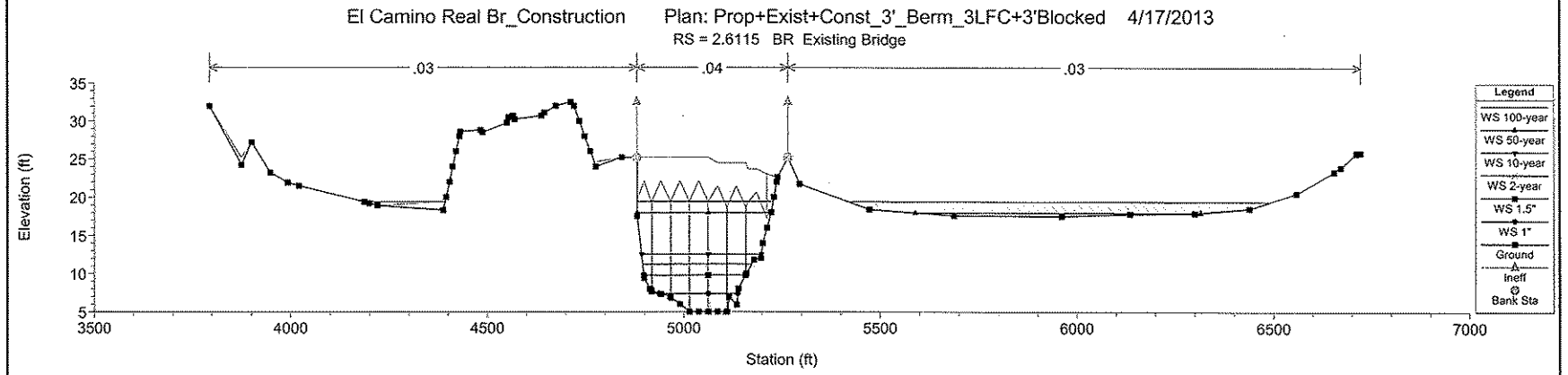

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.624 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

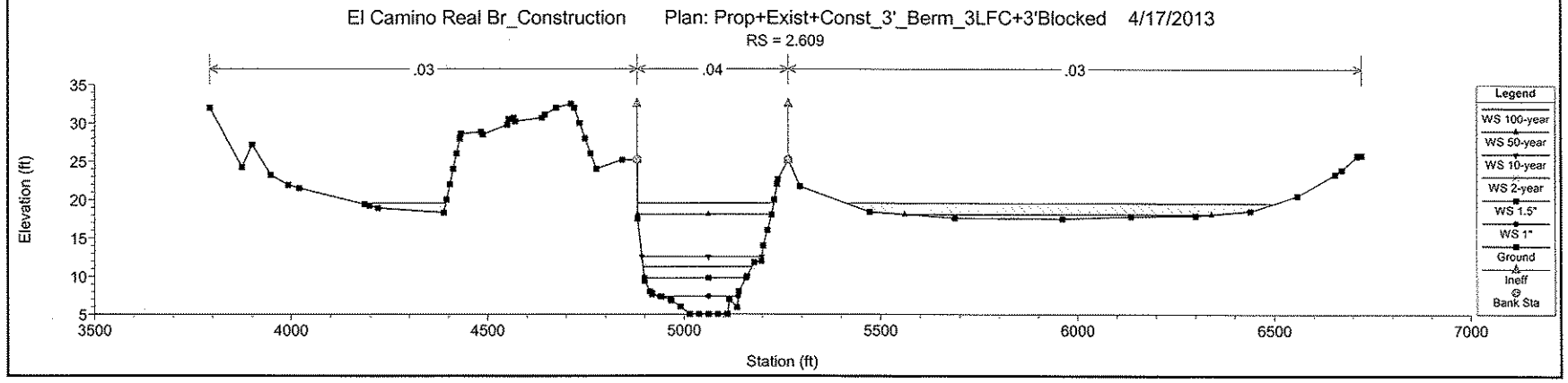

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.624 BR
.045
.04
.04
.04
.04
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

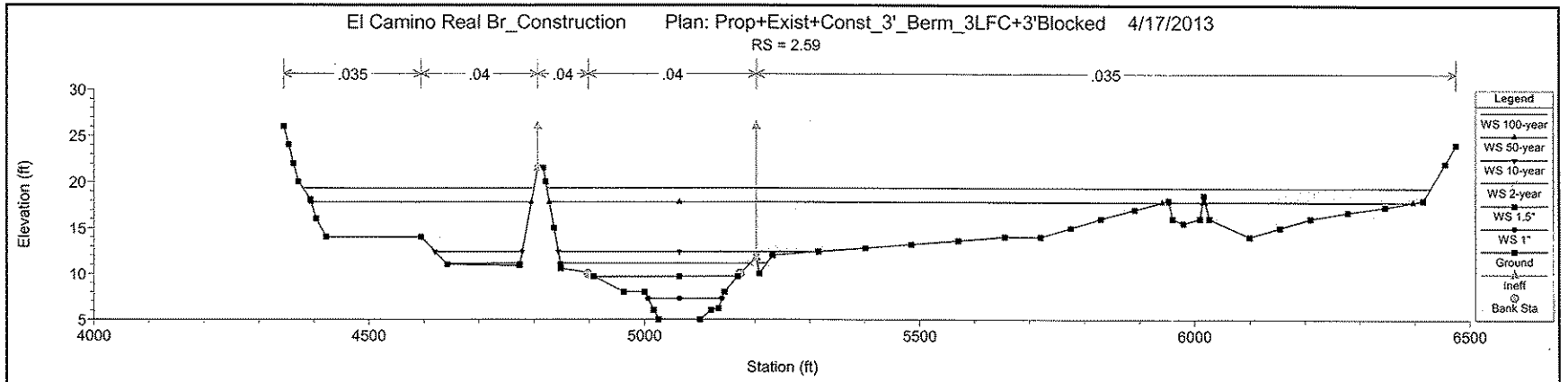

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.622
.045
.04
.04
.04
.04
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

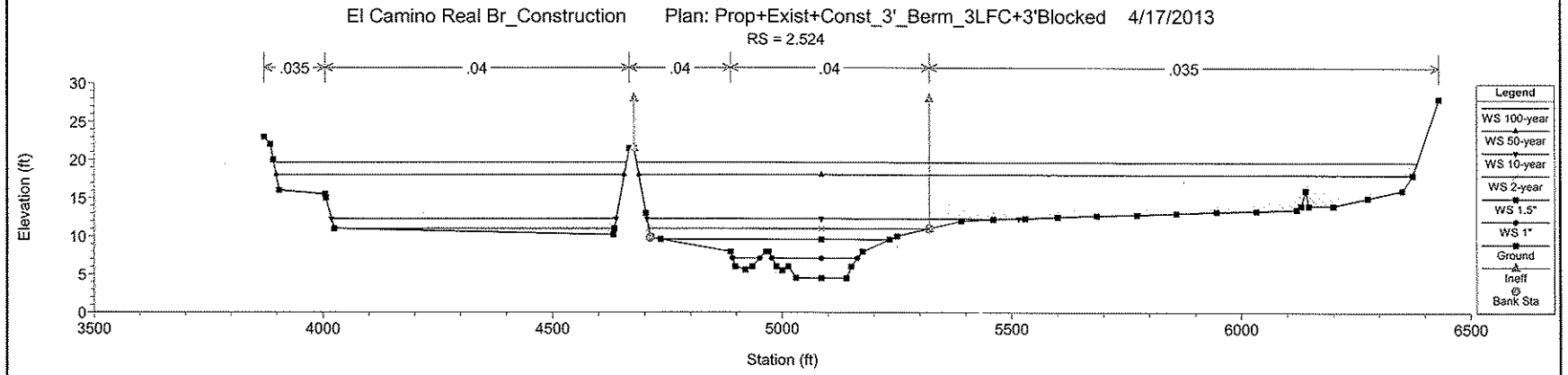

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.61915*
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

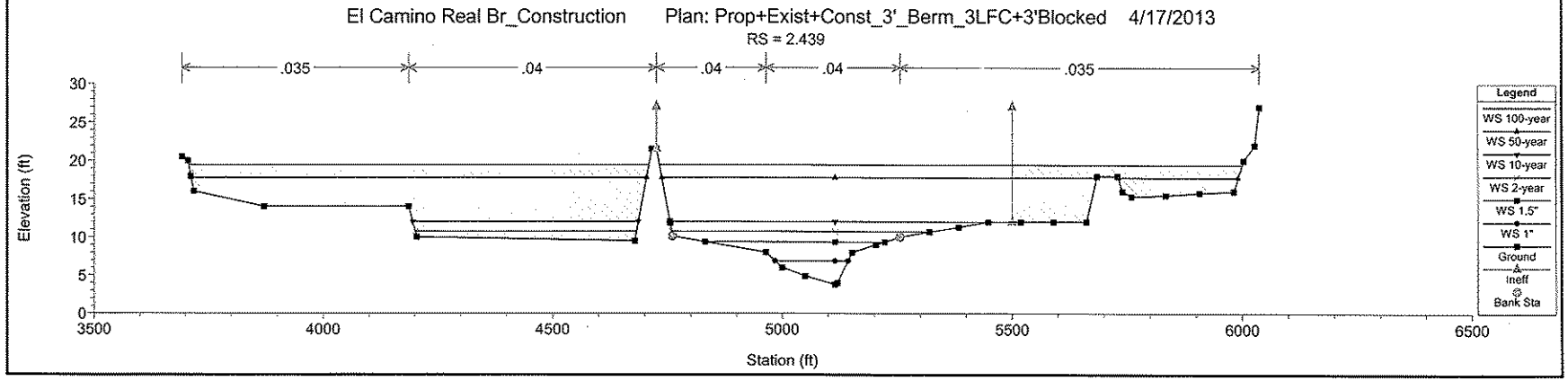

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.6115 BR Existing Bridge
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

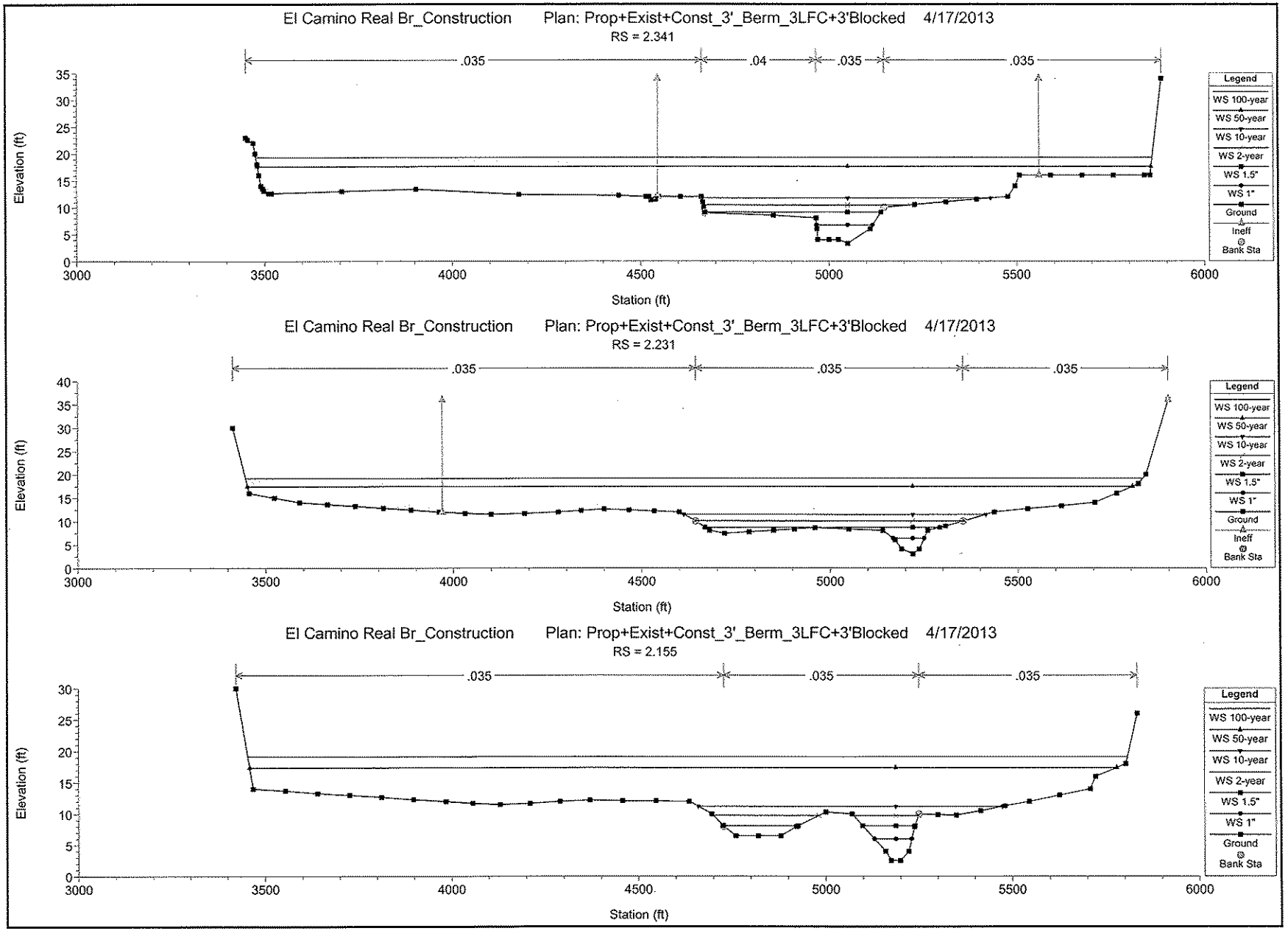

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.6115 BR Existing Bridge
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

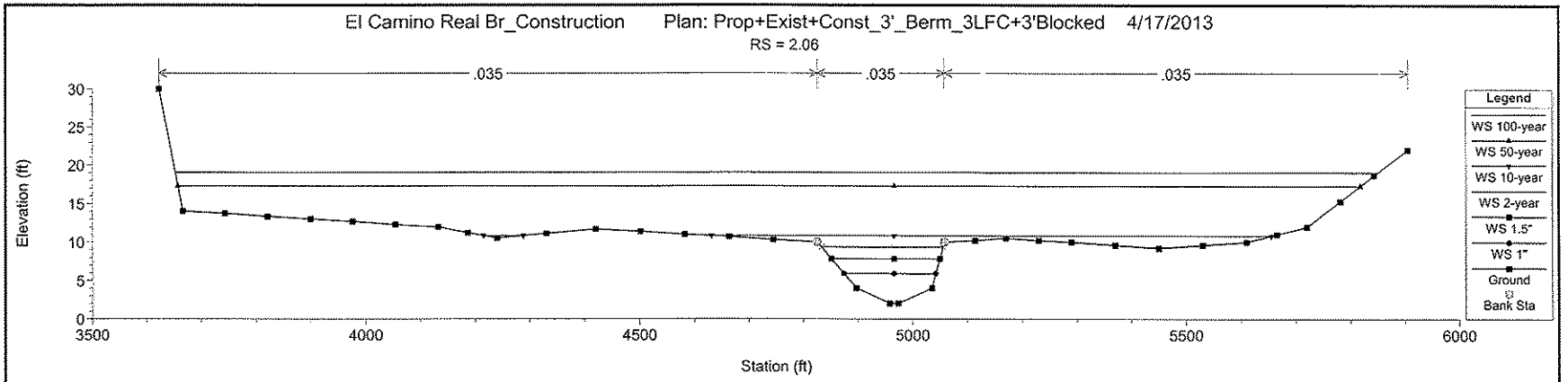

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.609
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

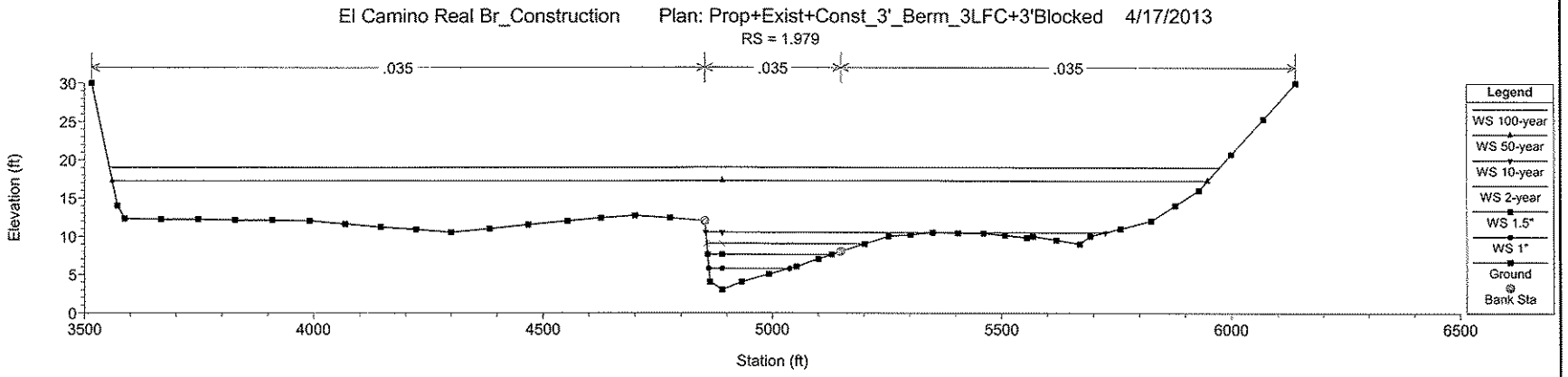

El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.59
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.524
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.439
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.341
.035
.04
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.231
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.155
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta


El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 2.06
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta


El Camino Real Br_Construction Plan: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked 4/17/2013
RS = 1.979
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

```
                    HEC-RAS Version 4.1.0 Jan 2010
                     U.S. Army Corps of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                           Davis, California

          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: El Camino Real Br_Construction
Project File : ECRBr_Construction.prj
Run Date and Time: 4/17/2013 2:13:27 PM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
Temporary Construction
Phase

The PROPOSED CONDITION ElCamino.p09 plan file was saved and
renamed for the future analyses with the existing bridge added to the geometry
file.

PLAN DATA

Plan Title: Prop+Exist+Const_3'_Berm_3LFC+3'Blocked
Plan File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.p34

Geometry Title: Prop+Exist+Const_Berm_3'+3-LFC+3Blocked
Geometry File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.g31

Flow Title : Prop+Exis_Construction_Berm
Flow File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.f08

Plan Description:
Existing and proposed bridge with 3' berm, three low flow channel AND 3'
OBSTRUCTION

Plan Summary Information:

Number of: Cross Sections = 30 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 4 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Prop+Exis_Construction_Berm
Flow File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.f08

Flow Data (cfs)

River	Reach	RS	100-year	50-year	10-year	2-year	1.5"	1"
RIVER-1	Reach-1	12	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.844	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.732	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.675	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.625	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.614	40100	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.524	33415	27307	5900	3450	1624	426
RIVER-1	Reach-1	2.439	34115	27307	5900	3450	1624	426
RIVER-1	Reach-1	2.341	34815	27307	5900	3450	1624	426
RIVER-1	Reach-1	2.231	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.155	42800	32500	5900	3450	1624	426

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	100-year		Known WS = 19
RIVER-1	Reach-1	50-year		Known WS = 17.24

```
  RIVER-1          Reach-1          10-year
Known WS = 10.5
  RIVER-1          Reach-1          2-year
Normal S = 0.001
  RIVER-1          Reach-1          1.5"
Normal S = 0.001
  RIVER-1          Reach-1          1"
Normal S = 0.001



GEOMETRY DATA

Geometry Title: Prop+Exist+Const_Berm_3'+3-LFC+3Blocked
Geometry File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.g31

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 12

INPUT
Description:
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000    35.6 1005.86   33.27 1013.08   31.83 1055.01    32.1 1099.25   30.47
 1144.99    29.5    1176   31.58 1180.55   32.16 1224.52   29.29 1272.69    28.7
 1321.29    25.1 1372.68   18.68 1498.17   18.68 1553.31   27.25 1584.04   26.05
 1592.99    24.9 1603.16    24.7 1625.67   28.06 1665.26    25.4 1744.29   22.84
 1791.24    20.4 1803.95   20.35 1815.94   20.71 1850.07   19.88 1852.08    20.1
 1856.82    19.9 1878.37   20.77 1904.54   21.04 1951.26   20.01 1980.89   18.85
 2021.94    18.8 2082.22   19.82 2177.87   19.99  2226.8   23.59 2260.35   26.81
 2266.62      28 2276.55   28.01 2289.11   26.36 2341.63   24.48 2453.87   29.83
 2463.88    30.9 2545.28   32.67 2603.12   30.76    2654   27.88 2670.13    26.1
 2711.85    22.7 2774.21   20.74 2797.93   20.55 2877.43   22.79 2902.47    22.3
 2935.73    27.6 2956.39   27.08 2981.85   25.02 3000.22   24.95 3060.28   26.72
 3075.48    26.6 3122.59   24.89 3174.65   25.29 3205.29    26.8  3264.7   25.15
 3287.43    17.9 3303.45   12.36 3319.08   11.84 3351.69   11.41 3622.04   11.32
 3727.53    12.8 3734.46    13.1 3776.26   20.11  3778.5   20.05 3805.79   19.28
 3830.09    19.1 3958.65   20.42 4161.16   20.39 4207.79   21.08 4296.23   20.35
 4323.61    27.9 4332.48   29.22 4343.85   29.47 4369.91   29.17 4423.85   29.14
 4453.69    28.6 4498.75   28.52 4531.82   27.51 4546.42   27.73 4568.52   27.35
 4576.79    27.6 4591.03   27.38 4616.36   23.58 4679.05   22.34 4746.64   23.31
 4773.16    23.1 4785.29   21.85 4818.03   17.15 4827.16   19.36 4857.86    29.1
 4861.74    30.9 4871.15   31.21 4888.42   29.54 4905.42   28.94

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 3287.43    .045  3778.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     3287.43  3778.5           49.32       48   73.57              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
    1000 3205.29              T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 11.
```



```
INPUT
Description:
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000    40.3 1017.77   32.69 1025.98   31.31 1068.34   31.84 1120.18   30.46
 1125.95    30.8 1139.82   31.06 1186.39   30.89  1205.9   30.03 1215.36   29.19
  1270.4    26.2 1319.99   23.06 1333.18   22.01 1387.97   22.58 1403.23    20.7
 1427.05      20 1458.92   20.06  1475.5   21.56 1490.04   22.43 1501.97   21.59
 1521.74    24.9 1544.11   27.77 1555.98   27.71 1576.39   27.13 1588.08   26.52
 1592.53    25.6 1602.16   25.44 1644.13   31.55 1689.45   26.26 1716.32   25.39
 1799.98      21 1821.54   19.32 1824.81   18.71 2071.33   18.71 2084.45   19.97
 2148.41    20.8 2163.75   22.18 2190.78   24.07 2208.44   26.01 2245.42   28.48
 2269.66    26.2 2324.04   22.89 2339.18   23.23 2497.01   28.39 2521.97   28.85
 2546.84    30.3 2565.05   29.68 2587.75   28.39 2631.81   28.04 2662.57   28.41
 2710.89    24.4 2807.45   21.06 2866.09   22.63    2901   26.32 2920.28   30.24
 2940.22    29.2 2959.82   27.62 2964.07      27 2969.64   26.61 2989.81   27.21
 3015.83    27.5 3041.11   28.24  3120.4   25.24 3169.54   25.37 3196.64   27.06
 3260.42    25.6  3282.4   18.34 3300.55   12.14 3349.52   11.94 3381.12   11.52
 3524.57    11.2  3619.7   11.39 3718.86   12.21  3738.3   13.08 3778.55   19.79
 3849.99    19.6 3921.31    20.2 4036.71    20.5 4181.79   20.35    4194   20.53
 4217.99      20 4243.34   19.95 4319.69   20.32 4337.47   20.86 4446.99   21.08
 4496.05    20.9 4547.69   22.06 4563.82   21.98 4593.72   23.28 4605.59   23.35
 4634.58    22.7 4681.06   22.26 4718.72   22.41 4726.07   21.78 4762.55   16.45
 4772.93    19.9 4811.26   33.42 4821.04   32.65 4860.55   31.96

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045  3282.4    .045 3778.55    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
     3282.4 3778.55           347.68      339  548.49              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
    1000 3196.64              T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 10.

INPUT
Description:
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000    61.6  1065.1   31.55 1066.72   30.96 1078.56   28.81 1133.55   30.82
 1144.36    30.8 1163.16   29.72 1174.61    27.9 1194.28   26.28 1220.63   25.97
 1272.47    24.6 1290.82   24.66 1313.56   23.75 1322.01   23.03 1330.79   23.38
 1346.64    24.6 1352.33   24.76 1372.19   24.37 1377.21   24.54 1396.08   23.58
    1409    23.3 1437.64   23.91 1457.07    23.5 1471.34   24.16 1487.88   23.48
 1489.88    23.6 1504.34    22.5 1520.03   23.02 1551.94   24.67 1568.23   25.86
 1572.66      26 1598.72   27.62 1653.76   25.37 1772.86   22.14 1802.96   20.84
 1830.99    20.5 1846.37   19.78 1904.05   18.71 2126.59   18.71 2143.98    20.6
 2181.47    20.3 2213.13   20.54 2228.29   20.02 2260.47   22.45 2285.56   23.91
 2292.62    25.6    2303    26.9 2317.41   25.97 2339.99   23.98 2349.03    22.8
 2373.01    20.9 2453.68   19.32 2467.97   19.43 2507.32    22.2 2533.93   21.88
 2540.85    21.2 2603.98   24.58  2655.3   24.99 2669.58   24.91 2697.53   25.59
    2749    26.4 2774.29   26.56 2817.77   21.14 2825.25   20.46 2903.54   27.83
 2922.14    28.7 2959.73   26.34 2998.12   24.68 3063.82   31.09  3131.8      27
 3139.33    26.8 3159.32    25.3 3185.34   23.98 3210.78   16.78 3228.28   11.78
 3244.48    11.9 3252.18   11.68 3344.18   11.39 3386.35   11.54 3552.31   10.72
 3679.96    11.5 3702.75   12.08 3737.94   17.39 3742.94   17.35 3759.57   17.33
```

3876.38	19.1	3950.62	18.95	4016.25	19.2	4059.21	19.11	4185.85	19.68
4245.42	20.7	4246.74	20.53	4274.78	15.27	4315.06	25.27	4357.64	25.53
4403.81	29	4407.41	30.26	4426.73	42.03	4430.62	43.13		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3210.78	.045	3742.94	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3210.78	3742.94	585.6	450	556.91	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3063.82		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 9.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	37	1016.9	33.7	1073.58	32.94	1121.8	33.23	1152.75	31.65
1161.67	30.1	1171.71	29.36	1198.09	28.64	1256.09	24.45	1282.45	24.17
1321.64	25.1	1382.49	25.44	1446.9	25.01	1463.43	24.47	1528.47	28.12
1533.87	28.1	1544.3	29.93	1559.42	28.86	1567.3	27.86	1581.06	29.5
1593.41	27.7	1627.08	27.96	1648.62	28.99	1680.4	29.4	1703.36	27.5
1712.61	28	1721.47	28.98	1732.48	28.9	1751.89	31.06	1766.04	33.19
1782.94	31.2	1800.28	27.57	1848.38	22.39	1882.05	21.62	1921.82	26.96
1943.46	27.3	1956.53	27.14	1966.87	26.49	2013.05	20.39	2114.35	24.06
2135.36	23.6	2151	23.9	2237.13	22.08	2307.12	21.91	2377.04	22.97
2399.54	22.4	2468.87	22.81	2473.19	23.63	2480.05	23.05	2491.91	24.59
2515.92	22.9	2524.23	22.84	2581.98	19.02	2637.55	22.51	2657.34	25.17
2674.82	24.2	2715.26	23.38	2740.33	21.83	2743.51	22	2751.97	21.28
2767.57	23.4	2821.64	23.57	2834.98	23.08	2844.63	22.26	2932.59	22.26
2951.05	22.9	2966.41	25.46	2986.32	27.06	2992.2	28.44	3039.79	23.8
3070.69	14.2	3080.08	11.42	3106.55	11.02	3321.87	10.64	3400.49	11.49
3522.98	10.7	3576.78	11.11	3603.66	11.87	3631.39	15.44	3637.71	15.64
3650.43	16.1	3668.33	18.59	3674.22	19.28	3691.74	18.65	3725.46	19.86
3742.81	20	3832.93	22.46	3869.75	30.39	3884.99	32.22	3889	36.15
3903.88	45.7	3915.36	57.56	3922.06	60.21	3934.59	69.86	3942.4	73.97
3955.33	78.1	3964.35	83.07	3985.23	95.58	3988.22	97.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3070.69	.045	3637.71	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3070.69	3637.71	1127.52	452	287.85	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2992.2		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 8.

INPUT
Description:

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	28.6	1005.45	28.45	1024.27	33.23	1035.35	32.74	1041.71	32.87
1061.19	32.9	1083.84	32.75	1092.86	32.56	1121.25	32.64	1124.3	32.11
1131.29	31.8	1140.59	31.88	1164.62	31.19	1219.06	30.98	1239.9	29.91
1242.97	30.9	1255.6	30.95	1268.5	30.77	1302.14	28.93	1308.95	29.04
1332.76	27.9	1359.49	28.05	1365.6	30.06	1378.37	30.03	1393.75	30.12
1394.57	29.8	1400.54	25.66	1416.32	23.32	1419.41	23.16	1420.28	23.05
1433.25	20.9	1482.05	21.18	1502.76	23.35	1526.92	25.37	1557.55	26.22
1561.6	26.2	1564.42	26.18	1588.13	25.13	1595.86	24.52	1627.6	21.8
1633.43	21.9	1657.37	22.66	1671.61	23.28	1703.38	22.62	1750.91	20.6
1766.08	19.6	1786.31	18.96	1806.22	19.85	1834.37	20.97	1846.46	20.93
1861.46	20.2	1883.93	19.91	1955.91	21.79	1958.38	21.71	1965.3	21.71
2051.2	20	2121.94	17.86	2585.61	17.86	2628.16	21.64	2641.35	22.45
2649.73	23.1	2687.98	25.74	2697.64	26.82	2724.27	29.32	2737.82	29.24
2748.03	29.2	2759.02	27.76	2777.42	26.7	2794.59	25.17	2802.41	23.78
2827.53	15.9	2845.35	10.4	2848.93	10.33	2949.01	9.78	2990.53	9.84
3031.41	9.4	3047.38	9.32	3118.85	9.51	3158.36	10.28	3200.01	10.36
3237.46	10.2	3284.67	10.19	3336.84	10.23	3346.59	12.25	3386.84	18.59
3390.01	18.7	3403.66	19.41	3416.52	24.97	3420.62	26.92	3433.41	25.66
3439.42	25.1	3448.56	28.08	3468.3	34.15	3471.51	33.72	3481.4	33.27
3494.77	37.3	3511.58	42.12	3539.78	51.12	3556.19	52.41		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2827.53	.045	3390.01	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2827.53	3390.01	806.85	444	387.93	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2724.27		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 7.

INPUT
Description: Revised
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	29.8	1045	27.9	1085	27.6	1103	26.3	1115	26.3
1126	22	1135	17.5	1151	17.2	1163	19.7	1173	20.4
1225	17.8	1313	18.2	1329	18.8	1336	21.6	1351	23.1
1357	21.9	1361	20.1	1367	20.7	1371	19.5	1376	19.9
1380	19.2	1389	19.6	1392	20.4	1396	19.1	1438	19.4
1445	20.9	1452	23.1	1461	19.9	1533	18.8	1577	20.5
1588	21.6	1602	24.8	1609	24.8	1620	23.3	1632	19.9
1646	17.2	1729	15.7	1761	14.5	1784	14.8	1794	16
1802	16.3	1826	15.5	1839	14.5	1924	12.1	1953	9.1
1958	7.6	2017	7.7	2023	9.3	2037	11.2	2108	13.5
2143	20.2	2151	20.9	2167	20.7	2194	17	2237	14.7
2272	15.8	2284	17	2317	17.8	2341	17.7	2365	17.8
2415	17.3	2437	16.7	2468	17.4	2484	17.6	2523	18.4
2565	18.9	2578	19.6	2580	20	2586	20.1	2598	21.1
2647	24.9	2655	24.7	2675	26.8	2689	26.5	2767	22.9
2800	22.5	2807	22.2	2824	17.1	2835	13.3	2843	11
2878	10.1	2919	10	3013	9.5	3101	9.4	3222	10.6
3243	10.7	3296	10.3	3318	13.8	3349	18.8	3377	20.2
3397	19.3	3436	20.9	3465	22.1	3476	22.8	3490	25.5
3499	26.2	3505	26.3	3516	29	3524	30.8	3546	31.4

3585	37	3587	37.5	3590	37.1	3597	37.4	3613	37.9
3620	37.9	3625	38.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2835	.045	3318	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2835	3318	692.7	497	459.02	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2674.77		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 6.

INPUT
Description: Revised
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	34.8	1013	34.7	1055	33.7	1055	33.9	1078	33.7
1086	35	1129	35.1	1187	33.7	1237	31.2	1269	28.9
1296	26.3	1322	24.3	1338	23.7	1356	21.1	1366	18.9
1376	17.3	1387	23.1	1391	22.8	1400	23.7	1413	24.3
1433	22.4	1463	15.9	1478	15.5	1504	15.7	1523	15
1552	12.7	1580	12	1600	9.1	1612	8.6	1656	8.3
1676	7.7	1698	7.7	1751	8.5	1765	9.3	1771	9.3
1784	8.6	1787	8.8	1791	8.3	1794	8.4	1796	8.9
1807	9.8	1816	9.6	1818	9.2	1824	7.7	1937	7.7
1976	8.8	2014	7.8	2026	9.6	2088	11.3	2111	13.2
2122	13.2	2150	14.5	2161	14.6	2170	14.1	2186	15.2
2247	14.5	2318	14.5	2329	14.9	2349	14.3	2397	19
2402	19.3	2403	19.3	2405	19	2427	15.9	2433	15.4
2444	14.8	2447	14.8	2473	16.6	2509	16.5	2524	17
2556	20	2565	20.6	2569	20.7	2591	22.2	2612	22.6
2631	23.7	2652	25.1	2679	26.7	2689	25.5	2700	24.4
2718	23.6	2743	21.7	2749	19.8	2780	9.7	2806	9.2
2862	9.3	2907	8.8	2925	8.8	2998	9.7	3089	10
3165	8.1	3173	7.9	3185	7.7	3279	9.9	3319	8.8
3363	9.5	3390	15.5	3409	19.8	3418	20.3	3428	20.7
3441	22.8	3449	22.9	3464	23.2	3477	28.5	3482	29.7
3508	30.7	3517	32.9	3572	46.4	3598	50.5	3607	52.7
3628	59.1	3633	60.8	3673	77.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2780	.045	3165	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2780	3165	642.39	511	528.63	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2678.79		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 5.

INPUT
Description: Revised
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	26.5	1002	26	1013	28.6	1024	32.7	1042	32
1135	31.8	1149	33.4	1163	32.7	1178	30.6	1194	26.7
1207	22.7	1259	16.3	1275	16	1297	19	1313	20.2
1322	19.4	1348	14	1357	14	1373	16.6	1389	16.7
1412	14.6	1499	12.7	1540	13.8	1579	17.2	1594	16.3
1640	7.7	1773	7.7	1800	9.3	1892	10.9	1943	8.5
1949	7.6	2006	7.6	2026	13.8	2035	15.6	2072	15.8
2089	14.9	2109	15.4	2147	18.4	2164	16.8	2176	17
2190	16	2204	17.5	2242	24.9	2253	25.5	2276	23.7
2295	23.9	2334	18.3	2408	18.3	2423	20.8	2445	22.5
2463	21	2470	19.5	2502	12.6	2514	9.1	2564	8.9
2593	8.6	2625	8.9	2694	9.2	2712	8.7	2807	7.9
2822	10.6	2842	14	2856	16.5	2864	16.5	2885	16.5
2901	16.8	2925	16.6	2942	16.6	2945	16.8	2962	16.6
3010	16.8	3053	16.5	3076	16.9	3091	17	3099	17.4
3120	17.4	3174	18.2	3238	18.2	3263	18.1	3281	18.2
3291	18.5	3333	18.7	3339	19.1	3350	20.7	3356	19.6
3361	18.6	3378	21.9	3430	29.7	3436	33		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2502	.045	2822	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2502	2822	578.02	495	791.59	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2446.02		T
3230	3436		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 4.

INPUT
Description: Revised
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	32.2	1007	27.6	1017	24.3	1053	24.2	1058	23.6
1073	24.4	1105	24.3	1120	24.9	1133	26.1	1146	25.4
1155	23.4	1173	16.9	1182	15.2	1210	14.1	1223	14.7
1240	13.1	1263	12.1	1345	11.3	1371	11.9	1391	13.7
1398	13.3	1409	11.5	1426	12.7	1437	16.1	1474	11.1
1494	10.7	1515	12.7	1533	15.8	1542	15.7	1571	13.6
1676	12.2	1699	10.5	1706	9.6	1713	7.6	1847	7.7
1851	7.7	1942	10.9	1970	13	2023	15.8	2053	15.5
2093	18.3	2111	20.1	2152	21.2	2159	22.3	2169	19
2178	13.4	2182	10.2	2186	8.8	2190	8.7	2197	12.8
2214	9.9	2225	8.1	2246	8	2278	7.8	2296	7.8
2454	7.5	2474	7.4	2482	7.3	2499	7.5	2527	7.5
2535	7.6	2557	11.9	2570	14.3	2573	14.9	2597	15.7
2610	15.3	2634	14.9	2638	14.8	2639	14.9	2701	17
2739	17.5	2798	18.7	2803	15.7	2804	15.7	2834	16.3
2887	16.2	2918	16.4	2982	16.5	2999	16.2	3115	16.2
3192	16.2	3279	16.5	3281	16.5	3346	16.2	3416	16.2
3418	16.2	3442	16.3	3451	16.4	3480	16.3	3497	15.9
3582	15.4	3675	16.7	3682	16.7	3687	16.9	3735	17.9

3756	18.3	3815	18.7	3830	18.6	3854	20	3856	20.2
3859	20.6	3871	25.3	3877	26.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2178	.045	2557	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2178	2557	537.07	495	500.63	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2155		T
3100	3877		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 3.

INPUT
Description: Revised
The X1 and GR information below is all generated from new sections cut from the topo received from Jas...saved as fairbanks.dtm. The X1 Id's currently indicate the station along the stream alignment, with the zero station of the stream at the upstream end. For this Hec-Clomr analysis, the X1 and GR information listed below is for all sections upstream of the Howard Chang CX 2.8444. CX geometry begins with Sta. 1000 at the left end

Date: 11-08-02

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	25.3	1039	23.4	1047	23	1055	22.6	1089	24.9
1105	25.2	1105	24.7	1139	25.7	1171	24.8	1171	25.3
1184	25.7	1191	27.6	1220	26.9	1232	25.5	1244	23.5
1256	19.6	1266	16.8	1277	13.6	1280	13.4	1288	13.7
1293	14.7	1320	14	1333	11.6	1358	7.4	1511	7.4
1527	9.7	1550	11.9	1577	13.1	1592	13.3	1650	10.4
1661	9.1	1669	7.6	1720	7.6	1770	7.6	1783	9
1792	8.9	1851	11.2	1876	12.5	1998	16.7	2056	22.7
2077	22.5	2083	21.6	2092	18.7	2101	13.2	2109	8
2115	8	2119	12.9	2120	13	2144	7	2182	7.3
2285	7	2326	7.1	2418	7	2444	7.1	2452	6.9
2474	10.9	2479	11.8	2496	14.6	2500	14.7	2520	14.9
2563	15.2	2594	15.4	2652	15.9	2666	16.3	2738	16.3
2756	16.4	2830	17.7	2832	17.4	2846	15.2	2871	15.5
2973	15.6	2987	15.6	3048	15.6	3060	15.6	3151	15.5
3256	14.5	3260	14.5	3330	15	3430	15.1	3431	15.1
3432	15.1	3570	13.6	3604	13.4	3693	13.1	3734	13.9
3765	14.9	3858	15.7	3868	15.8	3916	16.3	3934	19.3
3936	19.7	3946	20.2	4019	25.5	4039	26.3	4044	27.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2101	.045	2474	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.

2101	2474	715	765	795	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2065		T
3160	4044		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.844

INPUT
Description: Revised
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3745	45.5	3767	39	3803	36.6	3810	37.2	3821	40.4
3837	39.4	3850	40	3892	39.4	3910	39.5	3924	41.5
3934	41.5	3952	37.9	3977	30.9	3998	24.3	4010	21.3
4038	18.3	4046	16.4	4056	16.6	4086	13.9	4130	11.5
4187	11	4220	14.2	4232	16.3	4268	19.5	4281	21.4
4298	19.6	4313	15.6	4316	15.5	4327	15.3	4334	16.3
4350	15.9	4365	13	4392	10.1	4456	7.5	4559	8.3
4569	7.7	4587	8.5	4613	11.9	4632	15.5	4641	15.8
4652	14.5	4663	16.4	4690	16.3	4704	13.7	4733	13.6
4764	22.8	4770	22.1	4780	18.5	4790	13.4	4798	7.6
4807	7.4	4810	11.1	4845	7.4	4964	7.5	5141	7.6
5147	9.9	5153	13.4	5180	14	5185	15.7	5196	14.8
5287	14.4	5340	14.4	5427	14.6	5513	14.8	5600	15
5680	15	5760	15	5840	15	5920	15	6000	15
6060	14.7	6120	14.5	6200	15	6256	14.4	6312	13.8
6350	16.2	6366	16	6380	14	6455	13.9	6530	13.7
6599	13.9	6668	14	6716	16	6725	15	6742	16
6758	20	6822	22	6848	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3745	.045	4790	.045	5180	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4790	5180	325	325	325	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3745	4770		T
6060	6848		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6
3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8

4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6
4708	12.9	4727	12.4	4740	11	4763	7.7	4784	7.3
4823	7.1	4994	7.2	5165	7.2	5176	8.7	5184	12.4
5187	12.6	5212	12.8	5218	14.8	5230	14.2	5296	14.1
5326	14.2	5327	14.2	5400	14.5	5455	14.2	5510	14
5590	13.9	5670	13.8	5725	14	5780	14.2	5840	14
5900	13.8	5950	14	6000	14.2	6065	14	6130	13.8
6195	14.1	6260	14.3	6340	14	6420	13.8	6500	13.5
6563	13.7	6626	13.8	6648	13.3	6663	20.5	6666	20.5
6678	14.5	6701	14.5	6711	21.1	6733	20.7	6735	20.3
6780	21.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3877	.045	4727	.045	5184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4727	5184	265	265	265	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3877	4710		T
5830	6780		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.732

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3819	29.5	3837	29.1	3837	28.6	3856	28.8	3877	28.4
3877	28.9	3889	28.5	3904	28.6	3912	30.4	3929	29.3
3942	26.9	3949	25.1	3959	22	3967	20.7	3976	20.3
4012	16.6	4041	14.9	4118	12.9	4174	13	4214	13.8
4227	13.7	4277	15.2	4297	14.9	4320	16.8	4329	18.2
4368	13.3	4382	12.8	4405	10.2	4416	9.3	4425	9.2
4430	9.1	4445	10.3	4449	11	4454	11	4460	11.7
4488	11.7	4515	12.3	4541	11.5	4551	10.9	4560	9.3
4569	7.5	4649	7.5	4659	10.3	4695	18.2	4700	19
4714	22.1	4742	24.7	4758	22.5	4766	22.4	4780	18.3
4793	15.5	4818	11.5	4829	7.6	4854	7.2	4998	7.1
5171	7.1	5185	12.2	5211	12.3	5216	14.2	5250	13.9
5335	14	5365	13.5	5450	14.2	5525	13.9	5600	13.7
5675	13.4	5750	13.2	5827	13.5	5905	13.7	5982	14
6060	14.3	6148	14.1	6236	13.9	6324	13.8	6412	13.6
6500	13.4	6566	13.6	6628	13.2	6642	20	6645	20
6657	14	6679	14	6690	22.9	6713	22.2	6715	21.8
6760	22.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3819	.045	4793	.045	5185	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4793	5185	300	300	300	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3819	4740		T
5430	6760		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.675

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3836	28	3850	26	3887	25	3897	24.2	3898	24.7
3958	24.2	3984	19.6	3997	18.1	4011	17.3	4063	16
4077	15.9	4099	17.6	4104	17.7	4108	18.2	4160	15.5
4170	15.4	4210	13.9	4222	13	4235	12.7	4268	15
4279	15.5	4295	14	4310	11.7	4320	11	4334	10.6
4350	11.5	4373	12.2	4407	12.2	4458	9.7	4462	9.5
4482	9.1	4525	11.6	4633	13.4	4686	15.1	4707	17.2
4724	19.9	4733	22.1	4742	23	4755	21.8	4763	21.7
4782	16.1	4787	15.4	4806	14.6	4840	11.7	4852	11.6
4862	10.7	4873	7.3	4893	6.9	5018	6.8	5119	6.8
5139.2	8	5149.2	10	5159.5	11.8	5171.6	12	5185.6	12
5202.4	12.2	5204	12	5219	13	5228	13.4	5346	13.4
5370	13.3	5450	14.3	5533	13.9	5616	13.4	5700	13
5782	13.5	5865	14	5943	13.7	6021	13.3	6100	13
6186	13.4	6273	13.7	6360	14.1	6430	13.8	6500	13.5
6555	13.8	6610	14.1	6618	13.4	6630	19.4	6634	19.4
6645	13.4	6667	13.4	6681	24.1	6703	23.7	6705	23.3
6750	24.2	6758	24	6818	26	6822	28		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3836	.045	4787	.045	5171.6	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4787	5171.6	129.92	108	85.27	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3836	4745		T
5228	6822		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.65388*

INPUT
Description:
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4632.6	28	4635.23	27.63	4642.19	27.43	4642.2	27.43	4644.07	27.28
4644.25	27.38	4655.53	27.28	4660.42	26.42	4662.86	26.14	4662.88	26.14
4665.5	25.99	4675.27	25.75	4677.9	25.73	4682.04	26.05	4682.05	26.05
4682.98	26.07	4683.73	26.16	4693.5	25.65	4695.38	25.63	4702.9	25.35
4705.15	25.18	4707.6	25.12	4713.8	25.55	4715.87	25.65	4718.88	25.37
4721.7	24.93	4723.58	24.8	4726.2	24.73	4729.22	24.9	4729.23	24.9
4733.54	25.03	4733.55	25.03	4739.93	25.03	4749.52	24.56	4749.53	24.56
4750.27	24.52	4750.28	24.52	4754.03	24.45	4762.1	24.92	4782.41	25.25
4782.43	25.25	4792.37	25.58	4796.32	25.97	4796.33	25.97	4799.52	26.48
4799.53	26.48	4801.21	26.89	4802.9	27.06	4805.34	26.83	4805.36	26.83
4806.85	26.82	4806.86	26.82	4810.42	25.77	4810.43	25.77	4811.36	25.63
4817.13	24.01	4827.47	20.84	4831.12	19.89	4834.16	18.95	4837.5	17.46

4843.58	15.84	4881.58	6.15	4925.35	6.15	4969.11	6.15	5012.88	6.15
5056.65	6.15	5100.4	6.15	5144.17	6.15	5155.15	12.05	5162.1	12.14
5167.5	12.37	5170.97	14.31	5180.11	19.39	5190.85	25	5193.47	25
5196.62	25.03	5196.64	25.03	5196.92	25	5196.94	25	5199.75	25.18
5201.45	25.25	5223.62	25.25	5228.14	25.23	5243.17	25.42	5258.77	25.35
5274.37	25.25	5290.17	25.18	5305.57	25.27	5305.58	25.27	5321.17	25.37
5321.19	25.37	5335.85	25.31	5350.5	25.23	5350.51	25.23	5365.35	25.18
5365.36	25.18	5381.52	25.25	5397.87	25.31	5414.22	25.38	5427.37	25.33
5427.39	25.33	5440.55	25.27	5450.87	25.33	5450.88	25.33	5461.22	25.38
5462.72	25.25	5464.97	26.38	5465.72	26.38	5465.73	26.38	5467.8	25.26
5471.92	25.25	5471.94	25.26	5474.57	27.27	5478.7	27.19	5479.07	27.12
5487.52	27.28	5487.54	27.28	5489.04	27.25	5500.32	27.62	5501.07	28

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4632.6	.045	4811.36	.04	5190.85	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4811.36	5190.85	18.05	15	11.84	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.65095

INPUT
Description:
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4743.24	28	4744.29	27.85	4747.08	27.77	4747.83	27.71	4747.9	27.75
4752.41	27.71	4754.37	27.37	4755.35	27.26	4756.4	27.2	4760.31	27.1
4761.36	27.09	4763.02	27.22	4763.39	27.23	4763.69	27.26	4767.6	27.06
4768.35	27.05	4771.36	26.94	4772.26	26.87	4773.24	26.85	4775.72	27.02
4776.55	27.06	4777.75	26.95	4778.88	26.77	4779.63	26.72	4780.68	26.69
4781.89	26.76	4783.62	26.81	4786.17	26.81	4790.01	26.62	4790.31	26.61
4791.81	26.58	4795.04	26.77	4803.17	26.9	4807.15	27.03	4808.73	27.19
4810.01	27.39	4810.68	27.56	4811.36	27.62	4812.34	27.53	4812.94	27.53
4814.37	27.11	4814.74	27.05	4818.68	25.32	4825.73	22.11	4828.22	21.04
4830.29	20.09	4832.57	18.87	4836.72	17.08	4855.58	9.06	4909.85	9.06
4918.85	6.06	4940.85	6.06	4949.85	9.06	4984.13	9.06	4993.13	6.06
5015.13	6.06	5024.13	9.06	5058.35	9.06	5067.35	6.06	5089.35	6.06
5098.35	9.06	5152.56	9.06	5158.45	12.68	5165.28	12.72	5170.59	12.81
5173.99	14.91	5182.97	20.44	5193.52	26.8	5194.57	26.8	5195.83	26.81
5195.95	26.8	5197.08	26.87	5197.76	26.9	5206.63	26.9	5208.44	26.89
5214.45	26.97	5233.25	26.87	5245.65	26.95	5257.38	26.89	5263.32	26.87
5282.87	26.95	5293.4	26.91	5301.67	26.95	5302.27	26.9	5303.17	27.35
5303.47	27.35	5304.3	26.9	5305.95	26.9	5307.01	27.71	5308.66	27.68
5308.81	27.65	5312.19	27.71	5312.8	27.7	5317.31	27.85	5317.61	28

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4743.24	.045	4814.74	.04	4909.85	.04	4949.85	.04	4984.13	.04
5024.13	.04	5058.35	.04	5098.35	.04	5193.52	.035		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4814.74	5193.52	32.03	30	27.89	.1	.3

BRIDGE

RIVER: RIVER-1
REACH: Reach-1 RS: 2.650

INPUT
Description:
Distance from Upstream XS = .01
Deck/Roadway Width = 29.9
Weir Coefficient = 3
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4814.74	12.06	9.06	5193.52	12.06	9.06

Upstream Bridge Cross Section Data
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4743.24	28	4744.29	27.85	4747.08	27.77	4747.83	27.71	4747.9	27.75
4752.41	27.71	4754.37	27.37	4755.35	27.26	4756.4	27.2	4760.31	27.1
4761.36	27.09	4763.02	27.22	4763.39	27.23	4763.69	27.26	4767.6	27.06
4768.35	27.05	4771.36	26.94	4772.26	26.87	4773.24	26.85	4775.72	27.02
4776.55	27.06	4777.75	26.95	4778.88	26.77	4779.63	26.72	4780.68	26.69
4781.89	26.76	4783.62	26.81	4786.17	26.81	4790.01	26.62	4790.31	26.61
4791.81	26.58	4795.04	26.77	4803.17	26.9	4807.15	27.03	4808.73	27.19
4810.01	27.39	4810.68	27.56	4811.36	27.62	4812.34	27.53	4812.94	27.53
4814.37	27.11	4814.74	27.05	4818.68	25.32	4825.73	22.11	4828.22	21.04
4830.29	20.09	4832.57	18.87	4836.72	17.08	4855.58	9.06	4909.85	9.06
4918.85	6.06	4940.85	6.06	4949.85	9.06	4984.13	9.06	4993.13	6.06
5015.13	6.06	5024.13	9.06	5058.35	9.06	5067.35	6.06	5089.35	6.06
5098.35	9.06	5152.56	9.06	5158.45	12.68	5165.28	12.72	5170.59	12.81
5173.99	14.91	5182.97	20.44	5193.52	26.8	5194.57	26.8	5195.83	26.81
5195.95	26.8	5197.08	26.87	5197.76	26.9	5206.63	26.9	5208.44	26.89
5214.45	26.97	5233.25	26.87	5245.65	26.95	5257.38	26.89	5263.32	26.87
5282.87	26.95	5293.4	26.91	5301.67	26.95	5302.27	26.9	5303.17	27.35
5303.47	27.35	5304.3	26.9	5305.95	26.9	5307.01	27.71	5308.66	27.68
5308.81	27.65	5312.19	27.71	5312.8	27.7	5317.31	27.85	5317.61	28

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4743.24	.045	4814.74	.04	4909.85	.04	4949.85	.04	4984.13	.04
5024.13	.04	5058.35	.04	5098.35	.04	5193.52	.035		

Bank Sta: Left	Right	Coeff Contr.	Expan.
4814.74	5193.52	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4817	12	9	5160.65	12	9

Downstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4817	28	4845.5	9	4872.06	9	4881.06	6	4903.06	6
4912.06	9	4986.15	9	4995.15	6	5017.15	6	5026.15	9
5060.33	9	5090.02	9	5099.02	6	5121.02	6	5130.02	9
5154.5	9	5160.65	13.1	5172.65	13.1	5195.3	28		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4817	.03	4872.06	.03	4912.06	.03	4986.15	.03	5026.15	.03
5060.33	.03	5090.02	.03	5130.02	.03				

Bank Sta: Left	Right	Coeff Contr.	Expan.
4817	5195.3	.3	.5

Blocked Obstructions num= 2

```
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins           =   12.06
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =       .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.649

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4817      28  4845.5       9 4872.06       9 4881.06       6 4903.06       6
 4912.06       9 4986.15       9 4995.15       6 5017.15       6 5026.15       9
 5060.33       9 5090.02       9 5099.02       6 5121.02       6 5130.02       9
  5154.5       9 5160.65    13.1 5172.65    13.1  5195.3      28

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4817     .03 4872.06     .03 4912.06     .03 4986.15     .03 5026.15     .03
 5060.33     .03 5090.02     .03 5130.02     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4817  5195.3             93.8    93.8    93.8             .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

BRIDGE


RIVER: RIVER-1
REACH: Reach-1            RS: 2.637

INPUT
```



```
Description:
Distance from Upstream XS =      .01
Deck/Roadway Width        =    93.78
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4817      12       9  5195.3      12       9

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4817      28  4845.5       9 4872.06       9 4881.06       6 4903.06       6
 4912.06       9 4986.15       9 4995.15       6 5017.15       6 5026.15       9
 5060.33       9 5090.02       9 5099.02       6 5121.02       6 5130.02       9
  5154.5       9 5160.65    13.1 5172.65    13.1  5195.3      28

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4817     .03 4872.06     .03 4912.06     .03 4986.15     .03 5026.15     .03
 5060.33     .03 5090.02     .03 5130.02     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4817  5195.3            .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4827    11.9     8.9    5179    11.9     8.9

Downstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4827      28 4855.52     8.9  4876.5     8.9  4885.5     5.9  4907.5     5.9
  4916.5     8.9    4983     8.9    4992     5.9    5014     5.9    5023     8.9
 5053.72     8.9 5085.52     8.9 5094.52     5.9 5116.52     5.9 5125.52     8.9
 5144.44     8.9  5150.5      13  5162.5      13    5179      28

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4827     .03  4876.5     .03  4916.5     .03    4983     .03    5023     .03
 5053.72     .03 5085.52     .03 5125.52     .03 5144.44     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820              T
    5200    5179              T
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins           =      12
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested
```

```
Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =       .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.625

INPUT
Description: Revised
Station Elevation Data     num=      19
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
    4827       28 4855.52      8.9  4876.5      8.9  4885.5      5.9  4907.5      5.9
  4916.5      8.9    4983      8.9    4992      5.9    5014      5.9    5023      8.9
 5053.72      8.9 5085.52      8.9 5094.52      5.9 5116.52      5.9 5125.52      8.9
 5144.44      8.9  5150.5       13  5162.5       13    5179       28

Manning's n Values         num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4827     .03  4876.5     .03  4916.5     .03    4983     .03    5023     .03
 5053.72     .03 5085.52     .03 5125.52     .03 5144.44     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4827    5179             25.1      30   35.99              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820               T
    5200    5179               T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

BRIDGE


RIVER: RIVER-1
REACH: Reach-1            RS: 2.624

INPUT
Description:
Distance from Upstream XS =      .01
Deck/Roadway Width        =    29.98
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       2
```



```
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4827    11.9     8.9    5179    11.9     8.9

Upstream Bridge Cross Section Data
Station Elevation Data     num=      19
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
    4827       28 4855.52      8.9  4876.5      8.9  4885.5      5.9  4907.5      5.9
  4916.5      8.9    4983      8.9    4992      5.9    5014      5.9    5023      8.9
 5053.72      8.9 5085.52      8.9 5094.52      5.9 5116.52      5.9 5125.52      8.9
 5144.44      8.9  5150.5       13  5162.5       13    5179       28

Manning's n Values         num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4827     .03  4876.5     .03  4916.5     .03    4983     .03    5023     .03
 5053.72     .03 5085.52     .03 5125.52     .03 5144.44     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820               T
    5200    5179               T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
  4852.1   11.65    8.65 5177.82   11.65    8.65

Downstream Bridge Cross Section Data
Station Elevation Data     num=      68
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
 4545.46    29.09 4567.69    26.96 4574.69    27.78 4587.66    26.69 4599.67    26.34
 4607.41    26.23 4652.36    25.66 4655.82     25.6  4661.7    25.52 4707.41    25.36
 4709.37    25.82 4711.71    26.37    4714    26.91 4716.35    27.46 4718.66       28
 4719.31    28.16 4733.29    28.22 4734.68    28.14 4751.62    28.47 4752.71    28.68
  4755.9    28.74 4757.02     28.6 4775.62    28.74 4777.64    28.84 4785.59    29.09
 4795.81    29.23 4797.99    29.09 4801.69    28.54 4805.45       28 4809.38    27.46
 4813.24    26.91  4831.3    27.24 4841.79    27.24 4841.85    25.12  4852.1    19.38
 4881.52     8.65  4907.9     8.65 4918.85     5.65 4940.85     5.65  4951.8     8.65
 5000.22     8.65 5011.17     5.65 5033.17     5.65 5044.12     8.65 5074.19     8.65
 5083.19     5.65 5105.19     5.65 5114.19     8.65 5125.82     8.65 5165.15     8.65
 5165.82    10.64  5168.7    10.69 5177.82    15.93 5188.24    16.09 5202.56    27.24
 5210.63    26.28 5259.01    25.38 5317.52    25.17 5392.03    25.14 5439.67    25.22
 5484.38    25.25  5522.3    25.41 5554.66    25.96 5580.95    26.72 5585.55    26.88
 5596.39    27.37 5596.56     27.4 5599.28     27.4

Manning's n Values         num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 4545.46    .045 4841.79     .04  4907.9     .04  4951.8     .04 5000.22     .04
 5044.12     .04 5074.19     .04 5165.15     .04 5202.56    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       4841.79 5202.56              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 4545.464836.617               T
 5217.84 5599.28               T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
```

```
Maximum allowable submergence for weir flow =      .98
Elevation at which weir flow begins         =     11.9
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
      Pressure and Weir flow
          Submerged Inlet Cd          =
          Submerged Inlet + Outlet Cd =       .8
          Max Low Cord                =

Additional Bridge Parameters
      Add Friction component to Momentum
      Do not add Weight component to Momentum
      Class B flow critical depth computations use critical depth
          inside the bridge at the upstream end
      Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.622

INPUT
Description:
Station Elevation Data    num=      68
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 4545.46   29.09 4567.69   26.96 4574.69   27.78 4587.66   26.69 4599.67   26.34
 4607.41   26.23 4652.36   25.66 4655.82    25.6  4661.7   25.52 4707.41   25.36
 4709.37   25.82 4711.71   26.37    4714   26.91 4716.35   27.46 4718.66      28
 4719.31   28.16 4733.29   28.22 4734.68   28.14 4751.62   28.47 4752.71   28.68
  4755.9   28.74 4757.02    28.6 4775.62   28.74 4777.64   28.84 4785.59   29.09
 4795.81   29.23 4797.99   29.09 4801.69   28.54 4805.45      28 4809.38   27.46
 4813.24   26.91  4831.3   27.24 4841.79   27.24 4841.85   25.12  4852.1   19.38
 4881.52    8.65  4907.9    8.65 4918.85    5.65 4940.85    5.65  4951.8    8.65
 5000.22    8.65 5011.17    5.65 5033.17    5.65 5044.12    8.65 5074.19    8.65
 5083.19    5.65 5105.19    5.65 5114.19    8.65 5125.82    8.65 5165.15    8.65
 5165.82   10.64  5168.7   10.69 5177.82   15.93 5188.24   16.09 5202.56   27.24
 5210.63   26.28 5259.01   25.38 5317.52   25.17 5392.03   25.14 5439.67   25.22
 5484.38   25.25  5522.3   25.41 5554.66   25.96 5580.95   26.72 5585.55   26.88
 5596.39   27.37 5596.56    27.4 5599.28    27.4

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 4545.46    .045 4841.79     .04  4907.9     .04  4951.8     .04 5000.22     .04
 5044.12     .04 5074.19     .04 5165.15     .04 5202.56    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4841.79 5202.56           10.34      15   20.69              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 4545.464836.617          T
 5217.84 5599.28          T

CROSS SECTION
```



```
RIVER: RIVER-1
REACH: Reach-1            RS: 2.61915*

INPUT
Description:
Station Elevation Data    num=      91
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 4278.18   30.12 4321.51   25.98 4335.16   27.57 4360.43   25.45 4383.85   24.76
 4398.93   24.55 4486.55   23.43 4486.56   23.43  4493.3   23.33 4493.31   23.33
 4504.77   23.17 4593.88   22.85  4597.7   23.75 4602.26   24.82 4606.72   25.88
 4611.29   26.94  4611.3   26.94 4615.81      28 4617.07   28.32 4644.32   28.43
 4647.03   28.27 4680.06   28.92 4682.18   29.33  4688.4   29.44 4690.58   29.17
 4726.84   29.44 4730.78   29.64 4746.28   30.12  4766.2   30.39 4770.44   30.12
 4777.66   29.06 4784.99      28 4792.64   26.94 4792.65   26.94 4800.18   25.88
 4835.38   26.51 4855.83   26.51 4855.91   22.49 4855.91   22.41 4868.98   15.83
 4878.83   13.38 4882.06   12.71 4882.92   12.45 4899.74    9.37 4915.13    6.55
 4916.55    6.53 4917.42    6.42 4934.23    5.97 4951.05    5.42 4951.69    5.42
 4964.11    5.42 4976.53    5.42 4976.54    5.42 4977.17    5.42 4989.61    5.42
 5002.03    5.42 5002.67    5.42 5009.14    6.44 5037.77    5.92 5043.81    7.04
 5073.59    8.11 5091.87    8.75 5101.21    9.08    5106     9.1 5126.39    9.18
 5133.01   10.25 5148.54   11.31 5163.79   12.37 5173.86   13.43 5183.79    14.5
 5186.95   14.81 5192.23   15.01 5195.95   15.14 5203.75   18.71 5212.67   19.03
 5224.93   26.51 5240.65   24.65 5240.66   24.65 5334.96    22.9 5449.03   22.48
 5594.27   22.42 5687.14   22.58 5774.29   22.64  5774.3   22.64 5848.21   22.95
  5911.3   24.02 5962.54    25.5 5971.52   25.82 5992.65   26.78 5992.97   26.83
 5998.28   26.83

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4278.18     .03 4855.83     .04 5224.93     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4855.83 5224.93           18.76    27.2   37.52              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 4278.184852.393          T
 5234.781 5998.28         T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.614

INPUT
Description: This is a REPEATED section.
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  3793.5      32  3875.1    24.2  3900.8    27.2  3948.4    23.2  3992.5    21.9
  4020.9    21.5  4185.9    19.4  4198.6    19.2  4220.2    18.9    4388    18.3
  4395.2      20  4403.8      22  4412.2      24  4420.8      26  4429.3      28
  4431.7    28.6    4483    28.8  4488.1    28.5  4550.3   29.74  4554.3    30.5
    4566    30.7  4570.1    30.2  4638.4    30.7  4645.8    31.1    4675      32
  4712.5    32.5  4720.5      32  4734.1      30  4747.9      28  4762.3      26
  4776.5      24  4842.8    25.2  4881.3    25.2  4881.4    17.5  4899.6     9.4
  4913.3       8  4917.8     7.8    4919     7.6  4942.4     7.3  4965.8       7
    4967     6.8  4990.4       6  5013.8       5    5015       5  5038.4       5
  5061.8       5    5063       5  5086.4       5  5109.8       5    5111       5
  5115.5     6.9  5135.4     5.9  5139.6       8  5160.3      10  5179.5    11.8
    5197      12  5201.6      14  5212.4      16    5223      18    5230      20
  5236.9      22  5239.1    22.6  5265.5    25.2  5295.1    21.7  5472.7    18.4
```

5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.03	5265.5	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5265.5	27	27	27	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

BRIDGE

RIVER: RIVER-1
REACH: Reach-1 RS: 2.6115

INPUT
Description: Existing Bridge
Distance from Upstream XS = .1
Deck/Roadway Width = 26.8
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Upstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5
4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7

4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5
5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4
5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.03	5265.5	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
4881.3	5265.5	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

Downstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Downstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5
4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7
4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5
5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4
5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5

```
   6558    20.5  6654.5    23.3  6671.4    23.9  6711.2    25.7  6711.8    25.8
  6721.8    25.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  3793.5     .03  4881.3     .04  5265.5     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
        4881.3  5265.5            .3        .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
  3793.5    4881              T
  5265.5  6721.8              T

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow   =     .95
Elevation at which weir flow begins           =    17.6
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  7

Pier Data
Pier Station     Upstream=  4918.4    Downstream=  4918.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  4918.4    Downstream=  4918.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  4966.4    Downstream=  4966.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  5014.4    Downstream=  5014.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  5062.4    Downstream=  5062.4
Upstream     num=       2
```



```
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  5110.4    Downstream=  5110.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  5158.4    Downstream=  5158.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
      Energy Only

Additional Bridge Parameters
      Add Friction component to Momentum
      Do not add Weight component to Momentum
      Class B flow critical depth computations use critical depth
         inside the bridge at the upstream end
      Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.609

INPUT
Description:
Station Elevation Data    num=      76
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
  3793.5       32  3875.1    24.2  3900.8    27.2  3948.4    23.2  3992.5    21.9
  4020.9     21.5  4185.9    19.4  4198.6    19.2  4220.2    18.9    4388    18.3
  4395.2       20  4403.8      22  4412.2      24  4420.8      26  4429.3      28
  4431.7     28.6    4483    28.8  4488.1    28.5  4550.3   29.74  4554.3    30.5
    4566     30.7  4570.1    30.2  4638.4    30.7  4645.8    31.1    4675      32
  4712.5     32.5  4720.5      32  4734.1      30  4747.9      28  4762.3      26
  4776.5       24  4842.8    25.2  4881.3    25.2  4881.4    17.5  4899.6     9.4
  4913.3        8  4917.8     7.8    4919     7.6  4942.4     7.3  4965.8       7
    4967      6.8  4990.4       6  5013.8       5    5015       5  5038.4       5
  5061.8        5    5063       5  5086.4       5  5109.8       5    5111       5
  5115.5      6.9  5135.4     5.9  5139.6       8  5160.3      10  5179.5    11.8
    5197       12  5201.6      14  5212.4      16    5223      18    5230      20
  5236.9       22  5239.1    22.6  5265.5    25.2  5295.1    21.7  5472.7    18.4
```

5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5265.5	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5265.5	100	100	90	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.59

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4345.5	26	4354.4	24	4363.1	22	4372.1	20	4393.8	18.1
4404.3	16	4422.7	14	4594.7	14	4642.3	11	4773	10.89
4774.2	11	4806.4	21.5	4816.4	21.5	4821	20	4836	15
4848	11	4848.3	10.57	4897.7	10.1	4898	10	4962	8
5000	8	5016	6	5025	5	5100	5	5120	6
5133.3	6.2	5144.5	8	5173.2	10	5202.4	11.8	5208	10
5232	12	5316	12.4	5401	12.8	5485	13.2	5570	13.6
5655	14	5720	14	5775	15	5830	16	5891	17
5953	18	5960	16	5980	15.5	6010	16	6017	18.5
6027	16	6100	14	6155	15	6210	16	6278	16.7
6346	17.3	6415	18	6455	22	6475	24		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4345.5	.035	4594.7	.04	4806.4	.04	4898	.04	5202.4	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4898	5173.2	345	345	340	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4345.5	4806.4		T
5202.4	6475		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.524

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3871	23	3885	22	3891	20	3904	16	4004	15.5
4006	15	4024	11	4632	10.17	4634	11	4666	21.5
4676	21.5	4702	13	4712	9.8	4886	8	4897	6
4919	5.6	4934	6	4964	8	4969	8	4987	6
5000	5.5	5013	6	5030	4.5	5085	4.5	5140	4.5

5150	6	5175	8	5250	10	5320	11	5390	12
5460	12.2	5530	12.3	5600	12.5	5686	12.7	5773	12.8
5859	13	5946	13.2	6033	13.3	6120	13.5	6130	14
6140	16	6146	14	6200	14	6275	15	6350	16
6373	18	6430	28						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3871	.035	4004	.04	4666	.04	4886	.04	5320	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4712	5320	450	450	450	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3871	4676		T
5320	6430		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.439

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3692	20.5	3705	20	3711	18	3718	16	3871	14
4186	14	4204	10	4678	9.5	4715	21.5	4725	21.5
4754	12	4755	11.8	4760	10.1	4964	8	5000	6
5050	4.9	5115	3.8	5120	4	5152	8	5204	9
5256	10	5320	10.7	5384	11.3	5448	12	5519	12
5590	12	5662	12	5685	18	5730	18	5740	16
5760	15.3	5834	15.5	5908	15.8	5982	16	6003	20
6027	22	6037	27						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3692	.035	4186	.04	4725	.04	4964	.04	5256	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4760	5256	520	520	520	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3692	4725		T
5500	6037		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.341

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3449.9	23	3455	22.6	3470	22	3475	20	3480	18
3485	16	3490	14	3495	13.52	3498	13.1	3511	12.6
3518	12.6	3705	13	3903	13.4	4177	12.4	4442	12.2
4514	12	4522	12	4527	11.35	4540	11.45	4545	12
4548	12	4606	12	4662	12	4665	11	4668	10
4671	9	4853	8.5	4966	8	4968	6	4970	4

5000	4	5025	4	5050	3.3	5110	6	5147	10
5229	10.5	5312	11	5394	11.5	5477	12	5496	14
5508	16	5591	16	5674	16	5757	16	5840	16
5855	16	5885	34						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3449.9	.035	4662	.04	4966	.035	5147	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4671	5147	550	580	600	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3449.9	4545		T
5560	5885		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.231

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3413	.035	4644	.035	5355	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4644	5355	300	400	430	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3413	3970		T
5900	5900		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.155

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5
4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4
5175	2.5	5200	2.5	5222	4	5238	8	5250	10

5300	9.9	5350	9.8	5415	10.5	5480	11.3	5545	12
5626	13	5708	14	5722	16	5803	18	5834	26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3422	.035	4728	.035	5250	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4728	5250	330	500	450	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.06

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3622	30	3666	14	3743	13.7	3821	13.3	3899	13
3976	12.7	4054	12.3	4132	12	4186	11.2	4240	10.5
4330	11.1	4420	11.7	4501	11.4	4582	11	4663	10.7
4744	10.3	4825	10	4897	4	4958	2	4974	2
5035	4	5058	10	5114	10.2	5170	10.5	5230	10.2
5290	10	5370	9.6	5450	9.2	5530	9.6	5610	10
5665	11	5720	12	5781	15.3	5843	18.7	5905	22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3622	.035	4825	.035	5058	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4825	5058	480	430	330	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 1.979

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3516	30	3572	14	3588	12.3	3668	12.2	3749	12.2
3830	12.1	3911	12.1	3992	12	4069	11.6	4146	11.2
4223	10.9	4300	10.5	4384	11	4468	11.5	4553	12
4626	12.4	4700	12.7	4776	12.4	4852	12	4863	4
4890	3	4933	4	4993	5	5053	6	5101	7
5150	8	5202	9	5254	10	5302	10.2	5350	10.5
5405	10.4	5460	10.4	5507	10.1	5555	9.8	5568	10
5619	9.5	5670	9	5693	10	5759	11	5826	12
5878	14	5930	16	6000	20.7	6070	25.3	6140	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3516	.035	4852	.035	5150	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4852	5150	400	400	400	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Reach-1	12	.045	.045	.035						
Reach-1	11.	.045	.045	.035						
Reach-1	10.	.045	.045	.035						
Reach-1	9.	.045	.045	.035						
Reach-1	8.	.045	.045	.035						
Reach-1	7.	.045	.045	.035						
Reach-1	6.	.045	.045	.035						
Reach-1	5.	.045	.045	.035						
Reach-1	4.	.045	.045	.035						
Reach-1	3.	.045	.045	.035						
Reach-1	2.844	.045	.045	.035						
Reach-1	2.782	.045	.045	.035						
Reach-1	2.732	.045	.045	.035						
Reach-1	2.675	.045	.045	.035						
Reach-1	2.65388*	.045	.04	.035						
Reach-1	2.65095	.045	.04	.04	.04	.04	.04	.04	.04	.035
Reach-1	2.650	Bridge								
Reach-1	2.649	.03	.03	.03	.03	.03	.03	.03	.03	
Reach-1	2.637	Bridge								
Reach-1	2.625	.03	.03	.03	.03	.03	.03	.03	.03	.03
Reach-1	2.624	Bridge								
Reach-1	2.622	.045	.04	.04	.04	.04	.04	.04	.04	.035
Reach-1	2.61915*	.03	.04	.03						
Reach-1	2.614	.03	.03	.03						
Reach-1	2.6115	Bridge								
Reach-1	2.609	.03	.04	.03						
Reach-1	2.59	.035	.04	.04	.04	.035				
Reach-1	2.524	.035	.04	.04	.04	.035				
Reach-1	2.439	.035	.04	.04	.04	.035				
Reach-1	2.341	.035	.04	.035	.035					
Reach-1	2.231	.035	.035	.035						
Reach-1	2.155	.035	.035	.035						
Reach-1	2.06	.035	.035	.035						
Reach-1	1.979	.035	.035	.035						

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	12	49.32	48	73.57
Reach-1	11.	347.68	339	548.49
Reach-1	10.	585.6	450	556.91
Reach-1	9.	1127.52	452	287.85
Reach-1	8.	806.85	444	387.93
Reach-1	7.	692.7	497	459.02
Reach-1	6.	642.39	511	528.63

Reach-1	5.	578.02	495	791.59
Reach-1	4.	537.07	495	500.63
Reach-1	3.	715	765	795
Reach-1	2.844	325	325	325
Reach-1	2.782	265	265	265
Reach-1	2.732	300	300	300
Reach-1	2.675	129.92	108	85.27
Reach-1	2.65388*	18.05	15	11.84
Reach-1	2.65095	32.03	30	27.89
Reach-1	2.650	Bridge		
Reach-1	2.649	93.8	93.8	93.8
Reach-1	2.637	Bridge		
Reach-1	2.625	25.1	30	35.99
Reach-1	2.624	Bridge		
Reach-1	2.622	10.34	15	20.69
Reach-1	2.61915*	18.76	27.2	37.52
Reach-1	2.614	27	27	27
Reach-1	2.6115	Bridge		
Reach-1	2.609	100	100	90
Reach-1	2.59	345	345	340
Reach-1	2.524	450	450	450
Reach-1	2.439	520	520	520
Reach-1	2.341	550	580	600
Reach-1	2.231	300	400	430
Reach-1	2.155	330	500	450
Reach-1	2.06	480	430	330
Reach-1	1.979	400	400	400

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

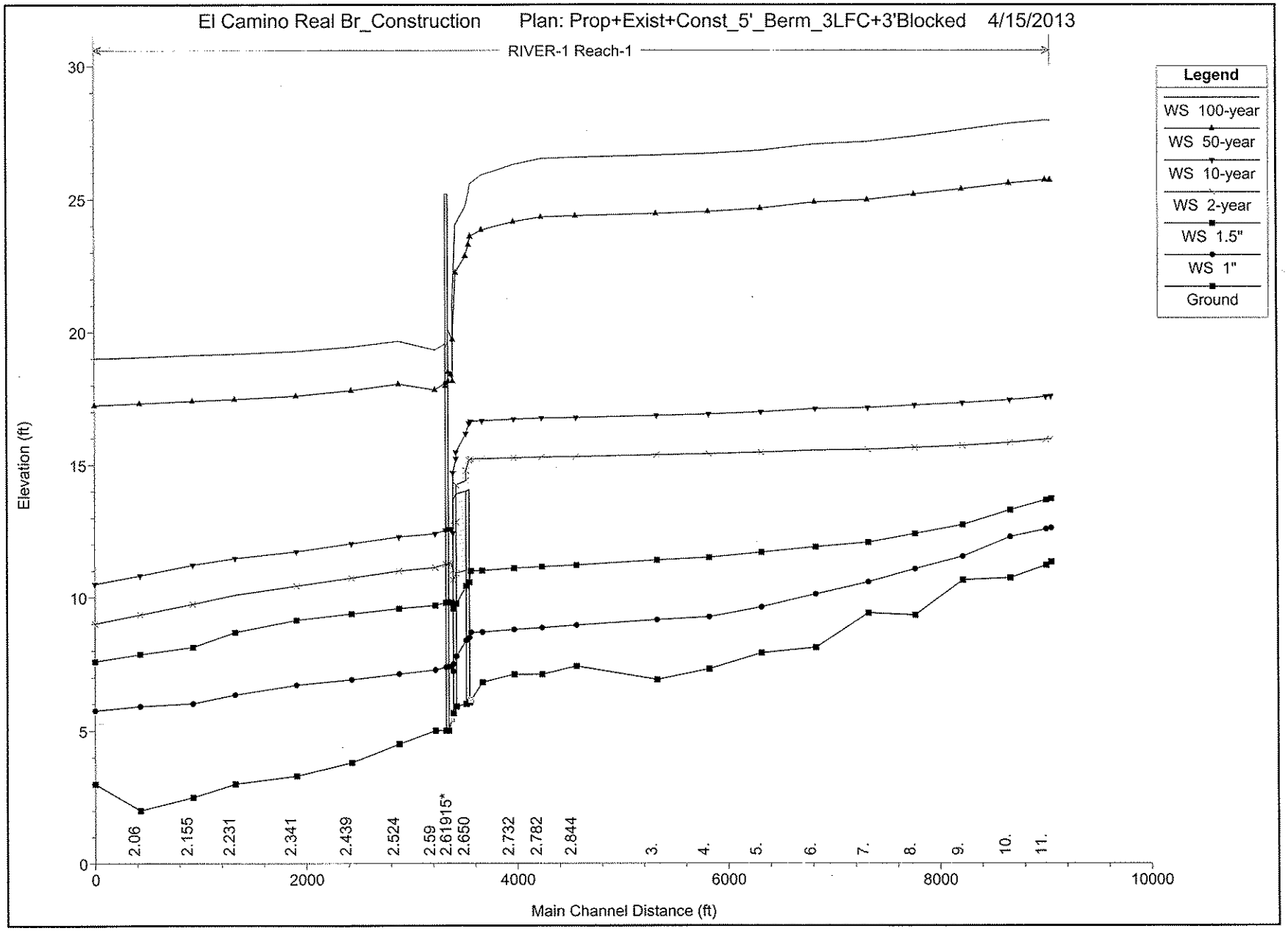
Reach	River Sta.	Contr.	Expan.
Reach-1	12	.1	.3
Reach-1	11.	.1	.3
Reach-1	10.	.1	.3
Reach-1	9.	.1	.3
Reach-1	8.	.1	.3
Reach-1	7.	.1	.3
Reach-1	6.	.1	.3
Reach-1	5.	.1	.3
Reach-1	4.	.1	.3
Reach-1	3.	.1	.3
Reach-1	2.844	.1	.3
Reach-1	2.782	.1	.3
Reach-1	2.732	.1	.3
Reach-1	2.675	.1	.3
Reach-1	2.65388*	.1	.3
Reach-1	2.65095	.1	.3
Reach-1	2.650	Bridge	
Reach-1	2.649	.3	.5
Reach-1	2.637	Bridge	
Reach-1	2.625	.3	.5
Reach-1	2.624	Bridge	
Reach-1	2.622	.3	.5
Reach-1	2.61915*	.3	.5
Reach-1	2.614	.3	.5
Reach-1	2.6115	Bridge	
Reach-1	2.609	.3	.5

Reach-1	2.59	.2	.4
Reach-1	2.524	.1	.3
Reach-1	2.439	.1	.3
Reach-1	2.341	.1	.3
Reach-1	2.231	.1	.3
Reach-1	2.155	.1	.3
Reach-1	2.06	.1	.3
Reach-1	1.979	.1	.3

ATTACHMENT 4

1.0-, 1.3-, 2-, 10-, 50- and 100-Year Construction Phase Condition HEC-RAS Analysis

Option 5 - Temporary Construction Berm


El Camino Real Br_Construction
Plan: Prop+Exist+Const_5'_Berm_3LFC+3'Blocked
4/15/2013
RIVER-1 Reach-1
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Elevation (ft)
Main Channel Distance (ft)
0
5
10
15
20
25
30
0
2000
4000
6000
8000
10000
2.06
2.155
2.231
2.341
2.439
2.524
2.59
2.61915*
2.650
2.732
2.782
2.844
3.
4.
5.
6.
7.
8.
9.
10.
11.

HEC-RAS Plan: 5'Fill_3'Block River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	12	100-year	42800.00	11.32	27.94		28.11	0.000307	3.63	13517.66	3125.63	0.16
Reach-1	12	50-year	32500.00	11.32	25.71		25.88	0.000364	3.57	10458.10	2603.87	0.17
Reach-1	12	10-year	5900.00	11.32	17.57		17.65	0.000446	2.21	2671.94	477.47	0.16
Reach-1	12	2-year	3450.00	11.32	15.96		16.01	0.000439	1.80	1921.12	458.51	0.15
Reach-1	12	1.5"	1624.00	11.32	13.72		13.77	0.001088	1.78	914.32	438.63	0.22
Reach-1	12	1"	426.00	11.32	12.61		12.62	0.000810	0.98	435.97	411.24	0.17
Reach-1	11.	100-year	42800.00	11.20	27.96		28.08	0.000236	3.19	15347.51	3240.55	0.14
Reach-1	11.	50-year	32500.00	11.20	25.72		25.85	0.000297	3.24	11818.95	2701.73	0.15
Reach-1	11.	10-year	5900.00	11.20	17.55		17.63	0.000435	2.18	2713.20	491.32	0.16
Reach-1	11.	2-year	3450.00	11.20	15.94		15.99	0.000431	1.77	1944.94	466.06	0.15
Reach-1	11.	1.5"	1624.00	11.20	13.66		13.71	0.001146	1.79	905.94	445.72	0.22
Reach-1	11.	1"	426.00	11.20	12.57		12.58	0.000935	1.00	424.19	427.54	0.18
Reach-1	10.	100-year	42800.00	10.72	27.83		27.98	0.000250	3.33	14067.83	3092.77	0.15
Reach-1	10.	50-year	32500.00	10.72	25.60		25.74	0.000277	3.18	11311.31	2682.74	0.15
Reach-1	10.	10-year	5900.00	10.72	17.44		17.50	0.000329	1.92	3088.18	578.56	0.14
Reach-1	10.	2-year	3450.00	10.72	15.83		15.87	0.000313	1.55	2225.37	518.70	0.13
Reach-1	10.	1.5"	1624.00	10.72	13.29		13.33	0.001092	1.70	952.70	487.76	0.21
Reach-1	10.	1"	426.00	10.72	12.27		12.28	0.000816	0.92	461.79	477.46	0.17
Reach-1	9.	100-year	42800.00	10.64	27.60		27.83	0.000358	4.03	11220.20	2353.86	0.18
Reach-1	9.	50-year	32500.00	10.64	25.39		25.58	0.000358	3.66	9365.33	2122.14	0.17
Reach-1	9.	10-year	5900.00	10.64	17.32		17.37	0.000235	1.69	3511.46	598.58	0.12
Reach-1	9.	2-year	3450.00	10.64	15.72		15.74	0.000223	1.35	2564.64	574.01	0.11
Reach-1	9.	1.5"	1624.00	10.64	12.73		12.78	0.001393	1.77	918.75	534.71	0.24
Reach-1	9.	1"	426.00	10.64	11.53		11.56	0.004465	1.49	285.17	511.90	0.35
Reach-1	8.	100-year	42800.00	9.32	27.35		27.65	0.000418	4.43	9933.68	1985.46	0.19
Reach-1	8.	50-year	32500.00	9.32	25.18		25.41	0.000385	3.88	8516.01	1837.42	0.18
Reach-1	8.	10-year	5900.00	9.32	17.24		17.28	0.000169	1.55	3799.43	554.99	0.10
Reach-1	8.	2-year	3450.00	9.32	15.64		15.67	0.000134	1.18	2926.74	539.78	0.09
Reach-1	8.	1.5"	1624.00	9.32	12.39		12.42	0.000504	1.33	1222.20	508.60	0.15
Reach-1	8.	1"	426.00	9.32	11.06		11.07	0.000479	0.77	551.05	497.62	0.13
Reach-1	7.	100-year	42800.00	9.40	27.16		27.46	0.000441	4.59	10123.72	2417.34	0.20
Reach-1	7.	50-year	32500.00	9.40	24.98		25.23	0.000433	4.15	8377.04	2304.47	0.19
Reach-1	7.	10-year	5900.00	9.40	17.15		17.19	0.000202	1.72	3456.27	1126.34	0.11

HEC-RAS Plan: 5'Fill_3'Block River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7.	2-year	3450.00	9.40	15.57		15.60	0.000162	1.30	2657.22	897.77	0.10
Reach-1	7.	1.5"	1624.00	9.40	12.07		12.11	0.001014	1.69	958.14	607.22	0.21
Reach-1	7.	1"	426.00	9.40	10.57		10.61	0.003602	1.55	274.52	489.69	0.33
Reach-1	6.	100-year	42800.00	8.10	27.06		27.27	0.000246	3.52	11927.83	2185.40	0.15
Reach-1	6.	50-year	32500.00	8.10	24.89		25.05	0.000230	3.12	10218.33	2107.43	0.14
Reach-1	6.	10-year	5900.00	8.10	17.11		17.13	0.000075	1.12	4836.42	1666.71	0.07
Reach-1	6.	2-year	3450.00	8.10	15.54		15.55	0.000054	0.82	3844.09	1514.49	0.06
Reach-1	6.	1.5"	1624.00	8.10	11.90		11.91	0.000202	0.88	1605.76	1115.03	0.10
Reach-1	6.	1"	426.00	8.10	10.11		10.12	0.000448	0.60	545.17	1038.58	0.12
Reach-1	5.	100-year	42800.00	7.90	26.83		27.11	0.000387	4.46	10329.26	2222.95	0.19
Reach-1	5.	50-year	32500.00	7.90	24.66		24.89	0.000399	4.15	8621.46	2172.72	0.18
Reach-1	5.	10-year	5900.00	7.90	16.98		17.06	0.000273	2.21	2844.18	1461.05	0.14
Reach-1	5.	2-year	3450.00	7.90	15.47		15.50	0.000186	1.59	2210.52	1010.52	0.11
Reach-1	5.	1.5"	1624.00	7.90	11.68		11.73	0.000705	1.77	917.32	723.74	0.18
Reach-1	5.	1"	426.00	7.90	9.62		9.66	0.002660	1.57	270.64	586.67	0.29
Reach-1	4.	100-year	42800.00	7.30	26.72		26.90	0.000235	3.53	12887.03	2867.34	0.14
Reach-1	4.	50-year	32500.00	7.30	24.54		24.68	0.000238	3.27	10822.39	2813.77	0.14
Reach-1	4.	10-year	5900.00	7.30	16.91		16.95	0.000148	1.70	3760.31	2312.33	0.10
Reach-1	4.	2-year	3450.00	7.30	15.41		15.43	0.000101	1.24	2816.88	1275.24	0.08
Reach-1	4.	1.5"	1624.00	7.30	11.50		11.52	0.000272	1.26	1289.53	689.13	0.12
Reach-1	4.	1"	426.00	7.30	9.25		9.27	0.000367	0.84	507.49	519.75	0.12
Reach-1	3.	100-year	42800.00	6.90	26.65		26.78	0.000171	3.06	14883.19	3006.58	0.12
Reach-1	3.	50-year	32500.00	6.90	24.46		24.57	0.000174	2.85	12483.55	2831.72	0.12
Reach-1	3.	10-year	5900.00	6.90	16.85		16.88	0.000117	1.57	4302.14	2503.77	0.09
Reach-1	3.	2-year	3450.00	6.90	15.37		15.39	0.000082	1.17	3014.80	1848.44	0.07
Reach-1	3.	1.5"	1624.00	6.90	11.39		11.41	0.000183	1.12	1451.29	799.21	0.10
Reach-1	3.	1"	426.00	6.90	9.14		9.15	0.000155	0.64	662.89	650.79	0.08
Reach-1	2.844	100-year	42800.00	7.40	26.57		26.66	0.000120	2.49	17645.76	2857.22	0.10
Reach-1	2.844	50-year	32500.00	7.40	24.37		24.45	0.000123	2.32	14810.45	2839.63	0.10
Reach-1	2.844	10-year	5900.00	7.40	16.77		16.79	0.000108	1.42	5039.82	2589.51	0.09
Reach-1	2.844	2-year	3450.00	7.40	15.29		15.32	0.000102	1.22	3163.60	2367.15	0.08
Reach-1	2.844	1.5"	1624.00	7.40	11.20		11.23	0.000315	1.33	1225.48	607.23	0.13
Reach-1	2.844	1"	426.00	7.40	8.94		8.95	0.000534	0.94	451.09	495.83	0.14

HEC-RAS Plan: 5'Fill_3'Block River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.782	100-year	42800.00	7.10	26.52		26.62	0.000119	2.56	16992.52	2826.60	0.10
Reach-1	2.782	50-year	32500.00	7.10	24.33		24.41	0.000115	2.32	14536.39	2819.72	0.10
Reach-1	2.782	10-year	5900.00	7.10	16.75		16.76	0.000060	1.12	6045.31	2643.45	0.07
Reach-1	2.782	2-year	3450.00	7.10	15.28		15.29	0.000047	0.89	4401.53	2593.07	0.06
Reach-1	2.782	1.5"	1624.00	7.10	11.14		11.16	0.000148	0.97	1670.28	758.42	0.09
Reach-1	2.782	1"	426.00	7.10	8.84		8.85	0.000192	0.63	677.89	542.91	0.09
Reach-1	2.732	100-year	42800.00	7.10	26.30		26.56	0.000312	4.08	10660.82	2815.67	0.17
Reach-1	2.732	50-year	32500.00	7.10	24.15		24.35	0.000291	3.63	9178.92	2798.03	0.16
Reach-1	2.732	10-year	5900.00	7.10	16.71		16.74	0.000108	1.48	4272.14	2533.99	0.09
Reach-1	2.732	2-year	3450.00	7.10	15.26		15.28	0.000075	1.10	3342.96	2459.38	0.07
Reach-1	2.732	1.5"	1624.00	7.10	11.09		11.11	0.000210	1.17	1388.73	535.19	0.11
Reach-1	2.732	1"	426.00	7.10	8.78		8.79	0.000274	0.75	566.35	440.94	0.10
Reach-1	2.675	100-year	42800.00	6.80	25.92		26.40	0.000636	5.59	7722.65	2962.35	0.24
Reach-1	2.675	50-year	32500.00	6.80	23.84		24.21	0.000574	4.88	6720.85	2757.49	0.22
Reach-1	2.675	10-year	5900.00	6.80	16.65		16.70	0.000174	1.76	3388.90	2490.21	0.11
Reach-1	2.675	2-year	3450.00	6.80	15.22		15.25	0.000116	1.27	2753.30	2361.57	0.09
Reach-1	2.675	1.5"	1624.00	6.80	11.00		11.03	0.000310	1.42	1139.70	400.76	0.13
Reach-1	2.675	1"	426.00	6.80	8.69		8.70	0.000337	0.88	482.31	274.12	0.12
Reach-1	2.65388*	100-year	42800.00	6.15	25.60	15.20	26.31	0.000799	6.76	6407.69	751.72	0.29
Reach-1	2.65388*	50-year	32500.00	6.15	23.60	13.77	24.13	0.000678	5.83	5574.12	369.72	0.26
Reach-1	2.65388*	10-year	5900.00	6.15	16.63	8.63	16.68	0.000134	1.89	3120.59	334.52	0.11
Reach-1	2.65388*	2-year	3450.00	6.15	15.21	7.89	15.24	0.000076	1.30	2652.12	326.54	0.08
Reach-1	2.65388*	1.5"	1624.00	6.15	10.99	7.20	11.01	0.000141	1.21	1337.68	290.56	0.10
Reach-1	2.65388*	1"	426.00	6.15	8.68	6.58	8.68	0.000086	0.63	681.51	277.19	0.07
Reach-1	2.65095	100-year	42800.00	6.06	25.22	18.11	26.26	0.001285	8.17	5235.63	372.00	0.38
Reach-1	2.65095	50-year	32500.00	6.06	23.29	16.76	24.09	0.001173	7.18	4524.21	364.55	0.36
Reach-1	2.65095	10-year	5900.00	6.06	16.56	12.08	16.67	0.000404	2.73	2157.23	338.72	0.19
Reach-1	2.65095	2-year	3450.00	6.06	15.17	10.75	15.23	0.000298	2.04	1689.76	333.18	0.16
Reach-1	2.65095	1.5"	1624.00	6.06	10.56	9.32	10.96	0.004943	5.12	316.93	110.95	0.53
Reach-1	2.65095	1"	426.00	6.06	8.48	7.62	8.66	0.004289	3.40	125.35	73.57	0.46
Reach-1	2.650		Bridge									

HEC-RAS Plan: 5'Fill_3'Block River: RIVER-1 Reach: Reach-1 (Continued)

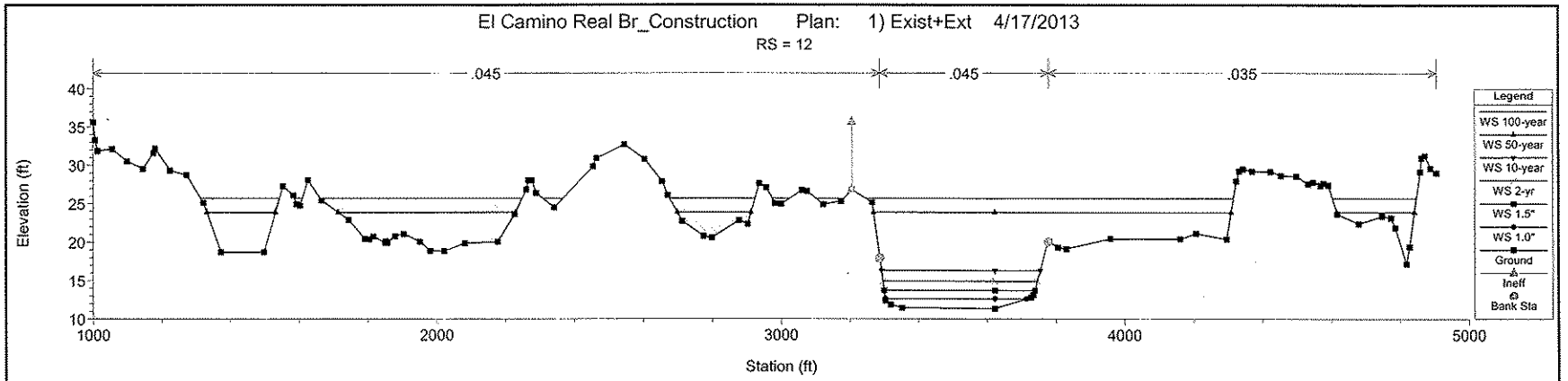
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.649	100-year	42800.00	6.00	24.73	18.14	25.90	0.001160	8.68	4930.88	354.42	0.41
Reach-1	2.649	50-year	32500.00	6.00	22.87	16.80	23.76	0.001027	7.60	4276.32	348.80	0.38
Reach-1	2.649	10-year	5900.00	6.00	16.16	12.01	16.30	0.000353	2.94	2006.45	328.56	0.21
Reach-1	2.649	2-year	3450.00	6.00	14.41	11.36	14.50	0.000352	2.41	1433.43	323.25	0.20
Reach-1	2.649	1.5"	1624.00	6.00	10.42	9.25	10.85	0.003000	5.27	308.16	109.51	0.55
Reach-1	2.649	1"	426.00	6.00	8.37	7.56	8.56	0.002625	3.50	121.59	72.64	0.48
Reach-1	2.637		Bridge									
Reach-1	2.625	100-year	42800.00	5.90	24.04	18.34	25.49	0.001509	9.66	4431.64	327.73	0.46
Reach-1	2.625	50-year	32500.00	5.90	22.24	16.90	23.35	0.001334	8.45	3845.93	323.07	0.43
Reach-1	2.625	10-year	5900.00	5.90	15.23	11.93	15.43	0.000617	3.59	1643.56	304.88	0.27
Reach-1	2.625	2-year	3450.00	5.90	12.83	10.64	13.05	0.001273	3.74	923.49	286.61	0.37
Reach-1	2.625	1.5"	1624.00	5.90	9.75	9.15	10.41	0.005340	6.52	249.15	99.35	0.73
Reach-1	2.625	1"	426.00	5.90	7.78	7.46	8.14	0.006409	4.83	88.24	63.85	0.72
Reach-1	2.624		Bridge									
Reach-1	2.622	100-year	42800.00	5.65	19.55		22.35	0.006843	13.41	3190.98	340.90	0.77
Reach-1	2.622	50-year	32500.00	5.65	18.15		20.37	0.006593	11.97	2715.89	335.41	0.74
Reach-1	2.622	10-year	5900.00	5.65	12.42		13.09	0.007399	6.56	899.88	300.53	0.67
Reach-1	2.622	2-year	3450.00	5.65	11.00	10.40	11.81	0.020397	7.24	476.67	294.14	1.00
Reach-1	2.622	1.5"	1624.00	5.65	9.57		10.19	0.008862	6.36	255.54	100.50	0.70
Reach-1	2.622	1"	426.00	5.65	7.21	7.21	7.81	0.023169	6.21	68.58	58.04	1.01
Reach-1	2.61915*	100-year	42800.00	5.42	19.85		21.89	0.004164	11.47	3731.31	353.01	0.62
Reach-1	2.61915*	50-year	32500.00	5.42	18.40		19.97	0.003683	10.07	3227.77	339.20	0.58
Reach-1	2.61915*	10-year	5900.00	5.42	12.56		12.85	0.001655	4.31	1368.48	283.07	0.35
Reach-1	2.61915*	2-year	3450.00	5.42	11.26		11.44	0.001355	3.40	1015.28	258.40	0.30
Reach-1	2.61915*	1.5"	1624.00	5.42	9.79		9.89	0.001113	2.47	657.11	232.77	0.26
Reach-1	2.61915*	1"	426.00	5.42	7.38		7.45	0.001948	2.08	204.68	142.81	0.31
Reach-1	2.614	100-year	40100.00	5.00	20.08	15.22	21.53	0.001430	9.65	4155.91	1763.48	0.49
Reach-1	2.614	50-year	32500.00	5.00	18.50	14.14	19.76	0.001466	9.01	3606.58	1370.09	0.49
Reach-1	2.614	10-year	5900.00	5.00	12.59	8.73	12.78	0.000513	3.49	1690.41	305.92	0.26
Reach-1	2.614	2-year	3450.00	5.00	11.28	7.85	11.39	0.000366	2.64	1305.09	278.56	0.22
Reach-1	2.614	1.5"	1624.00	5.00	9.80	6.87	9.85	0.000247	1.79	908.42	259.59	0.17
Reach-1	2.614	1"	426.00	5.00	7.39	5.81	7.41	0.000343	1.28	333.94	202.73	0.18

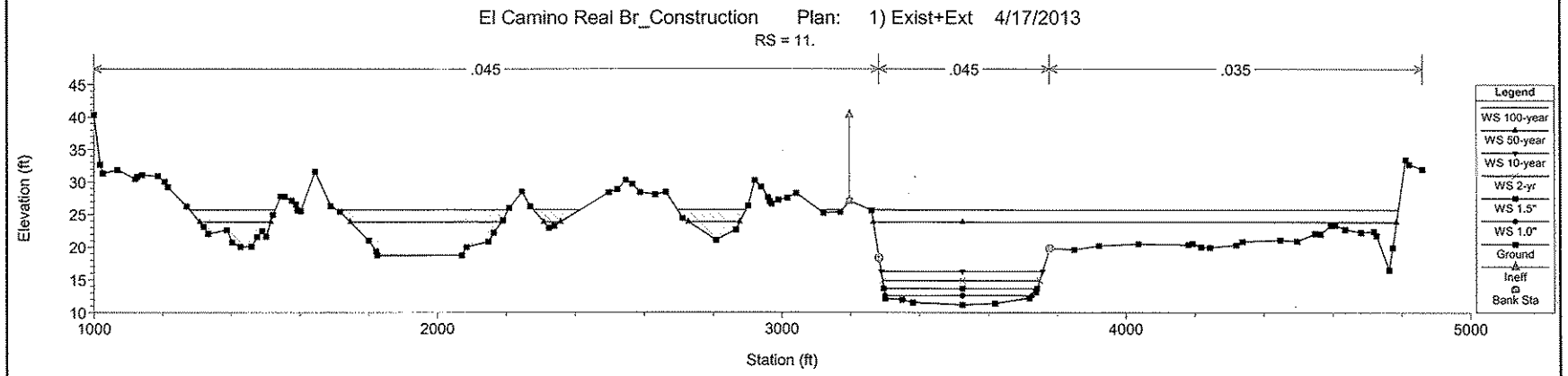
HEC-RAS Plan: 5'Fill_3'Block River: RIVER-1 Reach: Reach-1 (Continued)

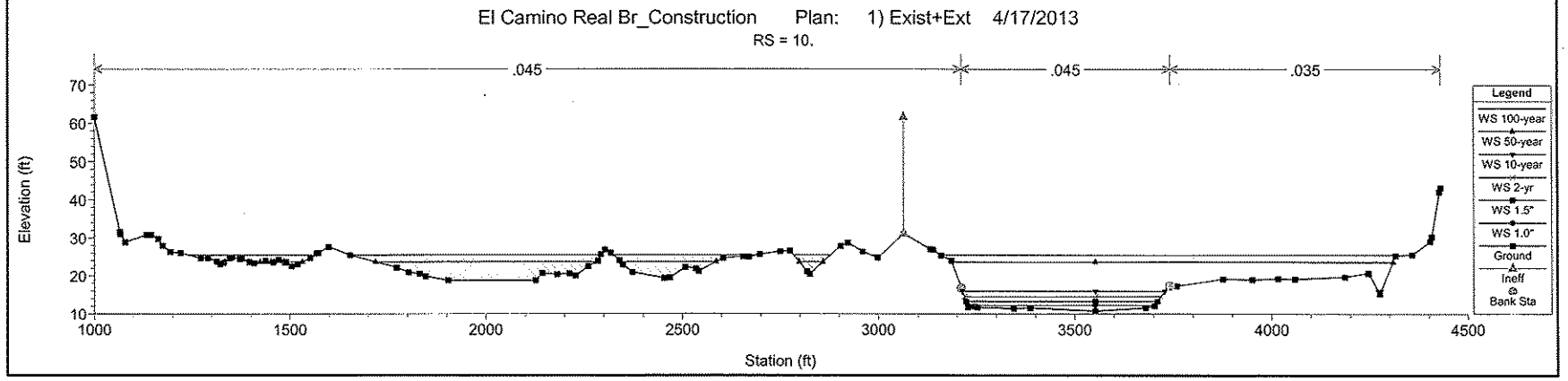
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.6115		Bridge									
Reach-1	2.609	100-year	40100.00	5.00	19.56		21.14	0.002930	10.10	3972.00	1658.02	0.53
Reach-1	2.609	50-year	32500.00	5.00	18.07		19.44	0.002966	9.39	3461.43	1121.47	0.52
Reach-1	2.609	10-year	5900.00	5.00	12.53		12.73	0.000942	3.53	1673.06	305.66	0.27
Reach-1	2.609	2-year	3450.00	5.00	11.24		11.35	0.000666	2.66	1295.39	278.11	0.22
Reach-1	2.609	1.5"	1624.00	5.00	9.79		9.84	0.000446	1.80	903.55	259.35	0.17
Reach-1	2.609	1"	426.00	5.00	7.37		7.39	0.000628	1.29	329.91	201.13	0.18
Reach-1	2.59	100-year	40100.00	5.00	19.33		20.81	0.002643	10.14	4172.39	2025.16	0.51
Reach-1	2.59	50-year	32500.00	5.00	17.81		19.13	0.002774	9.52	3602.64	1952.25	0.51
Reach-1	2.59	10-year	5900.00	5.00	12.39		12.61	0.001150	3.84	1614.64	629.10	0.29
Reach-1	2.59	2-year	3450.00	5.00	11.12		11.26	0.001048	3.05	1163.81	494.77	0.27
Reach-1	2.59	1.5"	1624.00	5.00	9.69		9.76	0.000942	2.25	722.50	260.66	0.24
Reach-1	2.59	1"	426.00	5.00	7.26		7.31	0.000967	1.73	246.20	134.02	0.22
Reach-1	2.524	100-year	33415.00	4.50	19.66		19.97	0.000522	4.49	7516.40	2469.13	0.23
Reach-1	2.524	50-year	27307.00	4.50	18.04		18.32	0.000565	4.24	6486.13	2444.73	0.23
Reach-1	2.524	10-year	5900.00	4.50	12.28		12.34	0.000369	2.05	2887.96	1430.90	0.17
Reach-1	2.524	2-year	3450.00	4.50	10.98		11.03	0.000354	1.65	2093.03	1208.83	0.16
Reach-1	2.524	1.5"	1624.00	4.50	9.57		9.59	0.000249	1.25	1301.79	499.52	0.14
Reach-1	2.524	1"	426.00	4.50	7.11		7.13	0.000297	0.95	447.66	246.73	0.12
Reach-1	2.439	100-year	34115.00	3.80	19.44		19.73	0.000525	4.43	7983.31	2270.74	0.23
Reach-1	2.439	50-year	27307.00	3.80	17.79		18.05	0.000587	4.24	6720.67	2200.10	0.23
Reach-1	2.439	10-year	5900.00	3.80	12.02		12.12	0.000660	2.64	2361.35	1398.96	0.22
Reach-1	2.439	2-year	3450.00	3.80	10.72		10.80	0.000715	2.26	1542.55	1045.40	0.23
Reach-1	2.439	1.5"	1624.00	3.80	9.37		9.42	0.000636	1.84	882.13	392.08	0.22
Reach-1	2.439	1"	426.00	3.80	6.90		6.93	0.000674	1.45	293.90	159.36	0.19
Reach-1	2.341	100-year	34815.00	3.30	19.28		19.48	0.000353	3.96	9741.34	2383.65	0.20
Reach-1	2.341	50-year	27307.00	3.30	17.59		17.78	0.000399	3.83	8031.78	2376.63	0.21
Reach-1	2.341	10-year	5900.00	3.30	11.72		11.83	0.000492	2.65	2400.64	786.52	0.22
Reach-1	2.341	2-year	3450.00	3.30	10.42		10.50	0.000478	2.26	1544.11	549.66	0.22
Reach-1	2.341	1.5"	1624.00	3.30	9.13		9.18	0.000342	1.77	916.33	468.39	0.22
Reach-1	2.341	1"	426.00	3.30	6.70		6.72	0.000257	1.20	353.79	149.18	0.14

HEC-RAS Plan: 5'Fill_3'Block River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.231	100-year	42800.00	3.00	19.18		19.30	0.000220	3.19	15687.33	2385.53	0.17
Reach-1	2.231	50-year	32500.00	3.00	17.46		17.58	0.000255	3.08	12516.73	2352.97	0.17
Reach-1	2.231	10-year	5900.00	3.00	11.46		11.54	0.000477	2.22	2703.16	803.13	0.20
Reach-1	2.231	2-year	3450.00	3.00	10.08		10.15	0.000784	2.09	1654.07	716.13	0.24
Reach-1	2.231	1.5"	1624.00	3.00	8.68		8.76	0.002377	2.27	716.36	624.35	0.37
Reach-1	2.231	1"	426.00	3.00	6.34		6.43	0.001278	2.47	172.74	83.01	0.30
Reach-1	2.155	100-year	42800.00	2.50	19.13		19.22	0.000170	2.89	18701.15	2354.14	0.15
Reach-1	2.155	50-year	32500.00	2.50	17.40		17.49	0.000209	2.89	14640.57	2320.43	0.16
Reach-1	2.155	10-year	5900.00	2.50	11.22		11.32	0.000609	2.64	2413.63	813.86	0.23
Reach-1	2.155	2-year	3450.00	2.50	9.74		9.84	0.000750	2.51	1386.67	455.53	0.25
Reach-1	2.155	1.5"	1624.00	2.50	8.12		8.20	0.000937	2.19	742.18	340.73	0.26
Reach-1	2.155	1"	426.00	2.50	6.01		6.07	0.000647	1.86	228.50	100.24	0.22
Reach-1	2.06	100-year	42800.00	2.00	19.05		19.15	0.000169	3.27	18250.76	2197.55	0.15
Reach-1	2.06	50-year	32500.00	2.00	17.31		17.40	0.000201	3.27	14444.66	2160.70	0.16
Reach-1	2.06	10-year	5900.00	2.00	10.82		11.01	0.000638	3.63	2098.55	1097.08	0.26
Reach-1	2.06	2-year	3450.00	2.00	9.35		9.50	0.000617	3.08	1122.79	281.81	0.24
Reach-1	2.06	1.5"	1624.00	2.00	7.86		7.92	0.000353	2.02	804.61	199.11	0.18
Reach-1	2.06	1"	426.00	2.00	5.91		5.93	0.000138	0.95	446.71	168.26	0.10
Reach-1	1.979	100-year	42800.00	3.00	19.00	13.18	19.08	0.000145	2.90	19913.77	2420.18	0.14
Reach-1	1.979	50-year	32500.00	3.00	17.24	12.57	17.32	0.000176	2.91	15682.74	2387.81	0.15
Reach-1	1.979	10-year	5900.00	3.00	10.50	7.56	10.70	0.000844	3.65	1887.90	871.94	0.28
Reach-1	1.979	2-year	3450.00	3.00	9.01	6.66	9.16	0.001001	3.18	1103.61	346.86	0.29
Reach-1	1.979	1.5"	1624.00	3.00	7.59	5.70	7.68	0.001002	2.44	666.55	271.80	0.27
Reach-1	1.979	1"	426.00	3.00	5.75	4.55	5.80	0.001001	1.69	251.84	177.53	0.25


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 12
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 11.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta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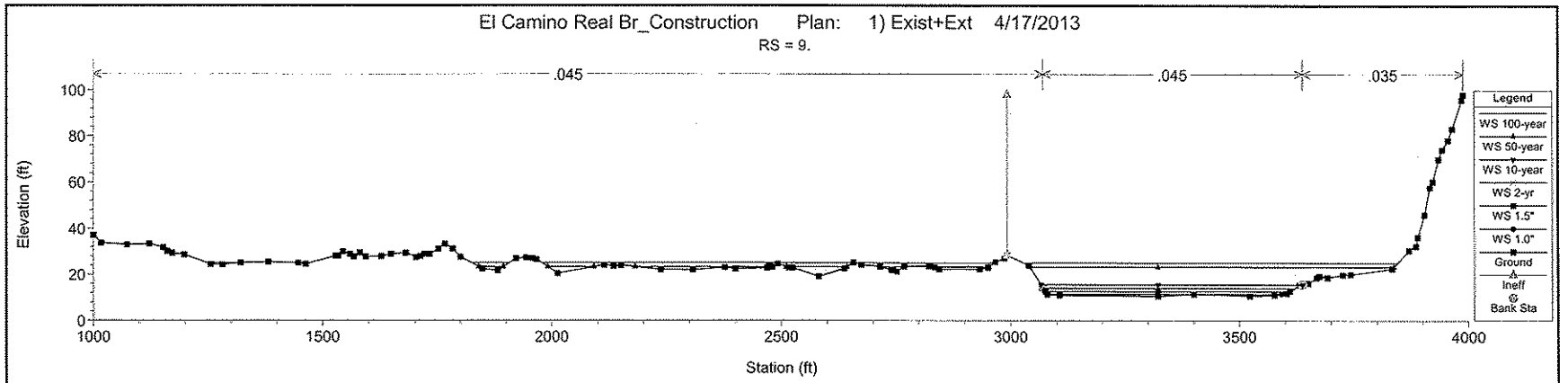
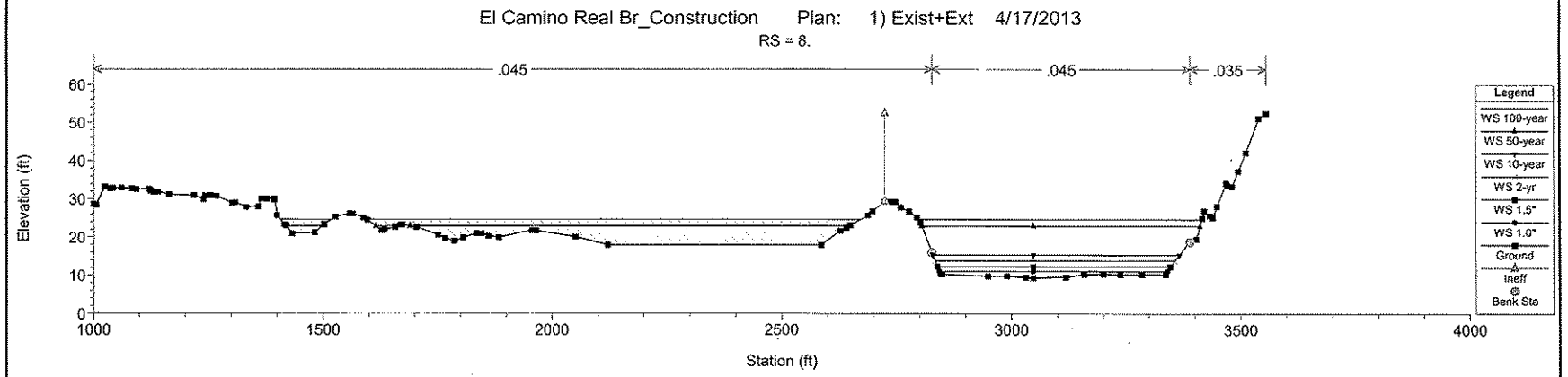
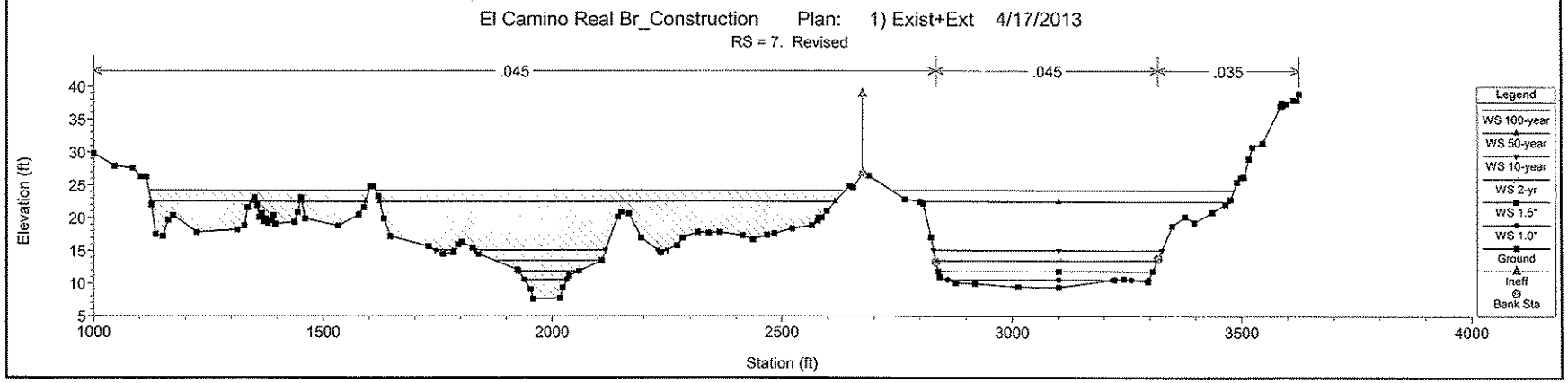
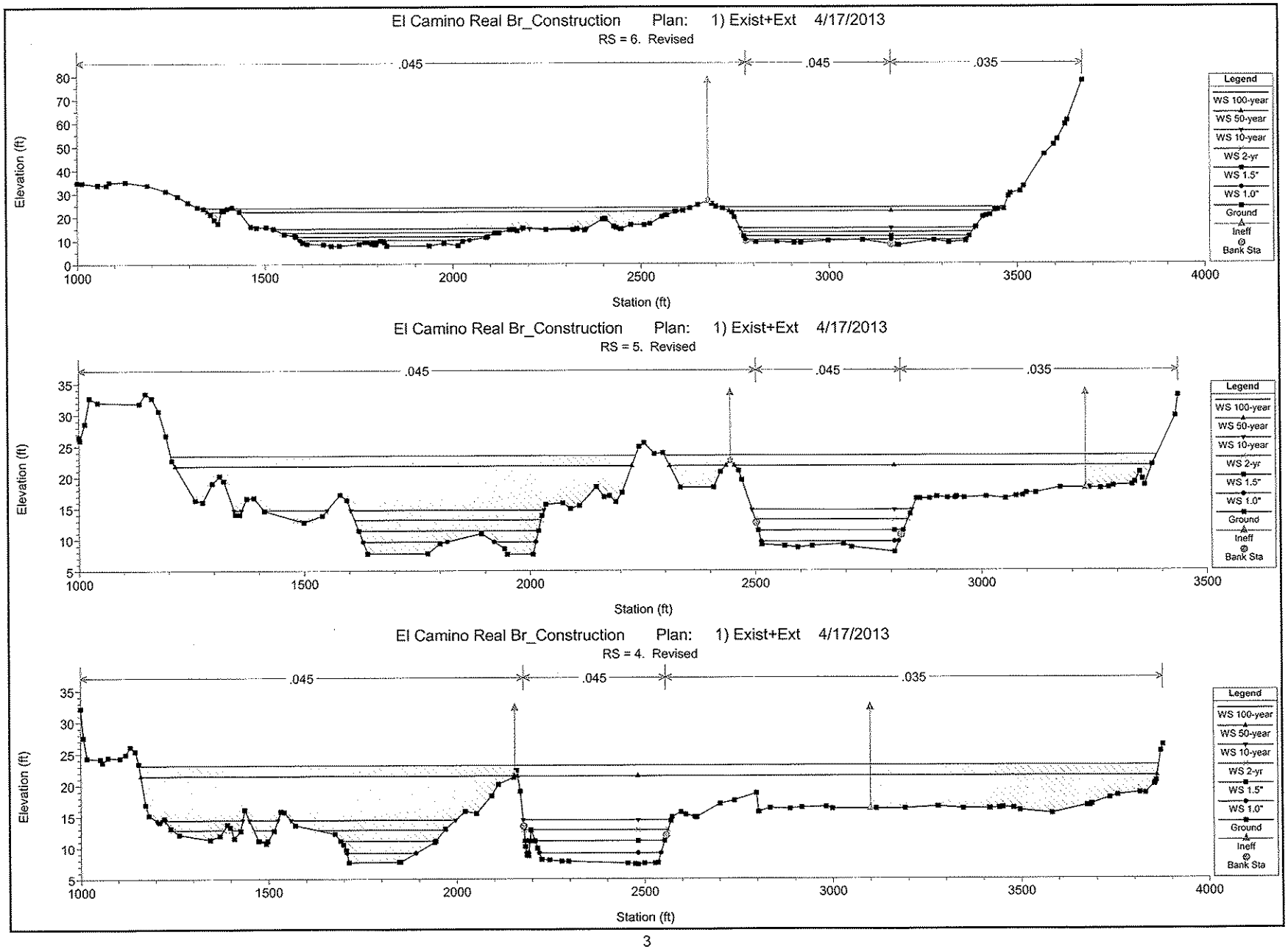
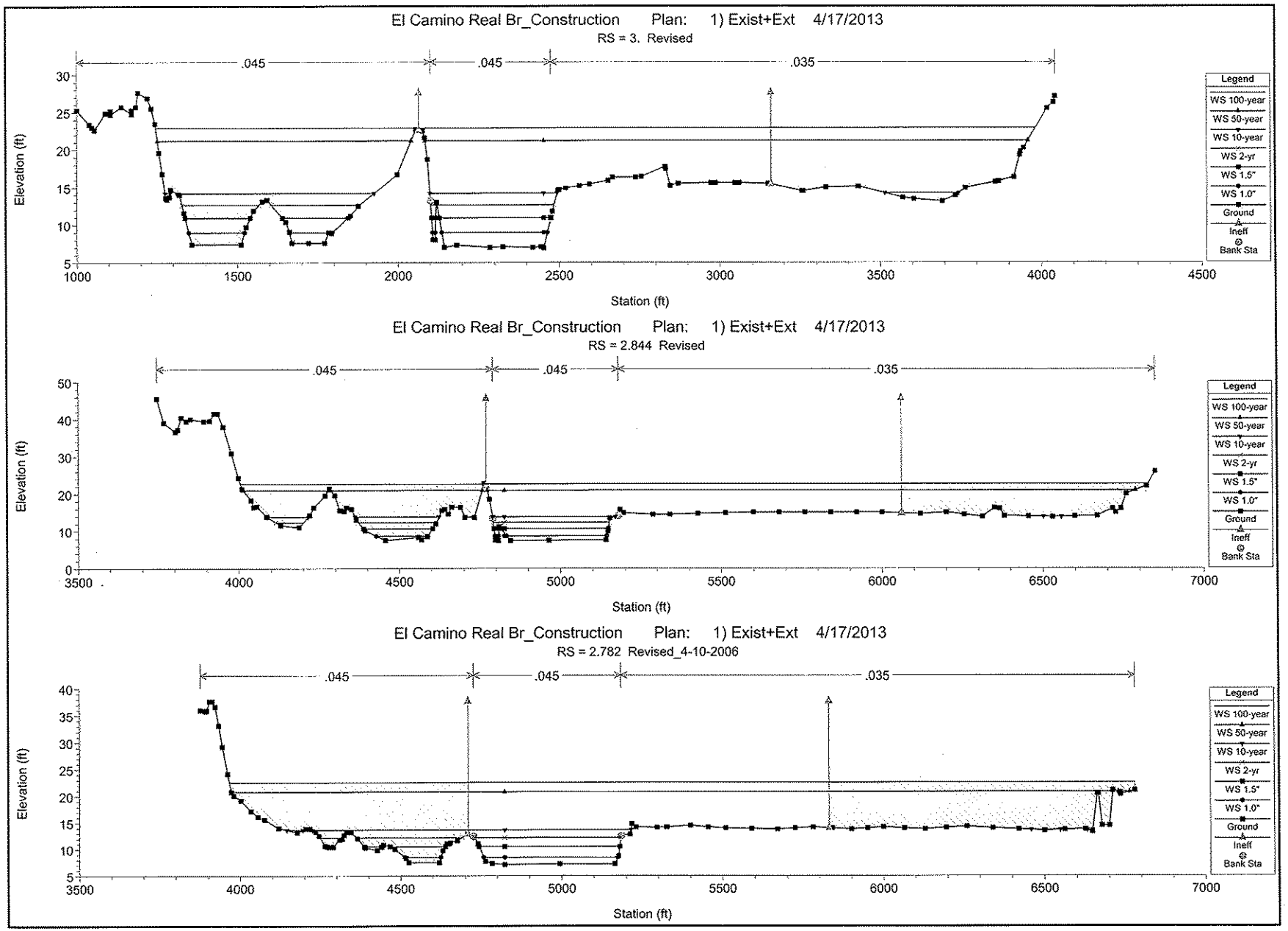
RS = 10.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta

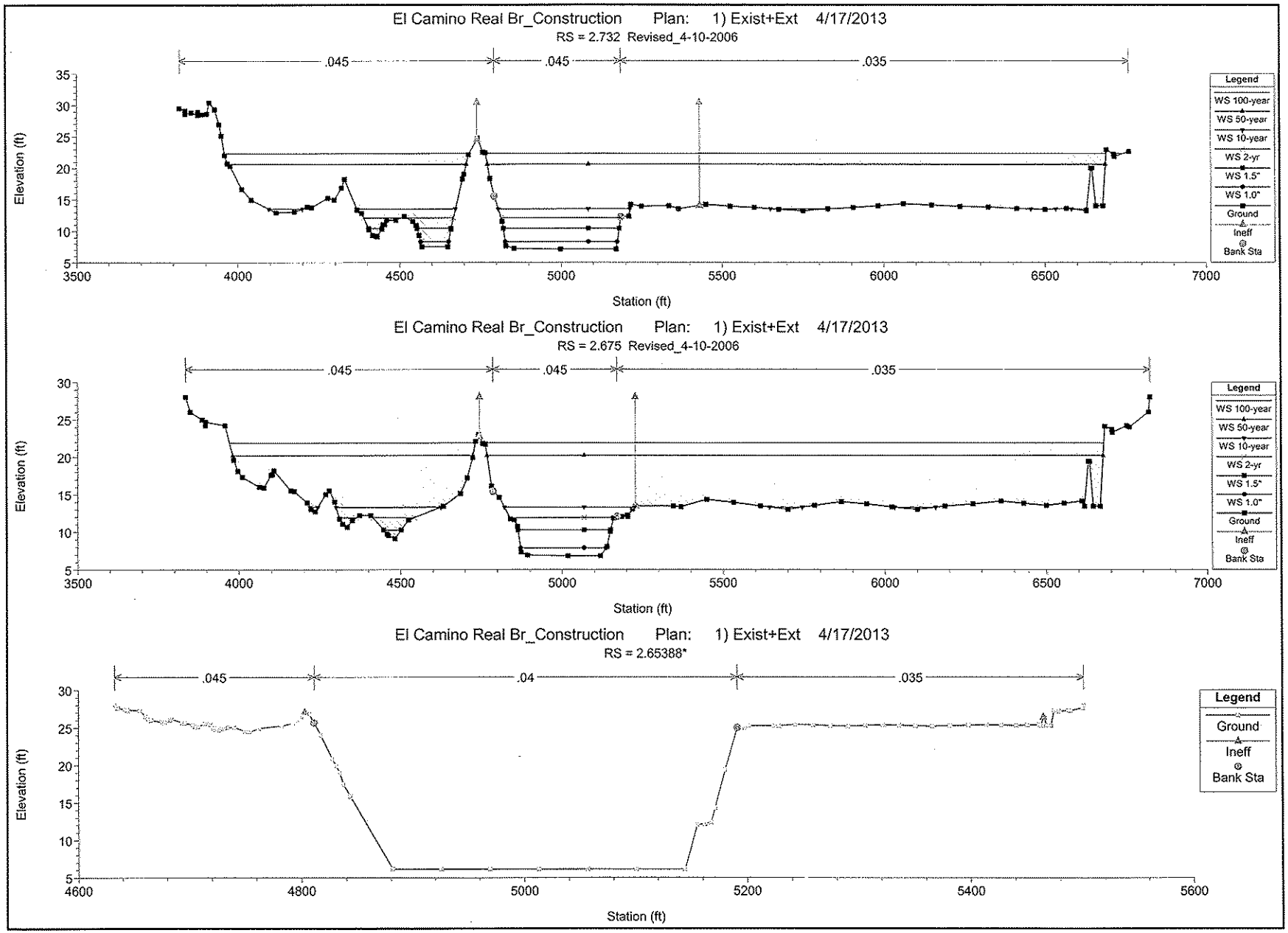

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 9.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta

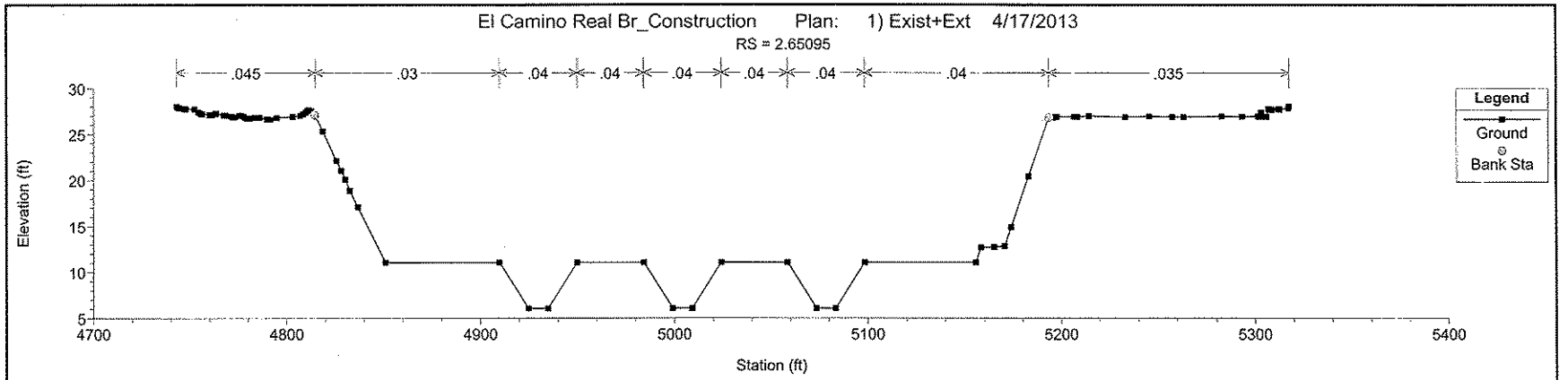

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 8.
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta

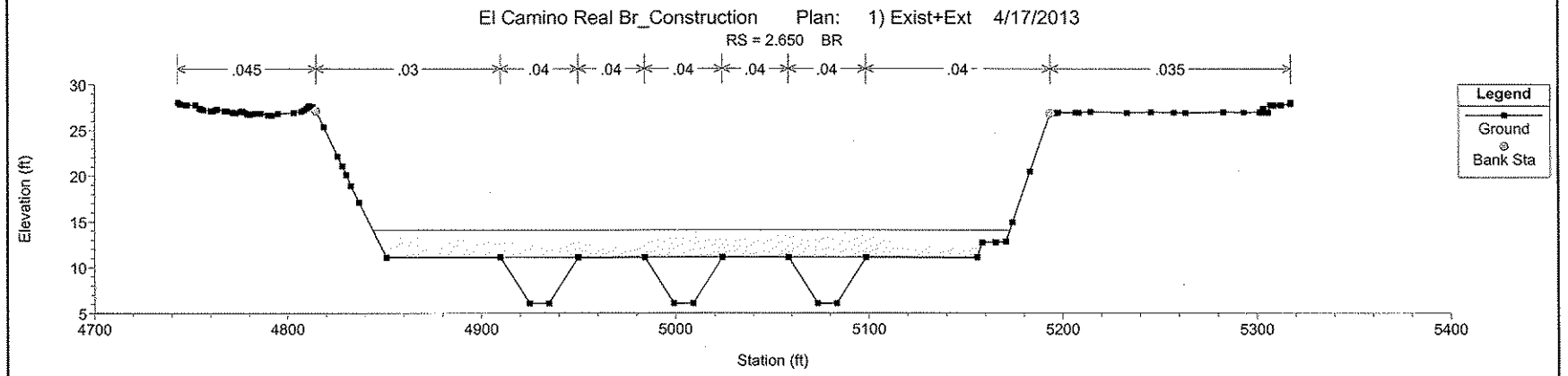

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 7. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta

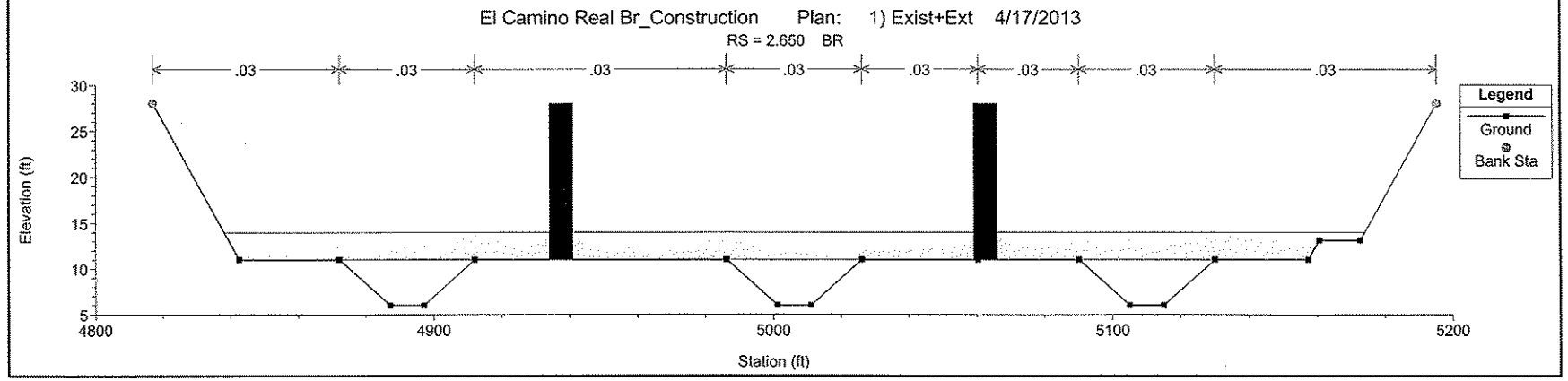

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 6. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 5. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 4. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta

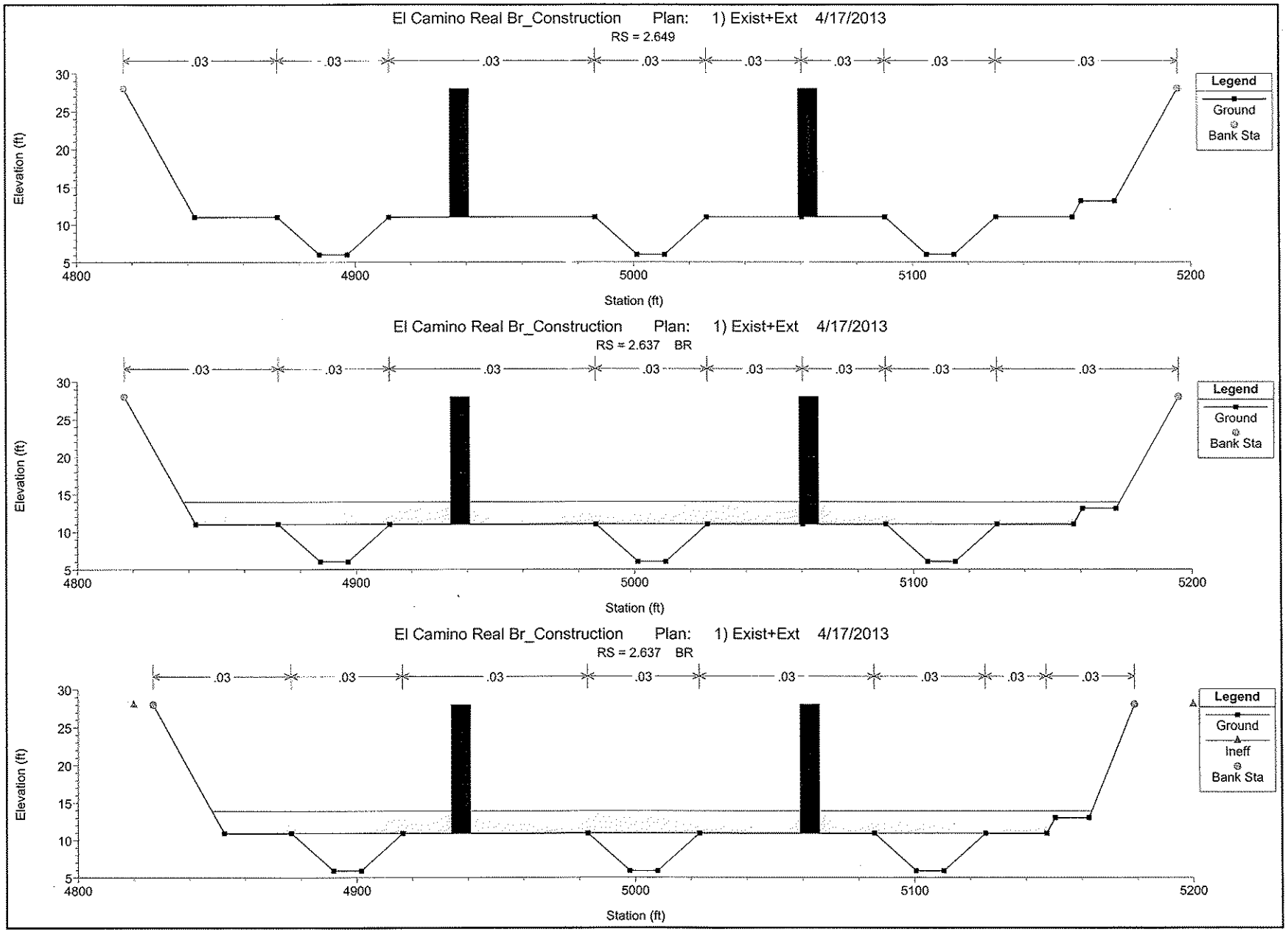

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 3. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.844 Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.782 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta

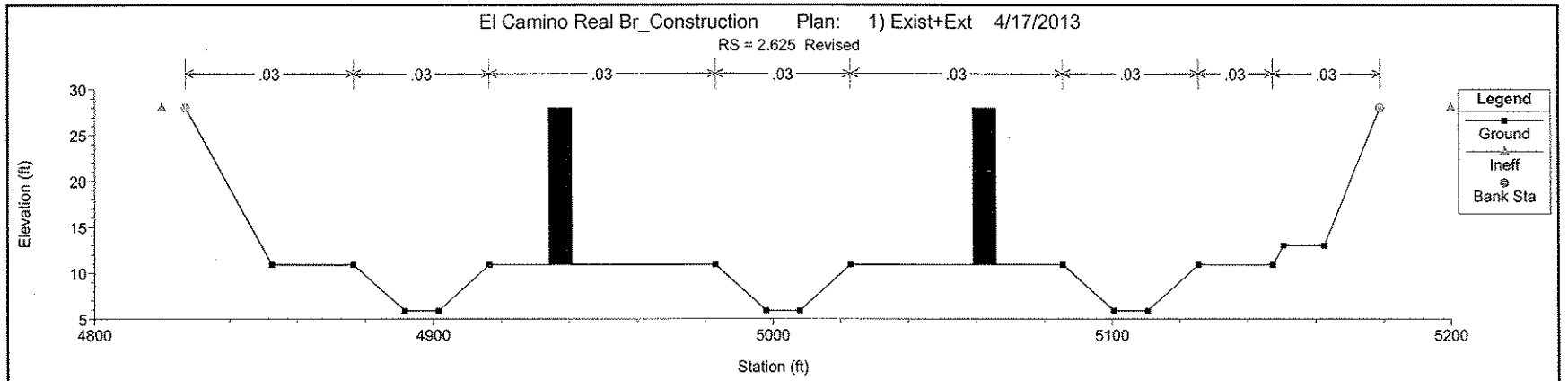

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.732 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.675 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.65388*
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
Ground
Ineff
Bank Sta

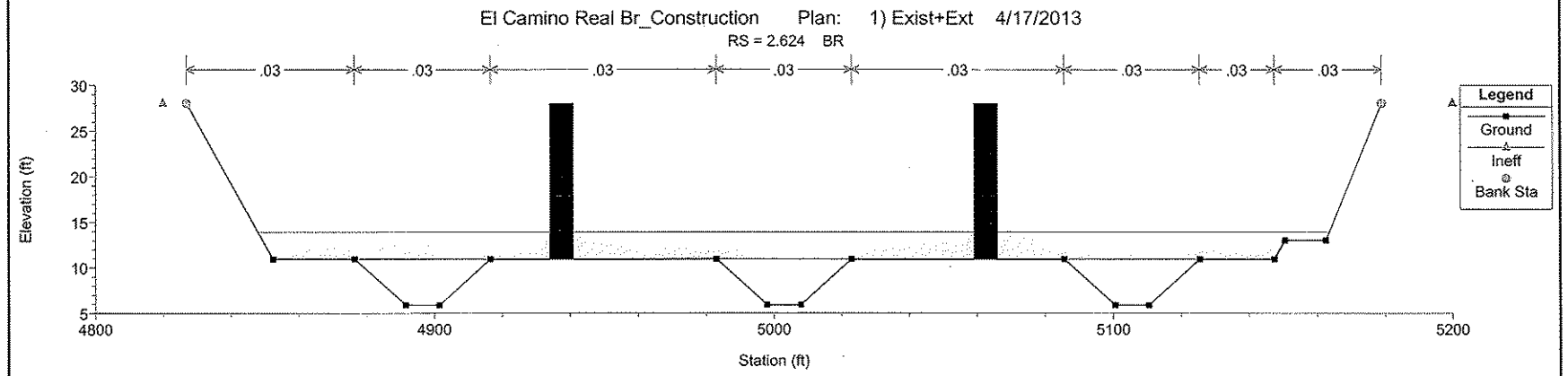

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.65095
.045
.03
.04
.04
.04
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta

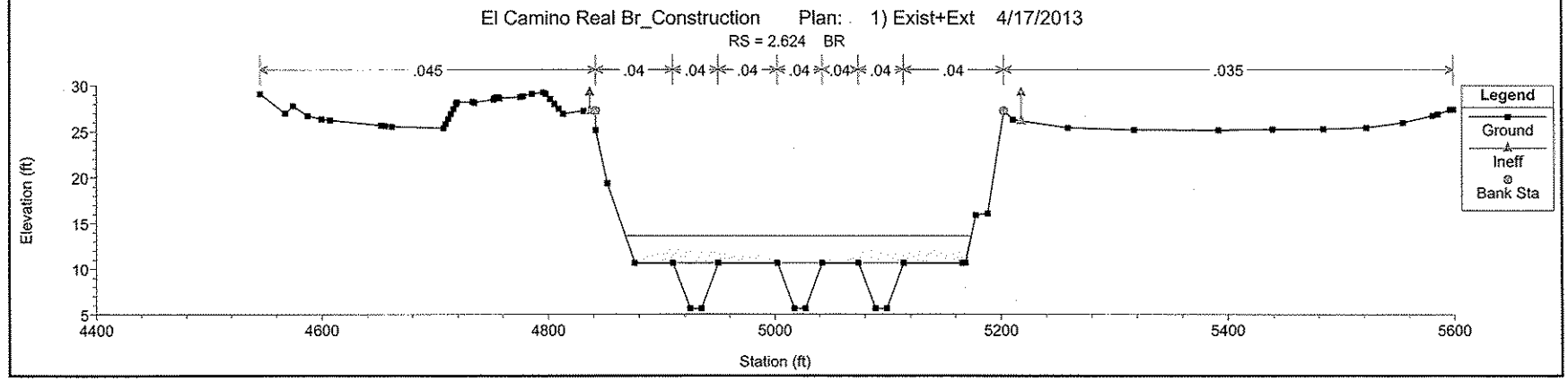

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.650 BR
.045
.03
.04
.04
.04
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta

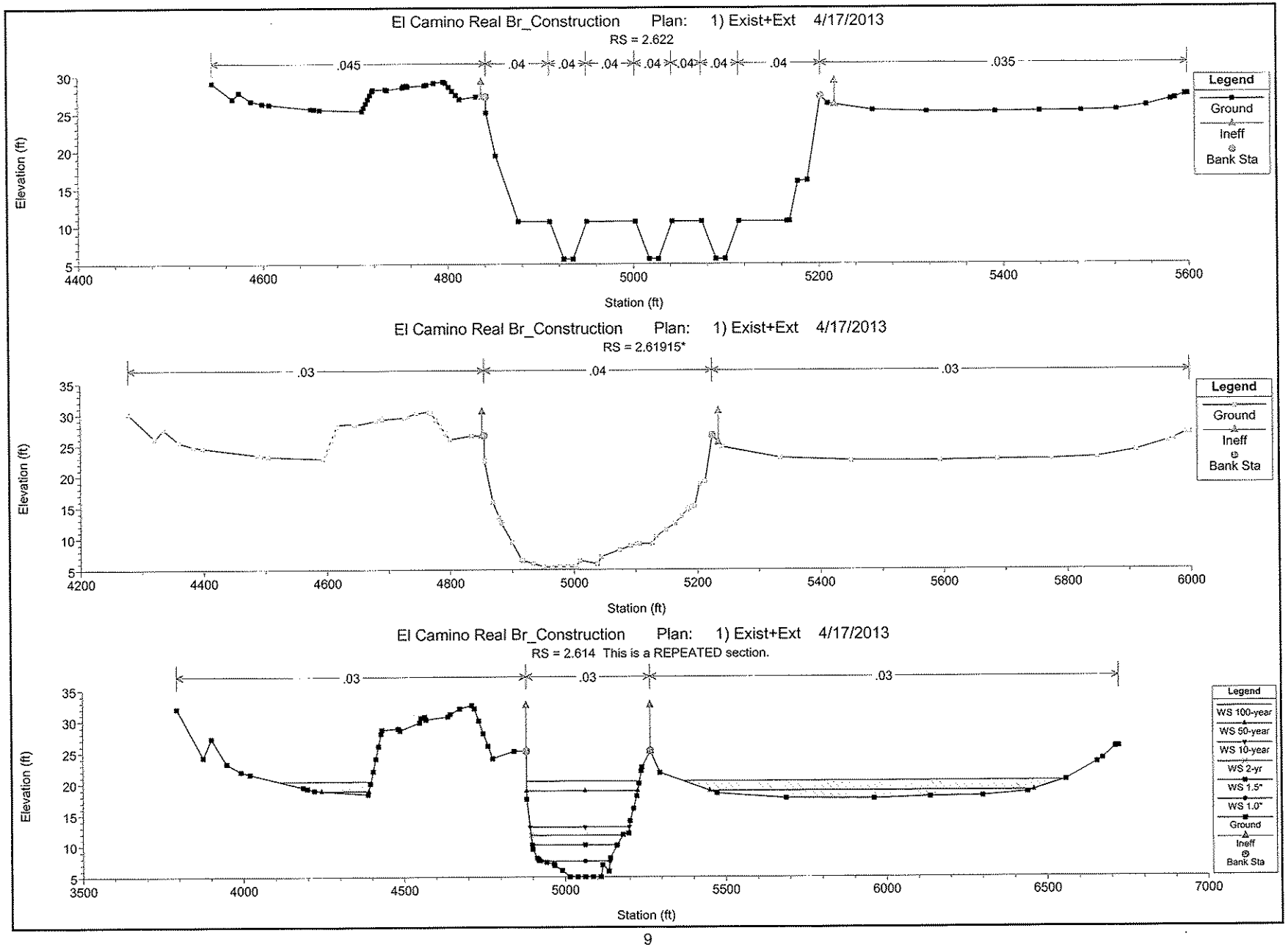

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.650 BR
.03
.03
.03
.03
.03
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta

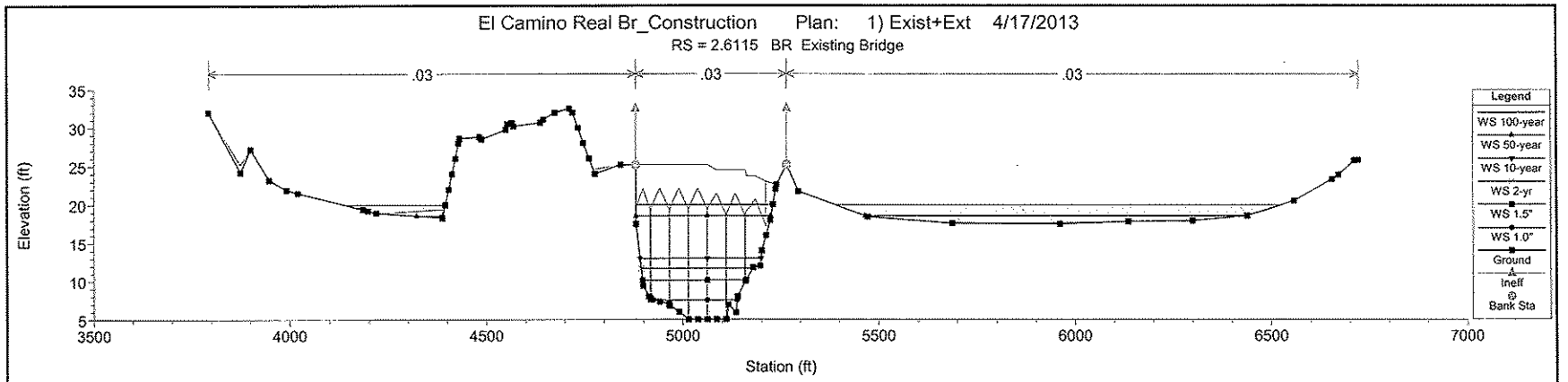

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.649
.03
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.637 BR
Legend
Ground
Bank Sta
Elevation (ft)
Station (ft)
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.637 BR
Legend
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

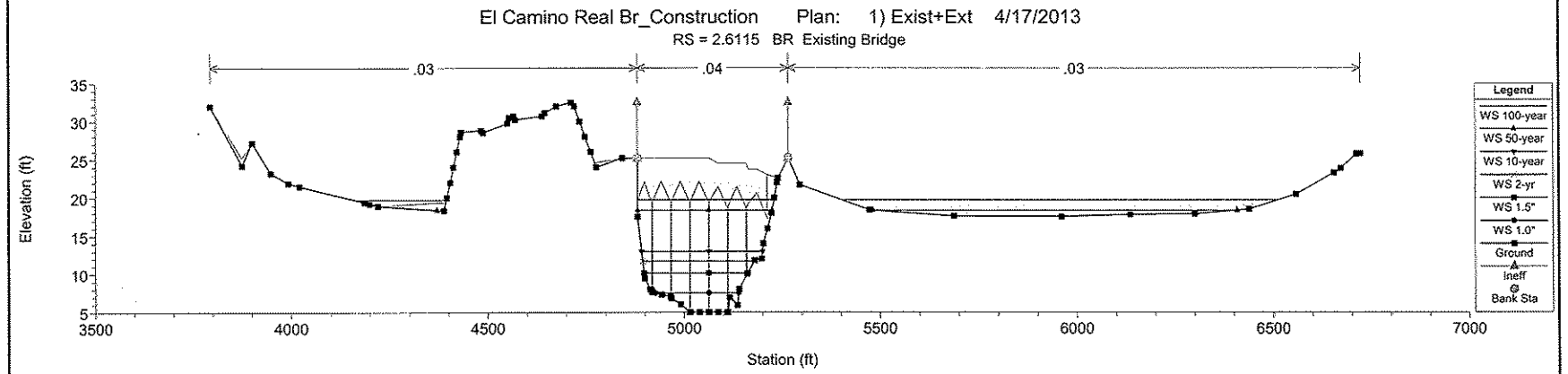

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.625 Revised
.03 .03 .03 .03 .03 .03 .03 .03
Elevation (ft)
Station (ft)
Legend
Ground
Ineff
Bank Sta

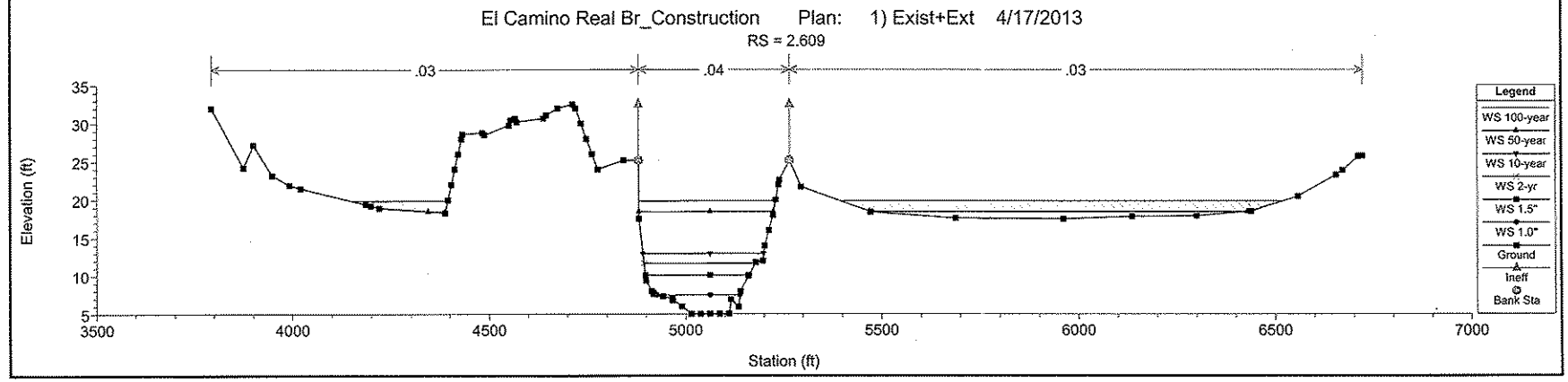

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.624 BR
.03 .03 .03 .03 .03 .03 .03 .03
Elevation (ft)
Station (ft)
Legend
Ground
Ineff
Bank Sta

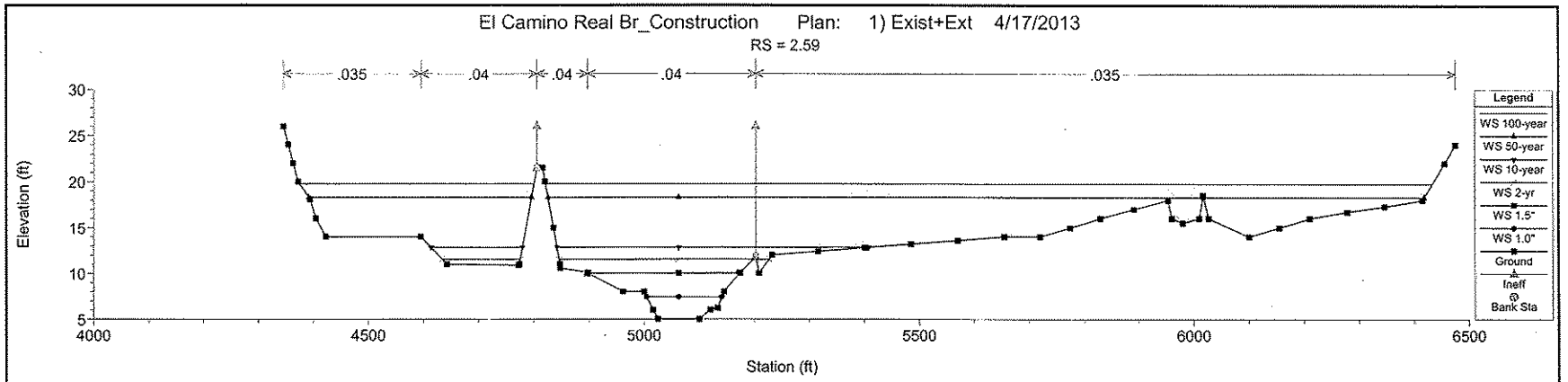

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.624 BR
.045 .04 .04 .04 .04 .04 .04 .04 .035
Elevation (ft)
Station (ft)
Legend
Ground
Ineff
Bank Sta

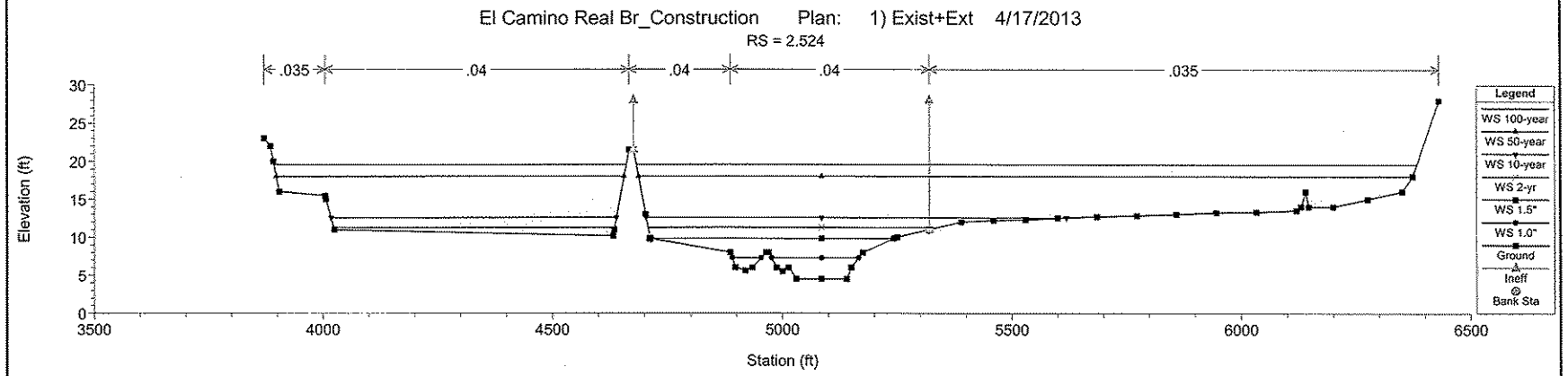

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.622
.045
.04
.04
.04
.04
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.61915*
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.614 This is a REPEATED section.
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5*
WS 1.0*
Ground
Ineff
Bank Sta

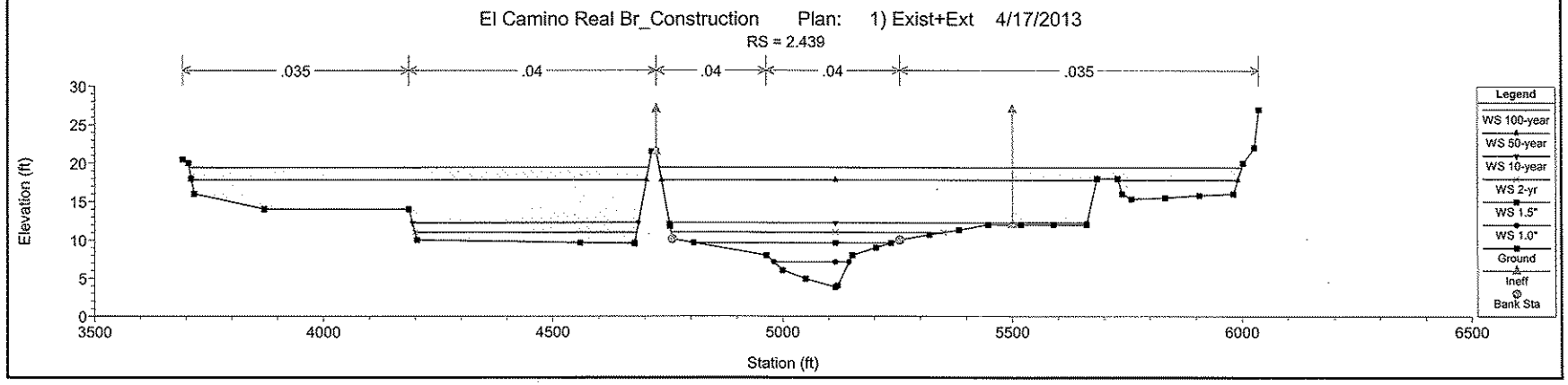

El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.6115 BR Existing Bridge
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.6115 BR Existing Bridge
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.609
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.59
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.524
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta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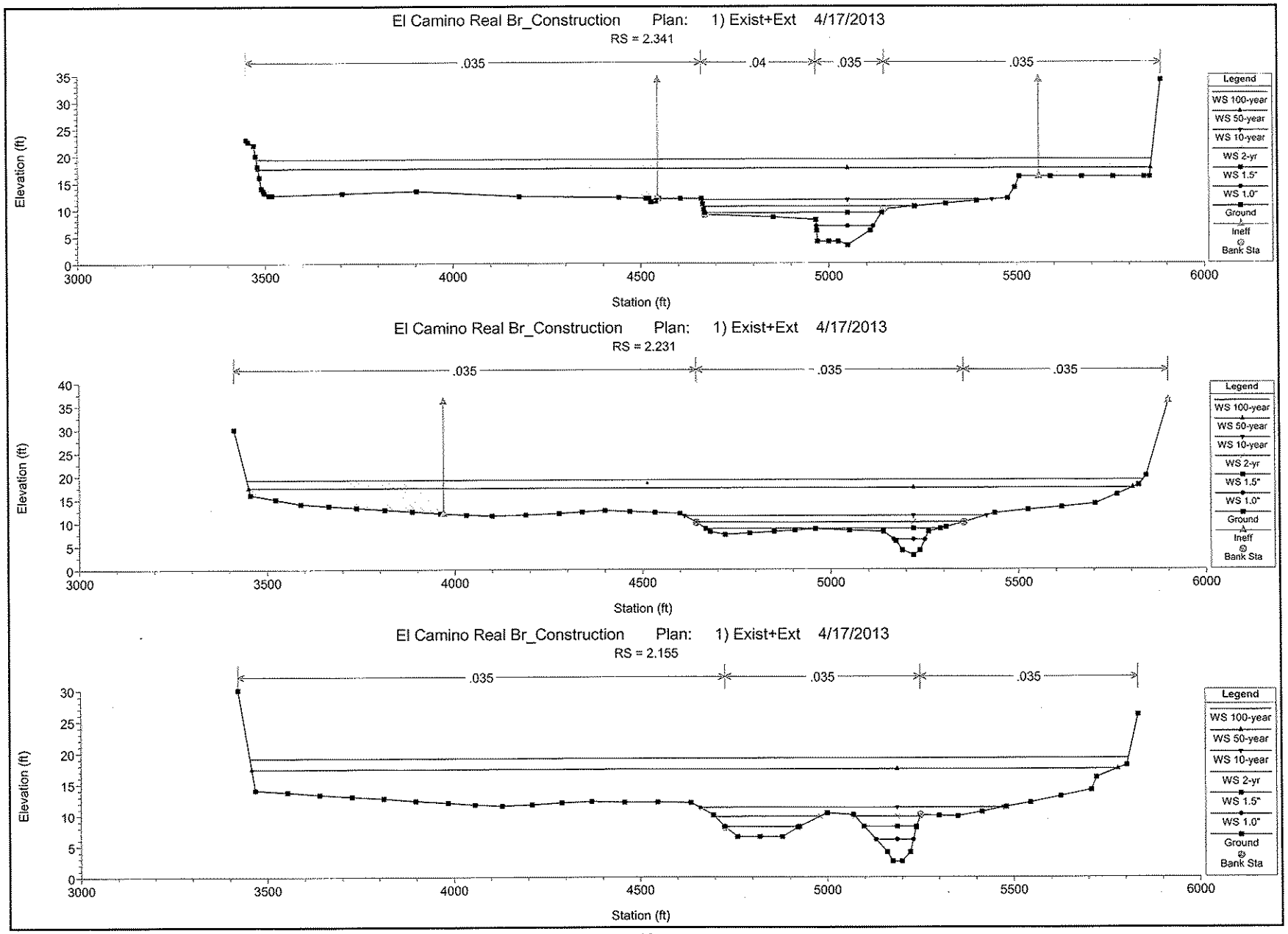
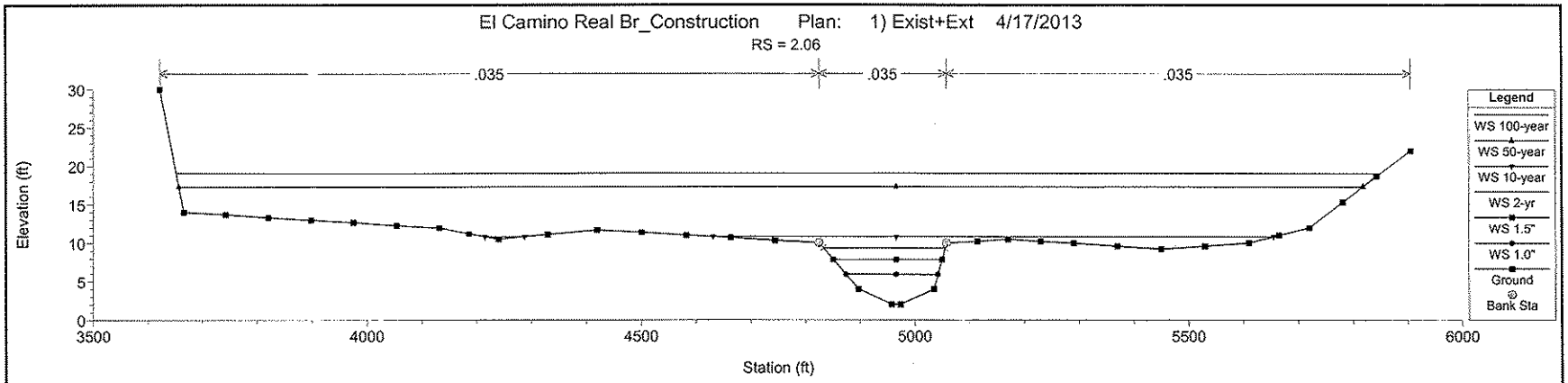
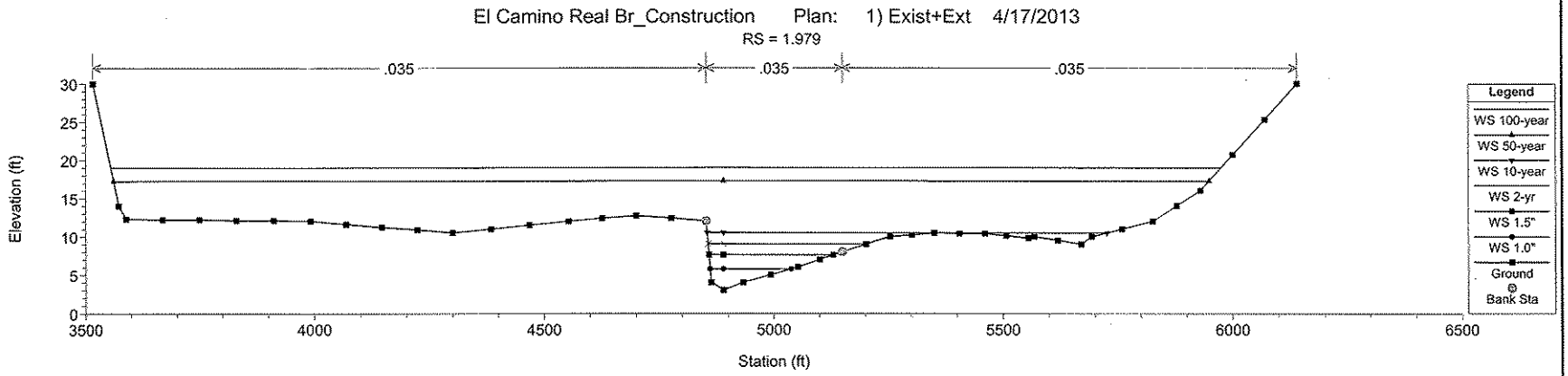
RS = 2.439
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.341
.035
.04
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.231
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.155
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Bank Sta


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 2.06
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Bank Sta


El Camino Real Br_Construction Plan: 1) Exist+Ext 4/17/2013
RS = 1.979
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-yr
WS 1.5"
WS 1.0"
Ground
Bank Sta

```
HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: El Camino Real Br_Construction
Project File : ECRBr_Construction.prj
Run Date and Time: 4/15/2013 3:49:58 PM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
Temporary Construction
Phase

The PROPOSED CONDITION ElCamino.p09 plan file was saved and
renamed for the future analyses with the existing bridge added to the geometry
file.

PLAN DATA

Plan Title: Prop+Exist+Const_5'_Berm_3LFC+3'Blocked
Plan File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.p35

Geometry Title: Prop+Exist+Const_Berm_5'+3-LFC+3Blocked
Geometry File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.g32

Flow Title : Prop+Exis_Construction_Berm
Flow File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.f08

Plan Description:
Existing and proposed bridge with 8' berm, three low flow channel AND 3'
OBSTRUCTION

Plan Summary Information:

Number of: Cross Sections = 30 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 4 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Prop+Exis_Construction_Berm
Flow File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.f08

Flow Data (cfs)

River	Reach	RS	100-year	50-year	10-year	2-year	1.5"	1"
RIVER-1	Reach-1	12	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.844	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.732	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.675	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.625	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.614	40100	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.524	33415	27307	5900	3450	1624	426
RIVER-1	Reach-1	2.439	34115	27307	5900	3450	1624	426
RIVER-1	Reach-1	2.341	34815	27307	5900	3450	1624	426
RIVER-1	Reach-1	2.231	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.155	42800	32500	5900	3450	1624	426

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	100-year		Known WS = 19
RIVER-1	Reach-1	50-year		Known WS = 17.24

```
  RIVER-1          Reach-1          10-year
Known WS = 10.5
  RIVER-1          Reach-1          2-year
Normal S = 0.001
  RIVER-1          Reach-1          1.5"
Normal S = 0.001
  RIVER-1          Reach-1          1"
Normal S = 0.001



GEOMETRY DATA

Geometry Title: Prop+Exist+Const_Berm_5'+3-LFC+3Blocked
Geometry File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.g32

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 12

INPUT
Description:
Station Elevation Data     num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000    35.6 1005.86   33.27 1013.08   31.83 1055.01    32.1 1099.25   30.47
 1144.99    29.5    1176   31.58 1180.55   32.16 1224.52   29.29 1272.69    28.7
 1321.29    25.1 1372.68   18.68 1498.17   18.68 1553.31   27.25 1584.04   26.05
 1592.99    24.9 1603.16    24.7 1625.67   28.06 1665.26    25.4 1744.29   22.84
 1791.24    20.4 1803.95   20.35 1815.94   20.71 1850.07   19.88 1852.08    20.1
 1856.82    19.9 1878.37   20.77 1904.54   21.04 1951.26   20.01 1980.89   18.85
 2021.94    18.8 2082.22   19.82 2177.87   19.99  2226.8   23.59 2260.35   26.81
 2266.62      28 2276.55   28.01 2289.11   26.36 2341.63   24.48 2453.87   29.83
 2463.88    30.9 2545.28   32.67 2603.12   30.76    2654   27.88 2670.13    26.1
 2711.85    22.7 2774.21   20.74 2797.93   20.55 2877.43   22.79 2902.47    22.3
 2935.73    27.6 2956.39   27.08 2981.85   25.02 3000.22   24.95 3060.28   26.72
 3075.48    26.6 3122.59   24.89 3174.65   25.29 3205.29    26.8  3264.7   25.15
 3287.43    17.9 3303.45   12.36 3319.08   11.84 3351.69   11.41 3622.04   11.32
 3727.53    12.8 3734.46    13.1 3776.26   20.11  3778.5   20.05 3805.79   19.28
 3830.09    19.1 3958.65   20.42 4161.16   20.39 4207.79   21.08 4296.23   20.35
 4323.61    27.9 4332.48   29.22 4343.85   29.47 4369.91   29.17 4423.85   29.14
 4453.69    28.6 4498.75   28.52 4531.82   27.51 4546.42   27.73 4568.52   27.35
 4576.79    27.6 4591.03   27.38 4616.36   23.58 4679.05   22.34 4746.64   23.31
 4773.16    23.1 4785.29   21.85 4818.03   17.15 4827.16   19.36 4857.86    29.1
 4861.74    30.9 4871.15   31.21 4888.42   29.54 4905.42   28.94

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 3287.43    .045  3778.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3287.43  3778.5            49.32       48   73.57              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
    1000 3205.29               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 11.
```



```
INPUT
Description:
Station Elevation Data     num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000    40.3 1017.77   32.69 1025.98   31.31 1068.34   31.84 1120.18   30.46
 1125.95    30.8 1139.82   31.06 1186.39   30.89  1205.9   30.03 1215.36   29.19
  1270.4    26.2 1319.99   23.06 1333.18   22.01 1387.97   22.58 1403.23    20.7
 1427.05      20 1458.92   20.06  1475.5   21.56 1490.04   22.43 1501.97   21.59
 1521.74    24.9 1544.11   27.77 1555.98   27.71 1576.39   27.13 1588.08   26.52
 1592.53    25.6 1602.16   25.44 1644.13   31.55 1689.45   26.26 1716.32   25.39
 1799.98      21 1821.54   19.32 1824.81   18.71 2071.33   18.71 2084.45   19.97
 2148.41    20.8 2163.75   22.18 2190.78   24.07 2208.44   26.01 2245.42   28.48
 2269.66    26.2 2324.04   22.89 2339.18   23.23 2497.01   28.39 2521.97   28.85
 2546.84    30.3 2565.05   29.68 2587.75   28.39 2631.81   28.04 2662.57   28.41
 2710.89    24.4 2807.45   21.06 2866.09   22.63    2901   26.32 2920.28   30.24
 2940.22    29.2 2959.82   27.62 2964.07      27 2969.64   26.61 2989.81   27.21
 3015.83    27.5 3041.11   28.24  3120.4   25.24 3169.54   25.37 3196.64   27.06
 3260.42    25.6  3282.4   18.34 3300.55   12.14 3349.52   11.94 3381.12   11.52
 3524.57    11.2  3619.7   11.39 3718.86   12.21  3738.3   13.08 3778.55   19.79
 3849.99    19.6 3921.31    20.2 4036.71    20.5 4181.79   20.35    4194   20.53
 4217.99      20 4243.34   19.95 4319.69   20.32 4337.47   20.86 4446.99   21.08
 4496.05    20.9 4547.69   22.06 4563.82   21.98 4593.72   23.28 4605.59   23.35
 4634.58    22.7 4681.06   22.26 4718.72   22.41 4726.07   21.78 4762.55   16.45
 4772.93    19.9 4811.26   33.42 4821.04   32.65 4860.55   31.96

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045  3282.4    .045 3778.55    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3282.4 3778.55            347.68      339  548.49              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
    1000 3196.64               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 10.

INPUT
Description:
Station Elevation Data     num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000    61.6  1065.1   31.55 1066.72   30.96 1078.56   28.81 1133.55   30.82
 1144.36    30.8 1163.16   29.72 1174.61    27.9 1194.28   26.28 1220.63   25.97
 1272.47    24.6 1290.82   24.66 1313.56   23.75 1322.01   23.03 1330.79   23.38
 1346.64    24.6 1352.33   24.76 1372.19   24.37 1377.21   24.54 1396.08   23.58
    1409    23.3 1437.64   23.91 1457.07    23.5 1471.34   24.16 1487.88   23.48
 1489.88    23.6 1504.34    22.5 1520.03   23.02 1551.94   24.67 1568.23   25.86
 1572.66      26 1598.72   27.62 1653.76   25.37 1772.86   22.14 1802.96   20.84
 1830.99    20.5 1846.37   19.78 1904.05   18.71 2126.59   18.71 2143.98    20.6
 2181.47    20.3 2213.13   20.54 2228.29   20.02 2260.47   22.45 2285.56   23.91
 2292.62    25.6    2303    26.9 2317.41   25.97 2339.99   23.98 2349.03    22.8
 2373.01    20.9 2453.68   19.32 2467.97   19.43 2507.32    22.2 2533.93   21.88
 2540.85    21.2 2603.98   24.58  2655.3   24.99 2669.58   24.91 2697.53   25.59
    2749    26.4 2774.29   26.56 2817.77   21.14 2825.25   20.46 2903.54   27.83
 2922.14    28.7 2959.73   26.34 2998.12   24.68 3063.82   31.09  3131.8      27
 3139.33    26.8 3159.32    25.3 3185.34   23.98 3210.78   16.78 3228.28   11.78
 3244.48    11.9 3252.18   11.68 3344.18   11.39 3386.35   11.54 3552.31   10.72
 3679.96    11.5 3702.75   12.08 3737.94   17.39 3742.94   17.35 3759.57   17.33
```

3876.38	19.1	3950.62	18.95	4016.25	19.2	4059.21	19.11	4185.85	19.68
4245.42	20.7	4246.74	20.53	4274.78	15.27	4315.06	25.27	4357.64	25.53
4403.81	29	4407.41	30.26	4426.73	42.03	4430.62	43.13		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3210.78	.045	3742.94	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3210.78	3742.94	585.6	450	556.91	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3063.82		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 9.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	37	1016.9	33.7	1073.58	32.94	1121.8	33.23	1152.75	31.65
1161.67	30.1	1171.71	29.36	1198.09	28.64	1256.09	24.45	1282.45	24.17
1321.64	25.1	1382.49	25.44	1446.9	25.01	1463.43	24.47	1528.47	28.12
1533.87	28.1	1544.3	29.93	1559.42	28.86	1567.3	27.86	1581.06	29.5
1593.41	27.7	1627.08	27.96	1648.62	28.99	1680.4	29.4	1703.36	27.5
1712.61	28	1721.47	28.98	1732.48	28.9	1751.89	31.06	1766.04	33.19
1782.94	31.2	1800.28	27.57	1848.38	22.39	1882.05	21.62	1921.82	26.96
1943.46	27.3	1956.53	27.14	1966.87	26.49	2013.05	20.39	2114.35	24.06
2135.36	23.6	2151	23.9	2237.13	22.08	2307.12	21.91	2377.04	22.97
2399.54	22.4	2468.87	22.81	2473.19	23.63	2480.05	23.05	2491.91	24.59
2515.92	22.9	2524.23	22.84	2581.98	19.02	2637.55	22.51	2657.34	25.17
2674.82	24.2	2715.26	23.38	2740.33	21.83	2743.51	22	2751.97	21.28
2767.57	23.4	2821.64	23.57	2834.98	23.08	2844.63	22.26	2932.59	22.26
2951.05	22.9	2966.41	25.46	2986.32	27.06	2992.2	28.44	3039.79	23.8
3070.69	14.2	3080.08	11.42	3106.55	11.02	3321.87	10.64	3400.49	11.49
3522.98	10.7	3576.78	11.11	3603.66	11.87	3631.39	15.44	3637.71	15.64
3650.43	16.1	3668.33	18.59	3674.22	19.28	3691.74	18.65	3725.46	19.86
3742.81	20	3832.93	22.46	3869.75	30.39	3884.99	32.22	3889	36.15
3903.88	45.7	3915.36	57.56	3922.06	60.21	3934.59	69.86	3942.4	73.97
3955.33	78.1	3964.35	83.07	3985.23	95.58	3988.22	97.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3070.69	.045	3637.71	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3070.69	3637.71	1127.52	452	287.85	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2992.2		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 8.

INPUT
Description:

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	28.6	1005.45	28.45	1024.27	33.23	1035.35	32.74	1041.71	32.87
1061.19	32.9	1083.84	32.75	1092.86	32.56	1121.25	32.64	1124.3	32.11
1131.29	31.8	1140.59	31.88	1164.62	31.19	1219.06	30.98	1239.9	29.91
1242.97	30.9	1255.6	30.95	1268.5	30.77	1302.14	28.93	1308.95	29.04
1332.76	27.9	1359.49	28.05	1365.6	30.06	1378.37	30.03	1393.75	30.12
1394.57	29.8	1400.54	25.66	1416.32	23.32	1419.41	23.16	1420.28	23.05
1433.25	20.9	1482.05	21.18	1502.76	23.35	1526.92	25.37	1557.55	26.22
1561.6	26.2	1564.42	26.18	1588.13	25.13	1595.86	24.52	1627.6	21.8
1633.43	21.9	1657.37	22.66	1671.61	23.28	1703.38	22.62	1750.91	20.6
1766.08	19.6	1786.31	18.96	1806.22	19.85	1834.37	20.97	1846.46	20.93
1861.46	20.2	1883.93	19.91	1955.91	21.79	1958.38	21.71	1965.3	21.71
2051.2	20	2121.94	17.86	2585.61	17.86	2628.16	21.64	2641.35	22.45
2649.73	23.1	2687.98	25.74	2697.64	26.82	2724.27	29.32	2737.82	29.24
2748.03	29.2	2759.02	27.76	2777.42	26.7	2794.59	25.17	2802.41	23.78
2827.53	15.9	2845.35	10.4	2848.93	10.33	2949.01	9.78	2990.53	9.84
3031.41	9.4	3047.38	9.32	3118.85	9.51	3158.36	10.28	3200.01	10.36
3237.46	10.2	3284.67	10.19	3336.84	10.23	3346.59	12.25	3386.84	18.59
3390.01	18.7	3403.66	19.41	3416.52	24.97	3420.62	26.92	3433.41	25.66
3439.42	25.1	3448.56	28.08	3468.3	34.15	3471.51	33.72	3481.4	33.27
3494.77	37.3	3511.58	42.12	3539.78	51.12	3556.19	52.41		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2827.53	.045	3390.01	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2827.53	3390.01	806.85	444	387.93	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2724.27		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 7.

INPUT
Description: Revised
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	29.8	1045	27.9	1085	27.6	1103	26.3	1115	26.3
1126	22	1135	17.5	1151	17.2	1163	19.7	1173	20.4
1225	17.8	1313	18.2	1329	18.8	1336	21.6	1351	23.1
1357	21.9	1361	20.1	1367	20.7	1371	19.5	1376	19.9
1380	19.2	1389	19.6	1392	20.4	1396	19.1	1438	19.4
1445	20.9	1452	23.1	1461	19.9	1533	18.8	1577	20.5
1588	21.6	1602	24.8	1609	24.8	1620	23.3	1632	19.9
1646	17.2	1729	15.7	1761	14.5	1784	14.8	1794	16
1802	16.3	1826	15.5	1839	14.5	1924	12.1	1953	9.1
1958	7.6	2017	7.7	2023	9.3	2037	11.2	2108	13.5
2143	20.2	2151	20.9	2167	20.7	2194	17	2237	14.7
2272	15.8	2284	17	2317	17.8	2341	17.7	2365	17.8
2415	17.3	2437	16.7	2468	17.4	2484	17.6	2523	18.4
2565	18.9	2578	19.6	2580	20	2586	20.1	2598	21.1
2647	24.9	2655	24.7	2675	26.8	2689	26.5	2767	22.9
2800	22.5	2807	22.2	2824	17.1	2835	13.3	2843	11
2878	10.1	2919	10	3013	9.5	3101	9.4	3222	10.6
3243	10.7	3296	10.3	3318	13.8	3349	18.8	3377	20.2
3397	19.3	3436	20.9	3465	22.1	3476	22.8	3490	25.5
3499	26.2	3505	26.3	3516	29	3524	30.8	3546	31.4

3585	37	3587	37.5	3590	37.1	3597	37.4	3613	37.9
3620	37.9	3625	38.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2835	.045	3318	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2835	3318	692.7	497	459.02	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2675		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 6.

INPUT
Description: Revised
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	34.8	1013	34.7	1055	33.7	1055	33.9	1078	33.7
1086	35	1129	35.1	1187	33.7	1237	31.2	1269	28.9
1296	26.3	1322	24.3	1338	23.7	1356	21.1	1366	18.9
1376	17.3	1387	23.1	1391	22.8	1400	23.7	1413	24.3
1433	22.4	1463	15.9	1478	15.5	1504	15.7	1523	15
1552	12.7	1580	12	1600	9.1	1612	8.6	1656	8.3
1676	7.7	1698	7.7	1751	8.5	1765	9.3	1771	9.3
1784	8.6	1787	8.8	1791	8.3	1794	8.4	1796	8.9
1807	9.8	1816	9.6	1818	9.2	1824	7.7	1937	7.7
1976	8.8	2014	7.8	2026	9.6	2088	11.3	2111	13.2
2122	13.2	2150	14.5	2161	14.6	2170	14.1	2186	15.2
2247	14.5	2318	14.5	2329	14.9	2349	14.3	2397	19
2402	19.3	2403	19.3	2405	19	2427	15.9	2433	15.4
2444	14.8	2447	14.8	2473	16.6	2509	16.5	2524	17
2556	20	2565	20.6	2569	20.7	2591	22.2	2612	22.6
2631	23.7	2652	25.1	2679	26.7	2689	25.6	2700	24.4
2718	23.6	2743	21.7	2749	19.8	2780	9.7	2806	9.2
2862	9.3	2907	8.8	2925	8.8	2998	9.7	3089	10
3165	8.1	3173	7.9	3185	7.7	3279	9.9	3319	8.8
3363	9.5	3390	15.5	3409	19.8	3418	20.3	3428	20.7
3441	22.8	3449	22.9	3464	23.2	3477	28.5	3482	29.7
3508	30.7	3517	32.9	3572	46.4	3598	50.5	3607	52.7
3628	59.1	3633	60.8	3673	77.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2780	.045	3165	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2780	3165	642.39	511	528.63	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2678.79		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 5.

INPUT
Description: Revised
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	26.5	1002	26	1013	28.6	1024	32.7	1042	32
1135	31.8	1149	33.4	1163	32.7	1178	30.6	1194	26.7
1207	22.7	1259	16.3	1275	16	1297	19	1313	20.2
1322	19.4	1348	14	1357	14	1373	16.6	1389	16.7
1412	14.6	1499	12.7	1540	13.8	1579	17.2	1594	16.3
1640	7.7	1773	7.7	1800	9.3	1892	10.9	1943	8.5
1949	7.6	2006	7.6	2026	13.8	2035	15.6	2072	15.8
2089	14.9	2109	15.4	2147	18.4	2164	16.8	2176	17
2190	16	2204	17.5	2242	24.9	2253	25.5	2276	23.7
2295	23.9	2334	18.3	2408	18.3	2423	20.8	2445	22.5
2463	21	2470	19.5	2502	12.6	2514	9.1	2564	8.9
2593	8.6	2625	8.9	2694	9.2	2712	8.7	2807	7.9
2822	10.6	2842	14	2856	16.5	2864	16.5	2885	16.5
2901	16.8	2925	16.6	2942	16.6	2945	16.8	2962	16.6
3010	16.8	3053	16.5	3076	16.9	3091	17	3099	17.4
3120	17.4	3174	18.2	3238	18.2	3263	18.1	3281	18.2
3291	18.5	3333	18.7	3339	19.1	3350	20.7	3356	19.6
3361	18.6	3378	21.9	3430	29.7	3436	33		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2502	.045	2822	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2502	2822	578.02	495	791.59	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2445		T
3230	3436		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 4.

INPUT
Description: Revised
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	32.2	1007	27.6	1017	24.3	1053	24.2	1058	23.6
1073	24.4	1105	24.3	1120	24.9	1133	26.1	1146	25.4
1155	23.4	1173	16.9	1182	15.2	1210	14.1	1223	14.7
1240	13.1	1263	12.1	1345	11.3	1371	11.9	1391	13.7
1398	13.3	1409	11.5	1426	12.7	1437	16.1	1474	11.1
1494	10.7	1515	12.7	1533	15.8	1542	15.7	1571	13.6
1676	12.2	1699	10.5	1706	9.6	1713	7.6	1847	7.7
1851	7.7	1942	10.9	1970	13	2023	15.8	2053	15.5
2093	18.3	2111	20.1	2152	21.2	2159	22.3	2169	19
2178	13.4	2182	10.2	2186	8.8	2190	8.7	2197	12.8
2214	9.9	2225	8.1	2246	8	2278	7.8	2296	7.8
2454	7.5	2474	7.4	2482	7.3	2499	7.5	2527	7.5
2535	7.6	2557	11.9	2570	14.3	2573	14.9	2597	15.7
2610	15.3	2634	14.9	2638	14.8	2639	14.9	2701	17
2739	17.5	2798	18.7	2803	15.7	2804	15.7	2834	16.3
2887	16.2	2918	16.4	2982	16.5	2999	16.2	3115	16.2
3192	16.2	3279	16.5	3281	16.5	3346	16.2	3416	16.2
3418	16.2	3442	16.3	3451	16.4	3480	16.3	3497	15.9
3582	15.4	3675	16.7	3682	16.7	3687	16.9	3735	17.9

3756	18.3	3815	18.7	3830	18.6	3854	20	3856	20.2
3859	20.6	3871	25.3	3877	26.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2178	.045	2557	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2178	2557	537.07	495	500.63	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2155		T
3100	3877		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 3.

INPUT
Description: Revised
The X1 and GR information below is all generated from new sections cut from
the topo received from Jas...saved as fairbanks.dtm. The X1 Id's
currently indicate the station along the stream alignment, with the zero
station of the stream at the upstream end. For this Hec-Clomr analysis,
the X1 and GR information listed below is for all sections upstream of the
Howard Chang CX 2.8444. CX geometry begins with Sta. 1000 at the left end

Date: 11-08-02

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	25.3	1039	23.4	1047	23	1055	22.6	1089	24.9
1105	25.2	1105	24.7	1139	25.7	1171	24.8	1171	25.3
1184	25.7	1191	27.6	1220	26.9	1232	25.5	1244	23.5
1256	19.6	1266	16.8	1277	13.6	1280	13.4	1288	13.7
1293	14.7	1320	14	1333	11.6	1358	7.4	1511	7.4
1527	9.7	1550	11.9	1577	13.1	1592	13.3	1650	10.4
1661	9.1	1669	7.6	1720	7.6	1770	7.6	1783	9
1792	8.9	1851	11.2	1876	12.5	1998	16.7	2056	22.7
2077	22.5	2083	21.6	2092	18.7	2101	13.2	2109	8
2115	8	2119	12.9	2120	13	2144	7	2182	7.3
2285	7	2326	7.1	2418	7	2444	7.1	2452	6.9
2474	10.9	2479	11.8	2496	14.6	2500	14.7	2520	14.9
2563	15.2	2594	15.4	2652	15.9	2666	16.3	2738	16.3
2756	16.4	2830	17.7	2832	17.4	2846	15.2	2871	15.5
2973	15.6	2987	15.6	3048	15.6	3060	15.6	3151	15.5
3256	14.5	3260	14.5	3330	15	3430	15.1	3431	15.1
3432	15.1	3570	13.6	3604	13.4	3693	13.1	3734	13.9
3765	14.9	3858	15.7	3868	15.8	3916	16.3	3934	19.3
3936	19.7	3946	20.2	4019	25.5	4039	26.3	4044	27.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2101	.045	2474	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.

2101	2474	715	765	795	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2065		T
3160	4044		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.844

INPUT
Description: Revised
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3745	45.5	3767	39	3803	36.6	3810	37.2	3821	40.4
3837	39.4	3850	40	3892	39.4	3910	39.5	3924	41.5
3934	41.5	3952	37.9	3977	30.9	3998	24.3	4010	21.3
4038	18.3	4046	16.4	4056	16.6	4086	13.9	4130	11.5
4187	11	4220	14.2	4232	16.3	4268	19.5	4281	21.4
4298	19.6	4313	15.6	4316	15.5	4327	15.3	4334	16.3
4350	15.9	4365	13	4392	10.1	4456	7.5	4559	8.3
4569	7.7	4587	8.5	4613	11.9	4632	15.5	4641	15.8
4652	14.5	4663	16.4	4690	16.3	4704	13.7	4733	13.6
4764	22.8	4770	22.1	4780	18.5	4790	13.4	4798	7.6
4807	7.4	4810	11.1	4845	7.4	4964	7.5	5141	7.6
5147	9.9	5153	13.4	5180	14	5185	15.7	5196	14.8
5287	14.4	5340	14.4	5427	14.6	5513	14.8	5600	15
5680	15	5760	15	5840	15	5920	15	6000	15
6060	14.7	6120	14.5	6200	15	6256	14.4	6312	13.8
6350	16.2	6366	16	6380	14	6455	13.9	6530	13.7
6599	13.9	6668	14	6716	16	6725	15	6742	16
6758	20	6822	22	6848	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3745	.045	4790	.045	5180	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4790	5180	325	325	325	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3745	4770		T
6060	6848		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6
3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8

4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6
4708	12.9	4727	12.4	4740	11	4763	7.7	4784	7.3
4823	7.1	4994	7.2	5165	7.2	5176	8.7	5184	12.4
5187	12.6	5212	12.8	5218	14.8	5230	14.2	5296	14.1
5326	14.2	5327	14.2	5400	14.5	5455	14.2	5510	14
5590	13.9	5670	13.8	5725	14	5780	14.2	5840	14
5900	13.8	5950	14	6000	14.2	6065	14	6130	13.8
6195	14.1	6260	14.3	6340	14	6420	13.8	6500	13.5
6563	13.7	6626	13.8	6648	13.3	6663	20.5	6666	20.5
6678	14.5	6701	14.5	6711	21.1	6733	20.7	6735	20.3
6780	21.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3877	.045	4727	.045	5184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4727	5184	265	265	265	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3877	4710		T
5830	6780		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.732

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3819	29.5	3837	29.1	3837	28.6	3856	28.8	3877	28.4
3877	28.9	3889	28.5	3904	28.6	3912	30.4	3929	29.3
3942	26.9	3949	25.1	3959	22	3967	20.7	3976	20.3
4012	16.6	4041	14.9	4118	12.9	4174	13	4214	13.8
4227	13.7	4277	15.2	4297	14.9	4320	16.8	4329	18.2
4368	13.3	4382	12.8	4405	10.2	4416	9.3	4425	9.2
4430	9.1	4445	10.3	4449	11	4454	11	4460	11.7
4488	11.7	4515	12.3	4541	11.5	4551	10.9	4560	9.3
4569	7.5	4649	7.5	4659	10.3	4695	18.2	4700	19
4714	22.1	4742	24.7	4758	22.5	4766	22.4	4780	18.3
4793	15.5	4818	11.5	4829	7.6	4854	7.2	4998	7.1
5171	7.1	5185	12.2	5211	12.3	5216	14.2	5250	13.9
5335	14	5365	13.5	5450	14.2	5525	13.9	5600	13.7
5675	13.4	5750	13.2	5827	13.5	5905	13.7	5982	14
6060	14.3	6148	14.1	6236	13.9	6324	13.8	6412	13.6
6500	13.4	6566	13.6	6628	13.2	6642	20	6645	20
6657	14	6679	14	6690	22.9	6713	22.2	6715	21.8
6760	22.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3819	.045	4793	.045	5185	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4793	5185	300	300	300	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3819	4740		T
5430	6760		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.675

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3836	28	3850	26	3887	25	3897	24.2	3898	24.7
3958	24.2	3984	19.6	3997	18.1	4011	17.3	4063	16
4077	15.9	4099	17.6	4104	17.7	4108	18.2	4160	15.5
4170	15.4	4210	13.9	4222	13	4235	12.7	4268	15
4279	15.5	4295	14	4310	11.7	4320	11	4334	10.6
4350	11.5	4373	12.2	4407	12.2	4458	9.7	4462	9.5
4482	9.1	4525	11.6	4633	13.4	4686	15.1	4707	17.2
4724	19.9	4733	22.1	4742	23	4755	21.8	4763	21.7
4782	16.1	4787	15.4	4806	14.6	4840	11.7	4852	11.6
4862	10.7	4873	7.3	4893	6.9	5018	6.8	5119	6.8
5139.2	8	5149.2	10	5159.5	11.8	5171.6	12	5185.6	12
5202.4	12.2	5204	12	5219	13	5228	13.4	5346	13.4
5370	13.3	5450	14.3	5533	13.9	5616	13.4	5700	13
5782	13.5	5865	14	5943	13.7	6021	13.3	6100	13
6186	13.4	6273	13.7	6360	14.1	6430	13.8	6500	13.5
6555	13.8	6610	14.1	6618	13.4	6630	19.4	6634	19.4
6645	13.4	6667	13.4	6681	24.1	6703	23.7	6705	23.3
6750	24.2	6758	24	6818	26	6822	28		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3836	.045	4787	.045	5171.6	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4787	5171.6	129.92	108	85.27	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3836	4745		T
5228	6822		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.65388*

INPUT
Description:
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4632.6	28	4635.23	27.63	4642.19	27.43	4642.2	27.43	4644.07	27.28
4644.25	27.38	4655.53	27.28	4660.42	26.42	4662.86	26.14	4662.88	26.14
4665.5	25.99	4675.27	25.75	4677.9	25.73	4682.04	26.05	4682.05	26.05
4682.98	26.07	4683.73	26.16	4693.5	25.65	4695.38	25.63	4702.9	25.35
4705.15	25.18	4707.6	25.12	4713.8	25.55	4715.87	25.65	4718.88	25.37
4721.7	24.93	4723.58	24.8	4726.2	24.73	4729.22	24.9	4729.23	24.9
4733.54	25.03	4733.55	25.03	4739.93	25.03	4749.52	24.56	4749.53	24.56
4750.27	24.52	4750.28	24.52	4754.03	24.45	4762.1	24.92	4782.41	25.25
4782.43	25.25	4792.37	25.58	4796.32	25.97	4796.33	25.97	4799.52	26.48
4799.53	26.48	4801.21	26.89	4802.9	27.06	4805.34	26.83	4805.36	26.83
4806.85	26.82	4806.86	26.82	4810.42	25.77	4810.43	25.77	4811.36	25.63
4817.13	24.01	4827.47	20.84	4831.12	19.89	4834.16	18.95	4837.5	17.46

4843.58	15.84	4881.58	6.15	4925.35	6.15	4969.11	6.15	5012.88	6.15
5056.65	6.15	5100.4	6.15	5144.17	6.15	5155.15	12.05	5162.1	12.14
5167.5	12.37	5170.97	14.31	5180.11	19.39	5190.85	25	5193.47	25
5196.62	25.03	5196.64	25.03	5196.92	25	5196.94	25	5199.75	25.18
5201.45	25.25	5223.62	25.25	5228.14	25.23	5243.17	25.42	5258.77	25.35
5274.37	25.25	5290.17	25.18	5305.57	25.27	5305.58	25.27	5321.17	25.37
5321.19	25.37	5335.85	25.31	5350.5	25.23	5350.51	25.23	5365.35	25.18
5365.36	25.18	5381.52	25.25	5397.87	25.31	5414.22	25.38	5427.37	25.33
5427.39	25.33	5440.55	25.27	5450.87	25.33	5450.88	25.33	5461.22	25.38
5462.72	25.25	5464.97	26.38	5465.72	26.38	5465.73	26.38	5467.8	25.26
5471.92	25.25	5471.94	25.26	5474.57	27.27	5478.7	27.19	5479.07	27.12
5487.52	27.28	5487.54	27.28	5489.04	27.25	5500.32	27.62	5501.07	28

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4632.6	.045	4811.36	.04	5190.85	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4811.36	5190.85	18.05	15	11.84	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4632.6	4802.9	27.06	F
5464.97	5501.07	26.38	F

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.65095

INPUT
Description:
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4743.24	28	4744.29	27.85	4747.08	27.77	4747.83	27.71	4747.9	27.75
4752.41	27.71	4754.37	27.37	4755.35	27.26	4756.4	27.2	4760.31	27.1
4761.36	27.09	4763.02	27.22	4763.39	27.23	4763.69	27.26	4767.6	27.06
4768.35	27.05	4771.36	26.94	4772.26	26.87	4773.24	26.85	4775.72	27.02
4776.55	27.06	4777.75	26.95	4778.88	26.77	4779.63	26.72	4780.68	26.69
4781.89	26.76	4783.62	26.81	4786.17	26.81	4790.01	26.62	4790.31	26.61
4791.81	26.58	4795.04	26.77	4803.17	26.9	4807.15	27.03	4808.73	27.19
4810.01	27.39	4810.68	27.56	4811.36	27.62	4812.34	27.53	4812.94	27.53
4814.37	27.11	4814.74	27.05	4818.68	25.32	4825.73	22.11	4828.22	21.04
4830.29	20.09	4832.57	18.87	4836.72	17.08	4850.88	11.06	4909.85	11.06
4924.85	6.06	4934.85	6.06	4949.85	11.06	4984.13	11.06	4999.13	6.06
5009.13	6.06	5024.13	11.06	5058.35	11.06	5073.35	6.06	5083.35	6.06
5098.35	11.06	5155.81	11.06	5158.45	12.68	5165.28	12.72	5170.59	12.81
5173.99	14.91	5182.97	20.44	5193.52	26.8	5194.57	26.8	5195.83	26.81
5195.95	26.8	5197.08	26.87	5197.76	26.9	5206.63	26.9	5208.44	26.89
5214.45	26.97	5233.25	26.87	5245.65	26.95	5257.38	26.89	5263.32	26.87
5282.87	26.95	5293.4	26.91	5301.67	26.95	5302.27	26.9	5303.17	27.35
5303.47	27.35	5304.3	26.9	5305.95	26.9	5307.01	27.71	5308.66	27.68
5308.81	27.65	5312.19	27.71	5312.8	27.7	5317.31	27.85	5317.61	28

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4743.24	.045	4814.74	.03	4909.85	.04	4949.85	.04	4984.13	.04
5024.13	.04	5058.35	.04	5098.35	.04	5193.52	.035		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4814.74	5193.52	32.03	30	27.89	.1	.3

BRIDGE

RIVER: RIVER-1
REACH: Reach-1 RS: 2.650

INPUT
Description:
Distance from Upstream XS = .01
Deck/Roadway Width = 29.9
Weir Coefficient = 3
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4836.72	14.06	11.06	5173.99	14.06	11.06

Upstream Bridge Cross Section Data
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4743.24	28	4744.29	27.85	4747.08	27.77	4747.83	27.71	4747.9	27.75
4752.41	27.71	4754.37	27.37	4755.35	27.26	4756.4	27.2	4760.31	27.1
4761.36	27.09	4763.02	27.22	4763.39	27.23	4763.69	27.26	4767.6	27.06
4768.35	27.05	4771.36	26.94	4772.26	26.87	4773.24	26.85	4775.72	27.02
4776.55	27.06	4777.75	26.95	4778.88	26.77	4779.63	26.72	4780.68	26.69
4781.89	26.76	4783.62	26.81	4786.17	26.81	4790.01	26.62	4790.31	26.61
4791.81	26.58	4795.04	26.77	4803.17	26.9	4807.15	27.03	4808.73	27.19
4810.01	27.39	4810.68	27.56	4811.36	27.62	4812.34	27.53	4812.94	27.53
4814.37	27.11	4814.74	27.05	4818.68	25.32	4825.73	22.11	4828.22	21.04
4830.29	20.09	4832.57	18.87	4836.72	17.08	4850.88	11.06	4909.85	11.06
4924.85	6.06	4934.85	6.06	4949.85	11.06	4984.13	11.06	4999.13	6.06
5009.13	6.06	5024.13	11.06	5058.35	11.06	5073.35	6.06	5083.35	6.06
5098.35	11.06	5155.81	11.06	5158.45	12.68	5165.28	12.72	5170.59	12.81
5173.99	14.91	5182.97	20.44	5193.52	26.8	5194.57	26.8	5195.83	26.81
5195.95	26.8	5197.08	26.87	5197.76	26.9	5206.63	26.9	5208.44	26.89
5214.45	26.97	5233.25	26.87	5245.65	26.95	5257.38	26.89	5263.32	26.87
5282.87	26.95	5293.4	26.91	5301.67	26.95	5302.27	26.9	5303.17	27.35
5303.47	27.35	5304.3	26.9	5305.95	26.9	5307.01	27.71	5308.66	27.68
5308.81	27.65	5312.19	27.71	5312.8	27.7	5317.31	27.85	5317.61	28

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4743.24	.045	4814.74	.03	4909.85	.04	4949.85	.04	4984.13	.04
5024.13	.04	5058.35	.04	5098.35	.04	5193.52	.035		

Bank Sta: Left	Right	Coeff Contr.	Expan.
4814.74	5193.52	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4817	14	11	5195.3	14	11

Downstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4817	28	4842.5	11	4872.06	11	4887.06	6	4897.06	6
4912.06	11	4986.15	11	5001.15	6	5011.15	6	5026.15	11
5060.33	11	5090.02	11	5105.02	6	5115.02	6	5130.02	11
5157.5	11	5160.65	13.1	5172.65	13.1	5195.3	28		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4817	.03	4872.06	.03	4912.06	.03	4986.15	.03	5026.15	.03
5060.33	.03	5090.02	.03	5130.02	.03				

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
          4817  5195.3            .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =   14.06
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.649

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4817      28  4842.5      11 4872.06      11 4887.06       6 4897.06       6
 4912.06      11 4986.15      11 5001.15       6 5011.15       6 5026.15      11
 5060.33      11 5090.02      11 5105.02       6 5115.02       6 5130.02      11
  5157.5      11 5160.65    13.1 5172.65    13.1  5195.3      28

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4817     .03 4872.06     .03 4912.06     .03 4986.15     .03 5026.15     .03
 5060.33     .03 5090.02     .03 5130.02     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4817  5195.3             93.8    93.8    93.8             .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

BRIDGE
```



```
RIVER: RIVER-1
REACH: Reach-1            RS: 2.637

INPUT
Description:
Distance from Upstream XS =      .01
Deck/Roadway Width        =    93.78
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4817      14      11  5195.3      14      11

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4817      28  4842.5      11 4872.06      11 4887.06       6 4897.06       6
 4912.06      11 4986.15      11 5001.15       6 5011.15       6 5026.15      11
 5060.33      11 5090.02      11 5105.02       6 5115.02       6 5130.02      11
  5157.5      11 5160.65    13.1 5172.65    13.1  5195.3      28

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4817     .03 4872.06     .03 4912.06     .03 4986.15     .03 5026.15     .03
 5060.33     .03 5090.02     .03 5130.02     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4817  5195.3             .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4827    13.9    10.9    5179    13.9    10.9

Downstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4827      28 4852.53    10.9  4876.5    10.9  4891.5     5.9  4901.5     5.9
  4916.5    10.9    4983    10.9    4998     5.9    5008     5.9    5023    10.9
 5085.52    10.9 5100.52     5.9 5130.52     5.9 5125.52    10.9  5147.4    10.9
  5150.5      13  5162.5      13    5179      28

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4827     .03  4876.5     .03  4916.5     .03    4983     .03    5023     .03
 5085.52     .03 5125.52     .03  5147.4     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179             .3       .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820                T
    5200    5179                T
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
```

```
Elevation at which weir flow begins          =      14
Energy head used in spillway design          =
Spillway height used in design               =
Weir crest shape                             = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
          inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.625

INPUT
Description: Revised
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4827      28 4852.53    10.9  4876.5    10.9  4891.5     5.9  4901.5     5.9
  4916.5    10.9    4983    10.9    4998     5.9    5008     5.9    5023    10.9
 5085.52    10.9 5100.52     5.9 5110.52     5.9 5125.52    10.9  5147.4    10.9
  5150.5      13  5162.5      13    5179      28

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4827     .03  4876.5     .03  4916.5     .03    4983     .03    5023     .03
 5085.52     .03 5125.52     .03  5147.4     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4827    5179             25.1      30   35.99              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820              T
    5200    5179              T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

BRIDGE


RIVER: RIVER-1
REACH: Reach-1            RS: 2.624

INPUT
Description:
Distance from Upstream XS =      .01
```



```
Deck/Roadway Width        =   29.98
Weir Coefficient          =       3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4827    13.9    10.9    5179    13.9    10.9

Upstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4827      28 4852.53    10.9  4876.5    10.9  4891.5     5.9  4901.5     5.9
  4916.5    10.9    4983    10.9    4998     5.9    5008     5.9    5023    10.9
 5085.52    10.9 5100.52     5.9 5110.52     5.9 5125.52    10.9  5147.4    10.9
  5150.5      13  5162.5      13    5179      28

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    4827     .03  4876.5     .03  4916.5     .03    4983     .03    5023     .03
 5085.52     .03 5125.52     .03  5147.4     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820              T
    5200    5179              T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
  4852.1   13.65   10.65 5188.24   13.65   10.65

Downstream Bridge Cross Section Data
Station Elevation Data    num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4545.46   29.09 4567.69   26.96 4574.69   27.78 4587.66   26.69 4599.67   26.34
  4607.41   26.23 4652.36   25.66 4655.82    25.6  4661.7   25.52 4707.41   25.36
  4709.37   25.82 4711.71   26.37    4714   26.91 4716.35   27.46 4718.66      28
  4719.31   28.16 4733.29   28.22 4734.68   28.14 4751.62   28.47 4752.71   28.68
   4755.9   28.74 4757.02    28.6 4775.62   28.74 4777.64   28.84 4785.59   29.09
  4795.81   29.23 4797.99   29.09 4801.69   28.54 4805.45      28 4809.38   27.46
  4813.24   26.91  4831.3   27.24 4841.79   27.24 4841.85   25.12  4852.1   19.38
  4876.04   10.65 4909.85   10.65 4924.85    5.65 4934.85    5.65 4949.85   10.65
  5002.17   10.65 5017.17    5.65 5027.17    5.65 5042.17   10.65 5074.19   10.65
  5089.19    5.65 5099.19    5.65 5114.19   10.65 5165.82   10.65  5168.7   10.69
  5177.82   15.93 5188.24   16.09 5202.56   27.24 5210.63   26.28 5259.01   25.38
  5317.52   25.17 5392.03   25.14 5439.67   25.22 5484.38   25.25  5522.3   25.41
  5554.66   25.96 5580.95   26.72 5585.55   26.88 5596.39   27.37 5596.56    27.4
  5599.28    27.4

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  4545.46    .045 4841.79     .04 4909.85     .04 4949.85     .04 5002.17     .04
  5042.17     .04 5074.19     .04 5114.19     .04 5202.56    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        4841.79 5202.56             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  4545.464836.617              T
```

5217.84 5599.28 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 13.9
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd = .8
Max Low Cord =

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.622

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4545.46	29.09	4567.69	26.96	4574.69	27.78	4587.66	26.69	4599.67	26.34
4607.41	26.23	4652.36	25.66	4655.82	25.6	4661.7	25.52	4707.41	25.36
4709.37	25.82	4711.71	26.37	4714	26.91	4716.35	27.46	4718.66	28
4719.31	28.16	4733.29	28.22	4734.68	28.14	4751.62	28.47	4752.71	28.68
4755.9	28.74	4757.02	28.6	4775.62	28.74	4777.64	28.84	4785.59	29.09
4795.81	29.23	4797.99	29.09	4801.69	28.54	4805.45	28	4809.38	27.46
4813.24	26.91	4831.3	27.24	4841.79	27.24	4841.85	25.12	4852.1	19.38
4876.04	10.65	4909.85	10.65	4924.85	5.65	4934.85	5.65	4949.85	10.65
5002.17	10.65	5017.17	5.65	5027.17	5.65	5042.17	10.65	5074.19	10.65
5089.19	5.65	5099.19	5.65	5114.19	10.65	5165.82	10.65	5168.7	10.69
5177.82	15.93	5188.24	16.09	5202.56	27.24	5210.63	26.28	5259.01	25.38
5317.52	25.17	5392.03	25.14	5439.67	25.22	5484.38	25.25	5522.3	25.41
5554.66	25.96	5580.95	26.72	5585.55	26.88	5596.39	27.37	5596.56	27.4
5599.28	27.4								

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4545.46	.045	4841.79	.04	4909.85	.04	4949.85	.04	5002.17	.04
5042.17	.04	5074.19	.04	5114.19	.04	5202.56	.035		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4841.79	5202.56	10.34	15	20.69	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4545.46	4836.617		T
5217.84	5599.28		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.61915*

INPUT
Description:
Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4278.18	30.12	4321.51	25.98	4335.16	27.57	4360.43	25.45	4383.85	24.76
4398.93	24.55	4486.55	23.43	4486.56	23.43	4493.3	23.33	4493.31	23.33
4504.77	23.17	4593.88	22.85	4597.7	23.75	4602.26	24.82	4606.72	25.88
4611.29	26.94	4611.3	26.94	4615.81	28	4617.07	28.32	4644.32	28.43
4647.03	28.27	4680.06	28.92	4682.18	29.33	4688.4	29.44	4690.58	29.17
4726.84	29.44	4730.78	29.64	4746.28	30.12	4766.2	30.39	4770.44	30.12
4777.66	29.06	4784.99	28	4792.64	26.94	4792.65	26.94	4800.18	25.88
4835.38	26.51	4855.83	26.51	4855.91	22.49	4855.91	22.41	4868.98	15.83
4878.83	13.38	4882.06	12.71	4882.92	12.45	4899.74	9.37	4915.13	6.55
4916.55	6.53	4917.42	6.42	4934.23	5.97	4951.05	5.42	4951.69	5.42
4964.11	5.42	4976.53	5.42	4976.54	5.42	4977.17	5.42	4989.61	5.42
5002.03	5.42	5002.67	5.42	5009.14	6.44	5037.77	5.92	5043.81	7.04
5073.59	8.11	5091.87	8.75	5101.21	9.08	5106	9.1	5126.39	9.18
5133.01	10.25	5148.54	11.31	5163.79	12.37	5173.86	13.43	5183.79	14.5
5186.95	14.81	5192.23	15.01	5195.95	15.14	5203.75	18.71	5212.67	19.03
5224.93	26.51	5240.65	24.65	5240.66	24.65	5334.96	22.9	5449.03	22.48
5594.27	22.42	5687.14	22.58	5774.29	22.64	5774.3	22.64	5848.21	22.95
5911.3	24.02	5962.54	25.5	5971.52	25.82	5992.65	26.78	5992.97	26.83
5998.28	26.83								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4278.18	.03	4855.83	.04	5224.93	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4855.83	5224.93		18.76	27.2	37.52 .3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4278.18	4852.393		T
5234.781	5998.28		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.614

INPUT
Description: This is a REPEATED section.
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5
4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7
4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5

5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4
5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.03	5265.5	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5265.5	27	27	27	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

BRIDGE

RIVER: RIVER-1
REACH: Reach-1 RS: 2.6115

INPUT
Description: Existing Bridge
Distance from Upstream XS = .1
Deck/Roadway Width = 26.8
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Upstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5

4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7
4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5
5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4
5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.03	5265.5	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
4881.3	5265.5	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

Downstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Downstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5
4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7
4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5
5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5

```
  5115.5     6.9  5135.4     5.9  5139.6       8  5160.3      10  5179.5    11.8
    5197      12  5201.6      14  5212.4      16    5223      18    5230      20
  5236.9      22  5239.1    22.6  5265.5    25.2  5295.1    21.7  5472.7    18.4
  5687.5    17.6    5961    17.5  6135.9    17.8    6300    17.9  6439.2    18.5
    6558    20.5  6654.5    23.3  6671.4    23.9  6711.2    25.7  6711.8    25.8
  6721.8    25.8

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
  3793.5     .03  4881.3     .04  5265.5     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
        4881.3  5265.5              .3       .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
  3793.5    4881               T
  5265.5  6721.8               T

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins           =    17.6
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  7

Pier Data
Pier Station     Upstream=  4918.4    Downstream=  4918.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22

Pier Data
Pier Station     Upstream=  4918.4    Downstream=  4918.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22

Pier Data
Pier Station     Upstream=  4966.4    Downstream=  4966.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22

Pier Data
Pier Station     Upstream=  5014.4    Downstream=  5014.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22
```



```
Pier Data
Pier Station     Upstream=  5062.4    Downstream=  5062.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22

Pier Data
Pier Station     Upstream=  5110.4    Downstream=  5110.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22

Pier Data
Pier Station     Upstream=  5158.4    Downstream=  5158.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3      5        3     22

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
      Energy Only

Additional Bridge Parameters
      Add Friction component to Momentum
      Do not add Weight component to Momentum
      Class B flow critical depth computations use critical depth
          inside the bridge at the upstream end
      Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.609

INPUT
Description:
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  3793.5      32  3875.1    24.2  3900.8    27.2  3948.4    23.2  3992.5    21.9
  4020.9    21.5  4185.9    19.4  4198.6    19.2  4220.2    18.9    4388    18.3
  4395.2      20  4403.8      22  4412.2      24  4420.8      26  4429.3      28
  4431.7    28.6    4483    28.8  4488.1    28.5  4550.3   29.74  4554.3    30.5
    4566    30.7  4570.1    30.2  4638.4    30.7  4645.8    31.1    4675      32
  4712.5    32.5  4720.5      32  4734.1      30  4747.9      28  4762.3      26
  4776.5      24  4842.8    25.2  4881.3    25.2  4881.4    17.5  4899.6     9.4
  4913.3       8  4917.8     7.8    4919     7.6  4942.4     7.3  4965.8       7
    4967     6.8  4990.4       6  5013.8       5    5015       5  5038.4       5
```

5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4
5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.04	5265.5	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5265.5	100	100	90	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.59

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4345.5	26	4354.4	24	4363.1	22	4372.1	20	4393.8	18.1
4404.3	16	4422.7	14	4594.7	14	4642.3	11	4773	10.89
4774.2	11	4806.4	21.5	4816.4	21.5	4821	20	4836	15
4848	11	4848.3	10.57	4897.7	10.1	4898	10	4962	8
5000	8	5016	6	5025	5	5100	5	5120	6
5133.3	6.2	5144.5	8	5173.2	10	5202.4	11.8	5208	10
5232	12	5316	12.4	5401	12.8	5485	13.2	5570	13.6
5655	14	5720	14	5775	15	5830	16	5891	17
5953	18	5960	16	5980	15.5	6010	16	6017	18.5
6027	16	6100	14	6155	15	6210	16	6278	16.7
6346	17.3	6415	18	6455	22	6475	24		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4345.5	.035	4594.7	.04	4806.4	.04	4898	.04	5202.4	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4898	5173.2	345	345	340	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4345.5	4806.4		T
5202.4	6475		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.524

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3871	23	3885	22	3891	20	3904	16	4004	15.5

4006	15	4024	11	4632	10.17	4634	11	4666	21.5
4676	21.5	4702	13	4712	9.8	4886	8	4897	6
4919	5.6	4934	6	4964	8	4969	8	4987	6
5000	5.5	5013	6	5030	4.5	5085	4.5	5140	4.5
5150	6	5175	8	5250	10	5320	11	5390	12
5460	12.2	5530	12.3	5600	12.5	5686	12.7	5773	12.8
5859	13	5946	13.2	6033	13.3	6120	13.5	6130	14
6140	16	6146	14	6200	14	6275	15	6350	16
6373	18	6430	28						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3871	.035	4004	.04	4666	.04	4886	.04	5320	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4712	5320	450	450	450	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3871	4676		T
5320	6430		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.439

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3692	20.5	3705	20	3711	18	3718	16	3871	14
4186	14	4204	10	4678	9.5	4715	21.5	4725	21.5
4754	12	4755	11.8	4760	10.1	4964	8	5000	6
5050	4.9	5115	3.8	5120	4	5152	8	5204	9
5256	10	5320	10.7	5384	11.3	5448	12	5519	12
5590	12	5662	12	5685	18	5730	18	5740	16
5760	15.3	5834	15.5	5908	15.8	5982	16	6003	20
6027	22	6037	27						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3692	.035	4186	.04	4725	.04	4964	.04	5256	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4760	5256	520	520	520	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3692	4725		T
5500	6037		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.341

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3449.9	23	3455	22.6	3470	22	3475	20	3480	18
3485	16	3490	14	3495	13.52	3498	13.1	3511	12.6

3518	12.6	3705	13	3903	13.4	4177	12.4	4442	12.2
4514	12	4522	12	4527	11.35	4540	11.45	4545	12
4548	12	4606	12	4662	12	4665	11	4668	10
4671	9	4853	8.5	4966	8	4968	6	4970	4
5000	4	5025	4	5050	3.3	5110	6	5147	10
5229	10.5	5312	11	5394	11.5	5477	12	5496	14
5508	16	5591	16	5674	16	5757	16	5840	16
5855	16	5885	34						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3449.9	.035	4662	.04	4966	.035	5147	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
4671	5147	550	580	600	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3449.9	4545		T
5560	5885		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.231

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3413	.035	4644	.035	5355	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
4644	5355	300	400	430	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3413	3970		T
5900	5900		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.155

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5

4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4
5175	2.5	5200	2.5	5222	4	5238	8	5250	10
5300	9.9	5350	9.8	5415	10.5	5480	11.3	5545	12
5626	13	5708	14	5722	16	5803	18	5834	26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3422	.035	4728	.035	5250	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
4728	5250	330	500	450	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.06

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3622	30	3666	14	3743	13.7	3821	13.3	3899	13
3976	12.7	4054	12.3	4132	12	4186	11.2	4240	10.5
4330	11.1	4420	11.7	4501	11.4	4582	11	4663	10.7
4744	10.3	4825	10	4897	4	4958	2	4974	2
5035	4	5058	10	5114	10.2	5170	10.5	5230	10.2
5290	10	5370	9.6	5450	9.2	5530	9.6	5610	10
5665	11	5720	12	5781	15.3	5843	18.7	5905	22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3622	.035	4825	.035	5058	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
4825	5058	480	430	330	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 1.979

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3516	30	3572	14	3588	12.3	3668	12.2	3749	12.2
3830	12.1	3911	12.1	3992	12	4069	11.6	4146	11.2
4223	10.9	4300	10.5	4384	11	4468	11.5	4553	12
4626	12.4	4700	12.7	4776	12.4	4852	12	4863	4
4890	3	4933	4	4993	5	5053	6	5101	7
5150	8	5202	9	5254	10	5302	10.2	5350	10.5
5405	10.4	5460	10.4	5507	10.1	5555	9.8	5568	10
5619	9.5	5670	9	5693	10	5759	11	5826	12
5878	14	5930	16	6000	20.7	6070	25.3	6140	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3516	.035	4852	.035	5150	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4852	5150	400	400	400	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Reach-1	12	.045	.045	.035						
Reach-1	11.	.045	.045	.035						
Reach-1	10.	.045	.045	.035						
Reach-1	9.	.045	.045	.035						
Reach-1	8.	.045	.045	.035						
Reach-1	7.	.045	.045	.035						
Reach-1	6.	.045	.045	.035						
Reach-1	5.	.045	.045	.035						
Reach-1	4.	.045	.045	.035						
Reach-1	3.	.045	.045	.035						
Reach-1	2.844	.045	.045	.035						
Reach-1	2.782	.045	.045	.035						
Reach-1	2.732	.045	.045	.035						
Reach-1	2.675	.045	.045	.035						
Reach-1	2.65388*	.045	.04	.035						
Reach-1	2.65095	.045	.03	.04	.04	.04	.04	.04	.04	.035
Reach-1	2.650	Bridge								
Reach-1	2.649	.03	.03	.03	.03	.03	.03	.03	.03	
Reach-1	2.637	Bridge								
Reach-1	2.625	.03	.03	.03	.03	.03	.03	.03	.03	
Reach-1	2.624	Bridge								
Reach-1	2.622	.045	.04	.04	.04	.04	.04	.04	.04	.035
Reach-1	2.61915*	.03	.04	.03						
Reach-1	2.614	.03	.03	.03						
Reach-1	2.6115	Bridge								
Reach-1	2.609	.03	.04	.03						
Reach-1	2.59	.035	.04	.04	.04	.035	.04	.04	.04	
Reach-1	2.524	.035	.04	.04	.04	.035	.04	.04	.04	
Reach-1	2.439	.035	.04	.04	.04	.035	.04	.04	.04	
Reach-1	2.341	.035	.04	.035	.035					
Reach-1	2.231	.035	.035	.035						
Reach-1	2.155	.035	.035	.035						
Reach-1	2.06	.035	.035	.035						
Reach-1	1.979	.035	.035	.035						

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	12	49.32	48	73.57
Reach-1	11.	347.68	339	548.49
Reach-1	10.	585.6	450	556.91

Reach-1	9.	1127.52	452	287.85
Reach-1	8.	806.85	444	387.93
Reach-1	7.	692.7	497	459.02
Reach-1	6.	642.39	511	528.63
Reach-1	5.	578.02	495	791.59
Reach-1	4.	537.07	495	500.63
Reach-1	3.	715	765	795
Reach-1	2.844	325	325	325
Reach-1	2.782	265	265	265
Reach-1	2.732	300	300	300
Reach-1	2.675	129.92	108	85.27
Reach-1	2.65388*	18.05	15	11.84
Reach-1	2.65095	32.03	30	27.89
Reach-1	2.650	Bridge		
Reach-1	2.649	93.8	93.8	93.8
Reach-1	2.637	Bridge		
Reach-1	2.625	25.1	30	35.99
Reach-1	2.624	Bridge		
Reach-1	2.622	10.34	15	20.69
Reach-1	2.61915*	18.76	27.2	37.52
Reach-1	2.614	27	27	27
Reach-1	2.6115	Bridge		
Reach-1	2.609	100	100	90
Reach-1	2.59	345	345	340
Reach-1	2.524	450	450	450
Reach-1	2.439	520	520	520
Reach-1	2.341	550	580	600
Reach-1	2.231	300	400	430
Reach-1	2.155	330	500	450
Reach-1	2.06	480	430	330
Reach-1	1.979	400	400	400

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	12	.1	.3
Reach-1	11.	.1	.3
Reach-1	10.	.1	.3
Reach-1	9.	.1	.3
Reach-1	8.	.1	.3
Reach-1	7.	.1	.3
Reach-1	6.	.1	.3
Reach-1	5.	.1	.3
Reach-1	4.	.1	.3
Reach-1	3.	.1	.3
Reach-1	2.844	.1	.3
Reach-1	2.782	.1	.3
Reach-1	2.732	.1	.3
Reach-1	2.675	.1	.3
Reach-1	2.65388*	.1	.3
Reach-1	2.65095	.1	.3
Reach-1	2.650	Bridge	
Reach-1	2.649	.3	.5
Reach-1	2.637	Bridge	
Reach-1	2.625	.3	.5
Reach-1	2.624	Bridge	
Reach-1	2.622	.3	.5

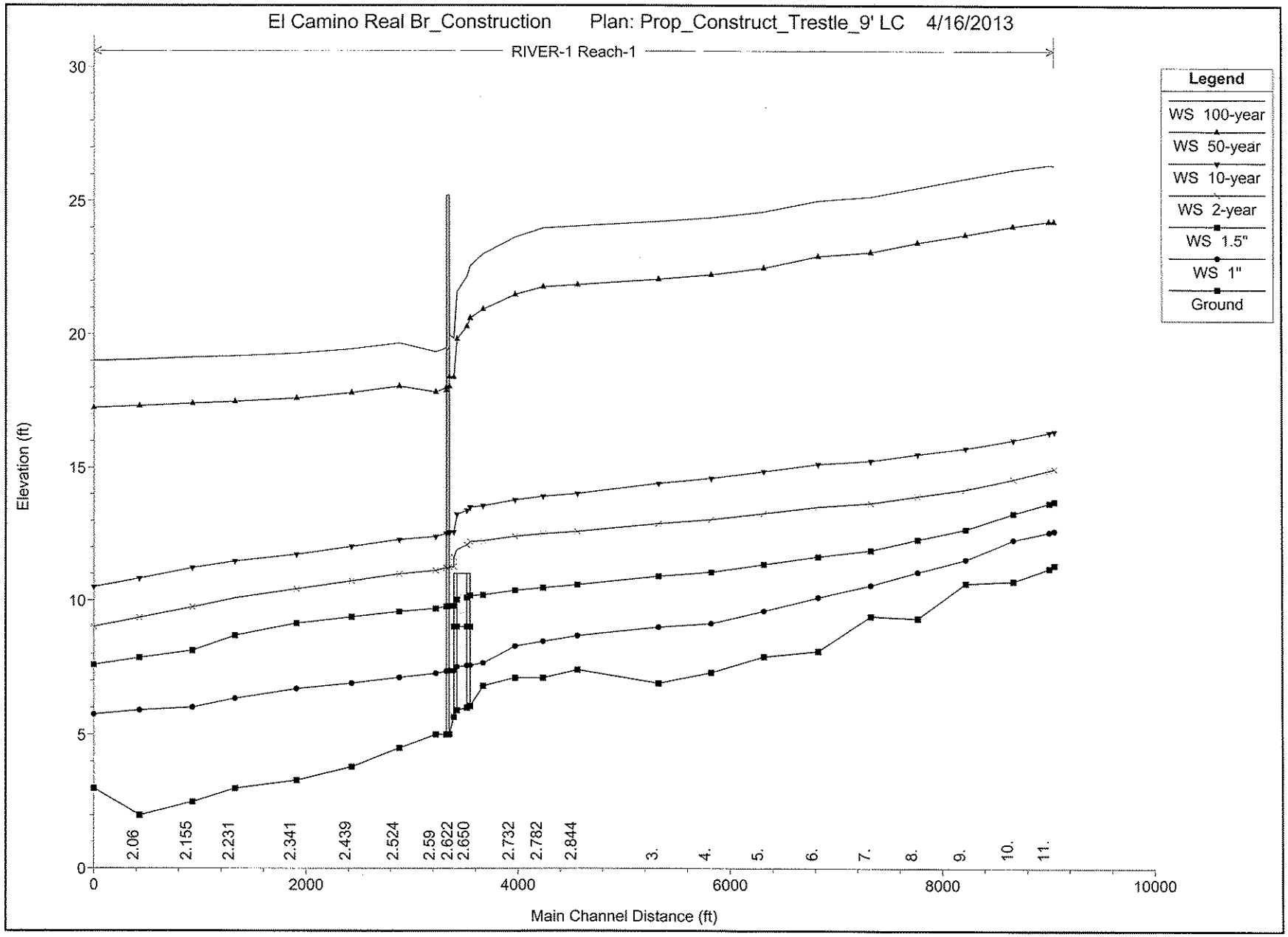
Reach-1	2.61915*		.3	.5
Reach-1	2.614		.3	.5
Reach-1	2.6115	Bridge		
Reach-1	2.609		.3	.5
Reach-1	2.59		.2	.4
Reach-1	2.524		.1	.3
Reach-1	2.439		.1	.3
Reach-1	2.341		.1	.3
Reach-1	2.231		.1	.3
Reach-I	2.155		.1	.3
Reach-1	2.06		.1	.3
Reach-I	1.979		.1	.3

5

ATTACHMENT 5

1.0-, 1.3-, 2-, 10-, 50- and 100-Year Construction Phase Condition HEC-RAS Analysis

Option 1 - Temporary Trestle Construction


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RIVER-1 Reach-1
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Elevation (ft)
Main Channel Distance (ft)
0
5
10
15
20
25
30
0
2000
4000
6000
8000
10000
2.06
2.155
2.231
2.341
2.439
2.524
2.59
2.622
2.650
2.732
2.782
2.844
3.
4.
5.
6.
7.
8.
9.
10.
11.

HEC-RAS Plan: Trestle LC-9' River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	12	100-year	42800.00	11.32	26.34		26.58	0.000507	4.34	11290.74	2777.53	0.20
Reach-1	12	50-year	32500.00	11.32	24.23		24.49	0.000642	4.39	8544.89	2232.34	0.22
Reach-1	12	10-year	5900.00	11.32	16.35		16.48	0.000962	2.81	2101.12	461.97	0.23
Reach-1	12	2-year	3450.00	11.32	14.95		15.04	0.001065	2.36	1460.80	449.53	0.23
Reach-1	12	1.5"	1624.00	11.32	13.71		13.76	0.001100	1.78	911.05	438.57	0.22
Reach-1	12	1"	426.00	11.32	12.61		12.62	0.000810	0.98	435.97	411.24	0.17
Reach-1	11.	100-year	42800.00	11.20	26.35		26.54	0.000408	3.91	12796.61	2848.01	0.18
Reach-1	11.	50-year	32500.00	11.20	24.23		24.44	0.000551	4.08	9544.01	2423.58	0.21
Reach-1	11.	10-year	5900.00	11.20	16.31		16.43	0.000960	2.79	2116.21	469.33	0.23
Reach-1	11.	2-year	3450.00	11.20	14.90		14.98	0.001083	2.36	1462.66	456.73	0.23
Reach-1	11.	1.5"	1624.00	11.20	13.66		13.71	0.001161	1.80	902.30	445.65	0.22
Reach-1	11.	1"	426.00	11.20	12.57		12.58	0.000935	1.00	424.19	427.54	0.18
Reach-1	10.	100-year	42800.00	10.72	26.17		26.38	0.000403	3.93	11998.91	2830.65	0.18
Reach-1	10.	50-year	32500.00	10.72	24.05		24.24	0.000456	3.76	9527.79	2214.77	0.19
Reach-1	10.	10-year	5900.00	10.72	16.03		16.13	0.000791	2.53	2330.51	522.64	0.21
Reach-1	10.	2-year	3450.00	10.72	14.57		14.64	0.000938	2.18	1583.98	500.70	0.22
Reach-1	10.	1.5"	1624.00	10.72	13.27		13.32	0.001123	1.72	944.79	487.60	0.22
Reach-1	10.	1"	426.00	10.72	12.27		12.28	0.000816	0.92	461.79	477.46	0.17
Reach-1	9.	100-year	42800.00	10.64	25.83		26.15	0.000553	4.64	9732.23	2176.40	0.21
Reach-1	9.	50-year	32500.00	10.64	23.73		24.00	0.000573	4.26	8020.79	1716.85	0.21
Reach-1	9.	10-year	5900.00	10.64	15.72		15.80	0.000651	2.30	2566.98	574.13	0.19
Reach-1	9.	2-year	3450.00	10.64	14.17		14.24	0.000840	2.03	1701.19	550.78	0.20
Reach-1	9.	1.5"	1624.00	10.64	12.68		12.73	0.001554	1.83	888.65	534.08	0.25
Reach-1	9.	1"	426.00	10.64	11.53		11.56	0.004465	1.49	285.17	511.90	0.35
Reach-1	8.	100-year	42800.00	9.32	25.49		25.87	0.000622	5.00	8711.18	1866.13	0.23
Reach-1	8.	50-year	32500.00	9.32	23.43		23.73	0.000594	4.42	7436.79	1743.41	0.22
Reach-1	8.	10-year	5900.00	9.32	15.49		15.56	0.000429	2.07	2846.28	538.34	0.16
Reach-1	8.	2-year	3450.00	9.32	13.91		13.96	0.000452	1.72	2007.19	523.19	0.15
Reach-1	8.	1.5"	1624.00	9.32	12.29		12.32	0.000584	1.39	1168.15	507.58	0.16
Reach-1	8.	1"	426.00	9.32	11.06		11.07	0.000479	0.77	550.89	497.61	0.13
Reach-1	7.	100-year	42800.00	9.40	25.15		25.57	0.000717	5.38	8509.98	2311.22	0.24
Reach-1	7.	50-year	32500.00	9.40	23.07		23.43	0.000732	4.93	6966.58	2187.09	0.24
Reach-1	7.	10-year	5900.00	9.40	15.25		15.34	0.000582	2.37	2496.60	860.21	0.18

HEC-RAS Plan: Trestle LC-9' River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7.	2-year	3450.00	9.40	13.65		13.71	0.000690	2.02	1711.07	722.72	0.19
Reach-1	7.	1.5"	1624.00	9.40	11.88		11.93	0.001385	1.86	871.14	597.84	0.24
Reach-1	7.	1"	426.00	9.40	10.57		10.60	0.003626	1.56	273.85	489.19	0.33
Reach-1	6.	100-year	42800.00	8.10	25.00		25.28	0.000388	4.07	10304.06	2111.91	0.18
Reach-1	6.	50-year	32500.00	8.10	22.92		23.14	0.000366	3.60	8735.62	1959.12	0.17
Reach-1	6.	10-year	5900.00	8.10	15.13		15.17	0.000197	1.50	3585.49	1469.21	0.11
Reach-1	6.	2-year	3450.00	8.10	13.51		13.54	0.000194	1.20	2585.26	1199.67	0.10
Reach-1	6.	1.5"	1624.00	8.10	11.64		11.66	0.000279	0.97	1454.17	1108.31	0.11
Reach-1	6.	1"	426.00	8.10	10.11		10.12	0.000451	0.60	543.94	1038.47	0.12
Reach-1	5.	100-year	42800.00	7.90	24.59		25.00	0.000705	5.50	8566.77	2170.86	0.24
Reach-1	5.	50-year	32500.00	7.90	22.48		22.86	0.000793	5.30	6916.06	2097.50	0.25
Reach-1	5.	10-year	5900.00	7.90	14.85		14.98	0.000761	3.01	1988.41	945.55	0.22
Reach-1	5.	2-year	3450.00	7.90	13.27		13.36	0.000732	2.41	1441.98	800.34	0.20
Reach-1	5.	1.5"	1624.00	7.90	11.35		11.41	0.001064	2.01	808.67	717.70	0.22
Reach-1	5.	1"	426.00	7.90	9.59		9.63	0.002987	1.63	261.29	583.71	0.31
Reach-1	4.	100-year	42800.00	7.30	24.37		24.63	0.000433	4.38	10663.10	2796.80	0.19
Reach-1	4.	50-year	32500.00	7.30	22.23		22.46	0.000484	4.22	8640.17	2704.22	0.20
Reach-1	4.	10-year	5900.00	7.30	14.60		14.69	0.000440	2.39	2476.45	1147.82	0.17
Reach-1	4.	2-year	3450.00	7.30	13.04		13.10	0.000377	1.85	1870.00	970.05	0.15
Reach-1	4.	1.5"	1624.00	7.30	11.06		11.09	0.000411	1.44	1131.38	633.04	0.14
Reach-1	4.	1"	426.00	7.30	9.13		9.14	0.000481	0.91	466.82	513.88	0.14
Reach-1	3.	100-year	42800.00	6.90	24.23		24.42	0.000323	3.84	12226.73	2818.80	0.17
Reach-1	3.	50-year	32500.00	6.90	22.06		22.24	0.000367	3.73	9858.65	2692.98	0.17
Reach-1	3.	10-year	5900.00	6.90	14.40		14.48	0.000373	2.28	2600.88	1293.34	0.15
Reach-1	3.	2-year	3450.00	6.90	12.88		12.93	0.000294	1.72	2008.52	915.51	0.13
Reach-1	3.	1.5"	1624.00	6.90	10.90		10.92	0.000278	1.28	1273.21	763.98	0.12
Reach-1	3.	1"	426.00	6.90	8.99		8.99	0.000203	0.70	609.92	640.61	0.09
Reach-1	2.844	100-year	42800.00	7.40	24.05		24.19	0.000234	3.15	14402.13	2836.37	0.14
Reach-1	2.844	50-year	32500.00	7.40	21.85		21.97	0.000276	3.10	11557.18	2799.44	0.15
Reach-1	2.844	10-year	5900.00	7.40	14.01		14.12	0.000624	2.63	2246.38	1132.29	0.19
Reach-1	2.844	2-year	3450.00	7.40	12.59		12.65	0.000466	2.00	1721.53	701.52	0.16
Reach-1	2.844	1.5"	1624.00	7.40	10.58		10.62	0.000589	1.61	1006.61	564.37	0.17
Reach-1	2.844	1"	426.00	7.40	8.67		8.69	0.001065	1.17	364.82	483.45	0.19

HEC-RAS Plan: Trestle LC-9' River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.782	100-year	42800.00	7.10	23.98		24.12	0.000218	3.15	14140.57	2818.55	0.14
Reach-1	2.782	50-year	32500.00	7.10	21.77		21.89	0.000236	2.98	11668.16	2810.52	0.14
Reach-1	2.782	10-year	5900.00	7.10	13.90		13.97	0.000311	2.00	2986.41	1583.44	0.14
Reach-1	2.782	2-year	3450.00	7.10	12.50		12.53	0.000247	1.51	2280.43	880.00	0.12
Reach-1	2.782	1.5"	1624.00	7.10	10.47		10.49	0.000278	1.18	1373.79	678.95	0.12
Reach-1	2.782	1"	426.00	7.10	8.46		8.47	0.000472	0.83	515.45	528.43	0.13
Reach-1	2.732	100-year	42800.00	7.10	23.64		24.01	0.000572	4.98	8827.69	2787.08	0.22
Reach-1	2.732	50-year	32500.00	7.10	21.47		21.78	0.000586	4.58	7378.25	2667.98	0.22
Reach-1	2.732	10-year	5900.00	7.10	13.77		13.86	0.000481	2.45	2434.92	1548.90	0.17
Reach-1	2.732	2-year	3450.00	7.10	12.40		12.45	0.000365	1.84	1874.08	681.91	0.15
Reach-1	2.732	1.5"	1624.00	7.10	10.37		10.40	0.000414	1.44	1128.37	505.97	0.14
Reach-1	2.732	1"	426.00	7.10	8.27		8.29	0.000941	1.09	389.68	433.77	0.18
Reach-1	2.675	100-year	42800.00	6.80	23.00		23.73	0.001216	6.84	6315.47	2714.79	0.32
Reach-1	2.675	50-year	32500.00	6.80	20.92		21.51	0.001204	6.14	5332.80	2662.89	0.31
Reach-1	2.675	10-year	5900.00	6.80	13.54		13.67	0.000797	2.94	2046.26	1434.84	0.22
Reach-1	2.675	2-year	3450.00	6.80	12.23		12.31	0.000630	2.26	1531.81	629.86	0.19
Reach-1	2.675	1.5"	1624.00	6.80	10.20		10.25	0.000639	1.79	905.21	339.65	0.18
Reach-1	2.675	1"	426.00	6.80	7.65		7.72	0.005573	2.09	203.98	261.51	0.42
Reach-1	2.65095	100-year	42800.00	6.06	22.56	14.76	23.55	0.001308	7.99	5359.73	361.75	0.37
Reach-1	2.65095	50-year	32500.00	6.06	20.59	13.39	21.35	0.001170	6.98	4653.76	354.01	0.34
Reach-1	2.65095	10-year	5900.00	6.06	13.49	8.41	13.60	0.000393	2.64	2237.64	326.54	0.18
Reach-1	2.65095	2-year	3450.00	6.06	12.20	7.70	12.26	0.000246	1.89	1825.22	309.48	0.14
Reach-1	2.65095	1.5"	1624.00	6.06	10.17	7.06	10.20	0.000209	1.35	1204.92	301.39	0.12
Reach-1	2.65095	1"	426.00	6.06	7.56	6.47	7.58	0.000413	0.98	433.35	291.03	0.14
Reach-1	2.650		Bridge									
Reach-1	2.649	100-year	42800.00	6.00	22.16	14.74	23.24	0.001017	8.35	5123.02	346.66	0.38
Reach-1	2.649	50-year	32500.00	6.00	20.27	13.35	21.09	0.000880	7.27	4472.85	340.95	0.35
Reach-1	2.649	10-year	5900.00	6.00	13.37	8.35	13.49	0.000259	2.69	2193.81	320.13	0.18
Reach-1	2.649	2-year	3450.00	6.00	12.08	7.64	12.13	0.000159	1.92	1793.44	304.23	0.14
Reach-1	2.649	1.5"	1624.00	6.00	10.10	7.00	10.13	0.000128	1.36	1197.37	298.30	0.12
Reach-1	2.649	1"	426.00	6.00	7.55	6.41	7.57	0.000214	0.95	447.64	290.66	0.14

HEC-RAS Plan: Trestle LC-9' River: RIVER-1 Reach: Reach-1 (Continued)

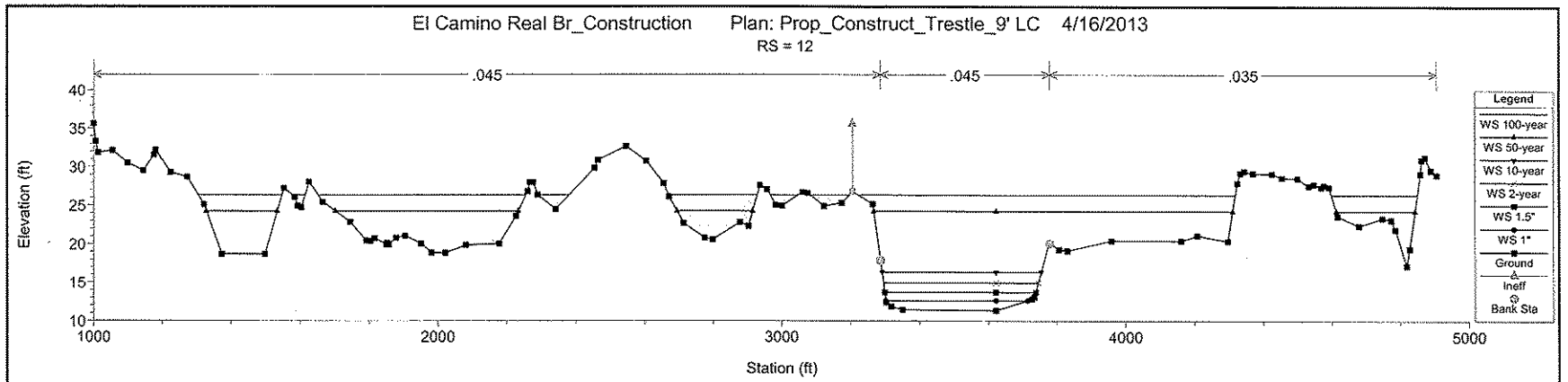
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.637		Bridge									
Reach-1	2.625	100-year	42800.00	5.90	21.58	15.14	22.93	0.002361	9.30	4604.18	321.32	0.43
Reach-1	2.625	50-year	32500.00	5.90	19.81	13.68	20.82	0.002015	8.05	4038.56	316.71	0.40
Reach-1	2.625	10-year	5900.00	5.90	13.22	8.44	13.36	0.000569	2.94	2009.27	299.58	0.20
Reach-1	2.625	2-year	3450.00	5.90	11.90	7.70	11.97	0.000358	2.12	1628.14	283.70	0.16
Reach-1	2.625	1.5"	1624.00	5.90	10.02	7.02	10.05	0.000275	1.48	1099.84	278.06	0.13
Reach-1	2.625	1"	426.00	5.90	7.51	6.40	7.53	0.000460	1.04	411.28	270.53	0.15
Reach-1	2.624		Bridge									
Reach-1	2.622	100-year	42800.00	5.65	19.82		21.73	0.002005	11.07	3867.27	341.73	0.58
Reach-1	2.622	50-year	32500.00	5.65	18.38		19.82	0.001774	9.62	3377.76	336.55	0.54
Reach-1	2.622	10-year	5900.00	5.65	12.56		12.79	0.000714	3.88	1521.43	301.57	0.30
Reach-1	2.622	2-year	3450.00	5.65	11.25		11.40	0.000635	3.05	1132.09	295.58	0.27
Reach-1	2.622	1.5"	1624.00	5.65	9.78		9.86	0.000555	2.27	716.56	264.03	0.24
Reach-1	2.622	1"	426.00	5.65	7.36		7.45	0.002299	2.49	170.86	158.60	0.42
Reach-1	2.614	100-year	40100.00	5.00	19.97	15.22	21.44	0.001476	9.75	4114.62	1739.85	0.50
Reach-1	2.614	50-year	32500.00	5.00	18.39	14.14	19.68	0.001514	9.10	3569.80	1306.38	0.50
Reach-1	2.614	10-year	5900.00	5.00	12.55	8.73	12.74	0.000524	3.51	1678.86	305.75	0.26
Reach-1	2.614	2-year	3450.00	5.00	11.25	7.85	11.36	0.000373	2.66	1296.89	278.18	0.22
Reach-1	2.614	1.5"	1624.00	5.00	9.78	6.87	9.83	0.000252	1.80	902.71	259.31	0.17
Reach-1	2.614	1"	426.00	5.00	7.36	5.81	7.39	0.000356	1.30	328.84	200.71	0.18
Reach-1	2.6115		Bridge									
Reach-1	2.609	100-year	40100.00	5.00	19.47		21.08	0.001685	10.17	3943.95	1641.89	0.53
Reach-1	2.609	50-year	32500.00	5.00	17.99		19.38	0.001712	9.47	3432.99	1079.52	0.53
Reach-1	2.609	10-year	5900.00	5.00	12.50		12.70	0.000540	3.55	1663.70	305.52	0.27
Reach-1	2.609	2-year	3450.00	5.00	11.22		11.33	0.000381	2.68	1288.52	277.79	0.22
Reach-1	2.609	1.5"	1624.00	5.00	9.77		9.82	0.000255	1.81	898.58	259.11	0.17
Reach-1	2.609	1"	426.00	5.00	7.34		7.37	0.000365	1.31	325.54	199.39	0.18
Reach-1	2.59	100-year	40100.00	5.00	19.33		20.81	0.002643	10.14	4172.39	2025.16	0.51
Reach-1	2.59	50-year	32500.00	5.00	17.81		19.13	0.002774	9.52	3602.64	1952.25	0.51
Reach-1	2.59	10-year	5900.00	5.00	12.39		12.61	0.001150	3.84	1614.65	629.10	0.29
Reach-1	2.59	2-year	3450.00	5.00	11.12		11.26	0.001048	3.05	1163.81	494.77	0.27

HEC-RAS Plan: Trestle LC-9' River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.59	1.5"	1624.00	5.00	9.69		9.76	0.000942	2.25	722.50	260.66	0.24
Reach-1	2.59	1"	426.00	5.00	7.26		7.31	0.000967	1.73	246.20	134.02	0.22
Reach-1	2.524	100-year	33415.00	4.50	19.66		19.97	0.000522	4.49	7516.40	2469.13	0.23
Reach-1	2.524	50-year	27307.00	4.50	18.04		18.32	0.000565	4.24	6486.13	2444.73	0.23
Reach-1	2.524	10-year	5900.00	4.50	12.28		12.34	0.000369	2.05	2887.97	1430.91	0.17
Reach-1	2.524	2-year	3450.00	4.50	10.98		11.03	0.000354	1.65	2093.02	1208.82	0.16
Reach-1	2.524	1.5"	1624.00	4.50	9.57		9.59	0.000249	1.25	1301.79	499.52	0.14
Reach-1	2.524	1"	426.00	4.50	7.11		7.13	0.000297	0.95	447.66	246.73	0.12
Reach-1	2.439	100-year	34115.00	3.80	19.44		19.73	0.000525	4.43	7983.31	2270.74	0.23
Reach-1	2.439	50-year	27307.00	3.80	17.79		18.05	0.000587	4.24	6720.67	2200.10	0.23
Reach-1	2.439	10-year	5900.00	3.80	12.02		12.12	0.000660	2.64	2361.36	1398.96	0.22
Reach-1	2.439	2-year	3450.00	3.80	10.72		10.80	0.000715	2.26	1542.55	1045.40	0.23
Reach-1	2.439	1.5"	1624.00	3.80	9.37		9.42	0.000636	1.84	882.13	392.08	0.22
Reach-1	2.439	1"	426.00	3.80	6.90		6.93	0.000674	1.45	293.90	159.36	0.19
Reach-1	2.341	100-year	34815.00	3.30	19.28		19.48	0.000353	3.96	9741.34	2383.65	0.20
Reach-1	2.341	50-year	27307.00	3.30	17.59		17.78	0.000399	3.83	8031.78	2376.63	0.21
Reach-1	2.341	10-year	5900.00	3.30	11.72		11.83	0.000492	2.65	2400.65	786.52	0.22
Reach-1	2.341	2-year	3450.00	3.30	10.42		10.50	0.000478	2.26	1544.11	549.66	0.22
Reach-1	2.341	1.5"	1624.00	3.30	9.13		9.18	0.000342	1.77	916.33	468.39	0.22
Reach-1	2.341	1"	426.00	3.30	6.70		6.72	0.000257	1.20	353.79	149.18	0.14
Reach-1	2.231	100-year	42800.00	3.00	19.18		19.30	0.000220	3.19	15687.33	2385.53	0.17
Reach-1	2.231	50-year	32500.00	3.00	17.46		17.58	0.000255	3.08	12516.73	2352.97	0.17
Reach-1	2.231	10-year	5900.00	3.00	11.46		11.54	0.000477	2.22	2703.17	803.13	0.20
Reach-1	2.231	2-year	3450.00	3.00	10.08		10.15	0.000784	2.09	1654.07	716.13	0.24
Reach-1	2.231	1.5"	1624.00	3.00	8.68		8.76	0.002377	2.27	716.36	624.35	0.37
Reach-1	2.231	1"	426.00	3.00	6.34		6.43	0.001278	2.47	172.74	83.01	0.30
Reach-1	2.155	100-year	42800.00	2.50	19.13		19.22	0.000170	2.89	18701.15	2354.14	0.15
Reach-1	2.155	50-year	32500.00	2.50	17.40		17.49	0.000209	2.89	14640.57	2320.43	0.16
Reach-1	2.155	10-year	5900.00	2.50	11.22		11.32	0.000609	2.64	2413.65	813.86	0.23
Reach-1	2.155	2-year	3450.00	2.50	9.74		9.84	0.000750	2.51	1386.66	455.53	0.25
Reach-1	2.155	1.5"	1624.00	2.50	8.12		8.20	0.000937	2.19	742.18	340.73	0.26
Reach-1	2.155	1"	426.00	2.50	6.01		6.07	0.000647	1.86	228.50	100.24	0.22

HEC-RAS Plan: Trestle LC-9' River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.06	100-year	42800.00	2.00	19.05		19.15	0.000169	3.27	18250.76	2197.55	0.15
Reach-1	2.06	50-year	32500.00	2.00	17.31		17.40	0.000201	3.27	14444.66	2160.70	0.16
Reach-1	2.06	10-year	5900.00	2.00	10.82		11.01	0.000638	3.63	2098.59	1097.10	0.26
Reach-1	2.06	2-year	3450.00	2.00	9.35		9.50	0.000617	3.08	1122.78	281.81	0.24
Reach-1	2.06	1.5"	1624.00	2.00	7.86		7.92	0.000353	2.02	804.61	199.12	0.18
Reach-1	2.06	1"	426.00	2.00	5.91		5.93	0.000138	0.95	446.71	168.26	0.10
Reach-1	1.979	100-year	42800.00	3.00	19.00	13.18	19.08	0.000145	2.90	19913.77	2420.18	0.14
Reach-1	1.979	50-year	32500.00	3.00	17.24	12.57	17.32	0.000176	2.91	15682.74	2387.81	0.15
Reach-1	1.979	10-year	5900.00	3.00	10.50	7.56	10.70	0.000844	3.65	1887.90	871.94	0.28
Reach-1	1.979	2-year	3450.00	3.00	9.01	6.66	9.16	0.001001	3.18	1103.61	346.87	0.29
Reach-1	1.979	1.5"	1624.00	3.00	7.59	5.70	7.68	0.001002	2.44	666.55	271.80	0.27
Reach-1	1.979	1"	426.00	3.00	5.75	4.55	5.80	0.001001	1.69	251.84	177.53	0.25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Elevation (ft)
Station (ft)
Legend
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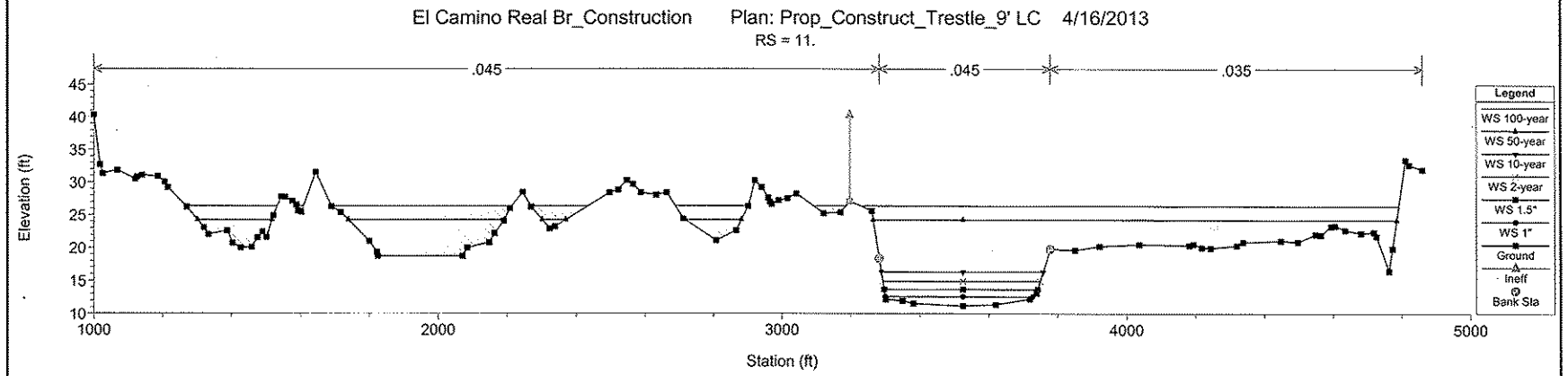
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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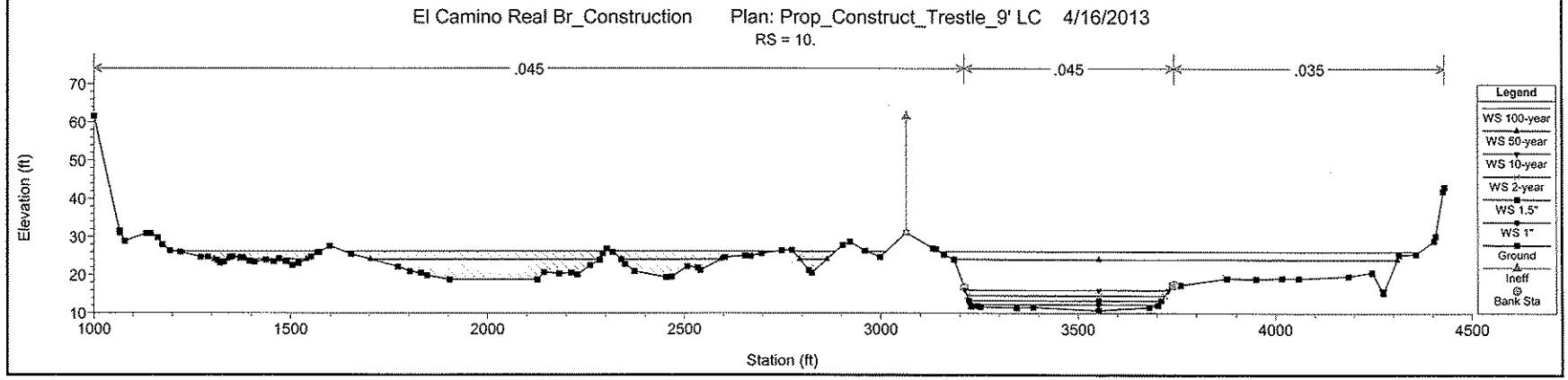
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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Elevation (ft)
Station (ft)
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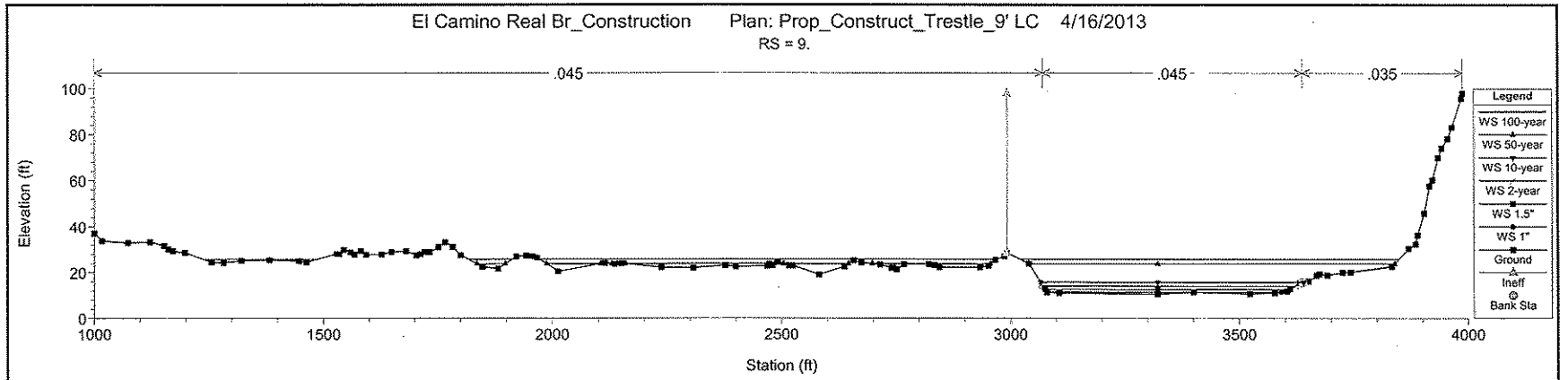
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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Elevation (ft)
Station (ft)
Legend
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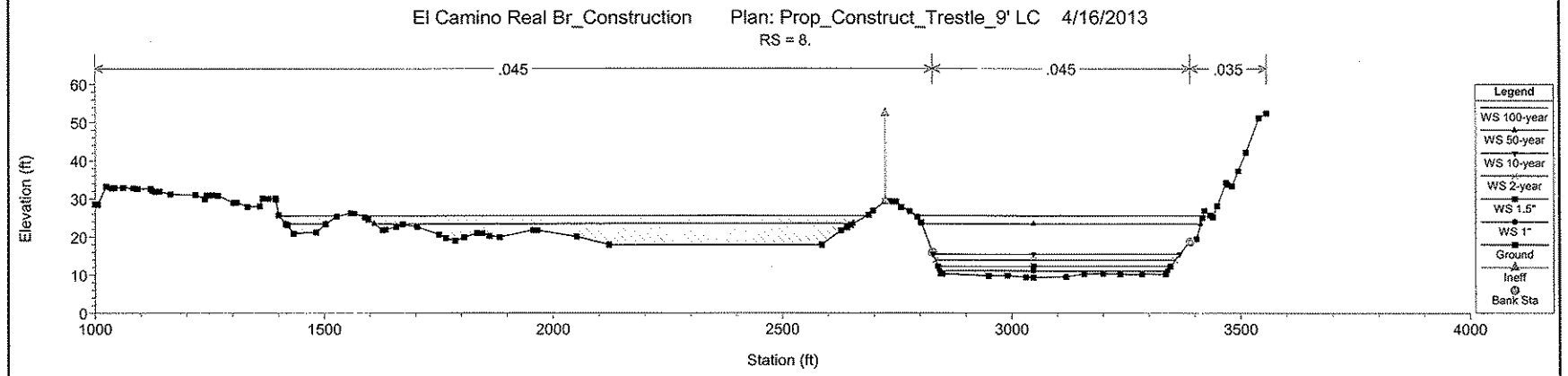
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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Elevation (ft)
Station (ft)
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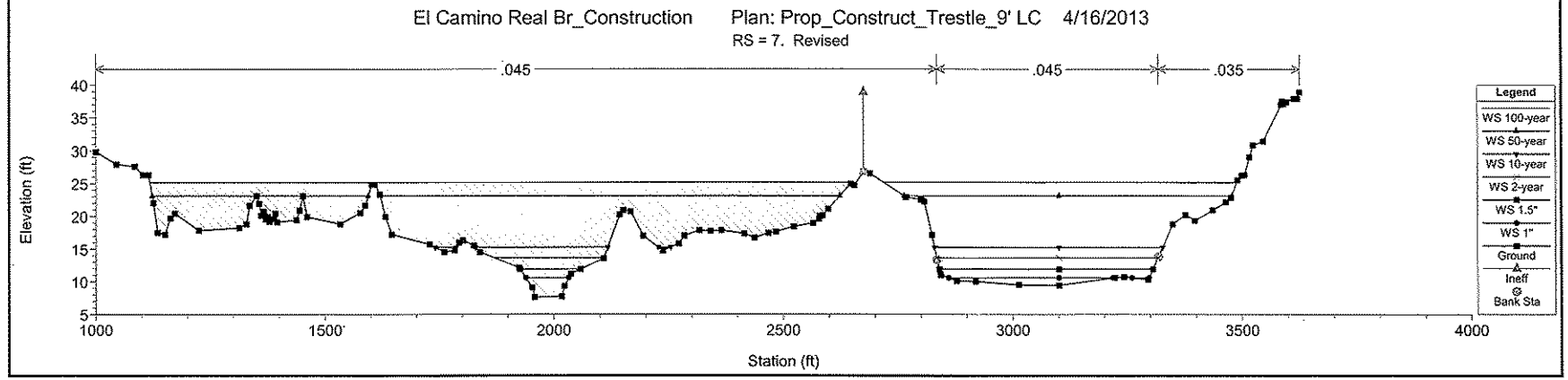
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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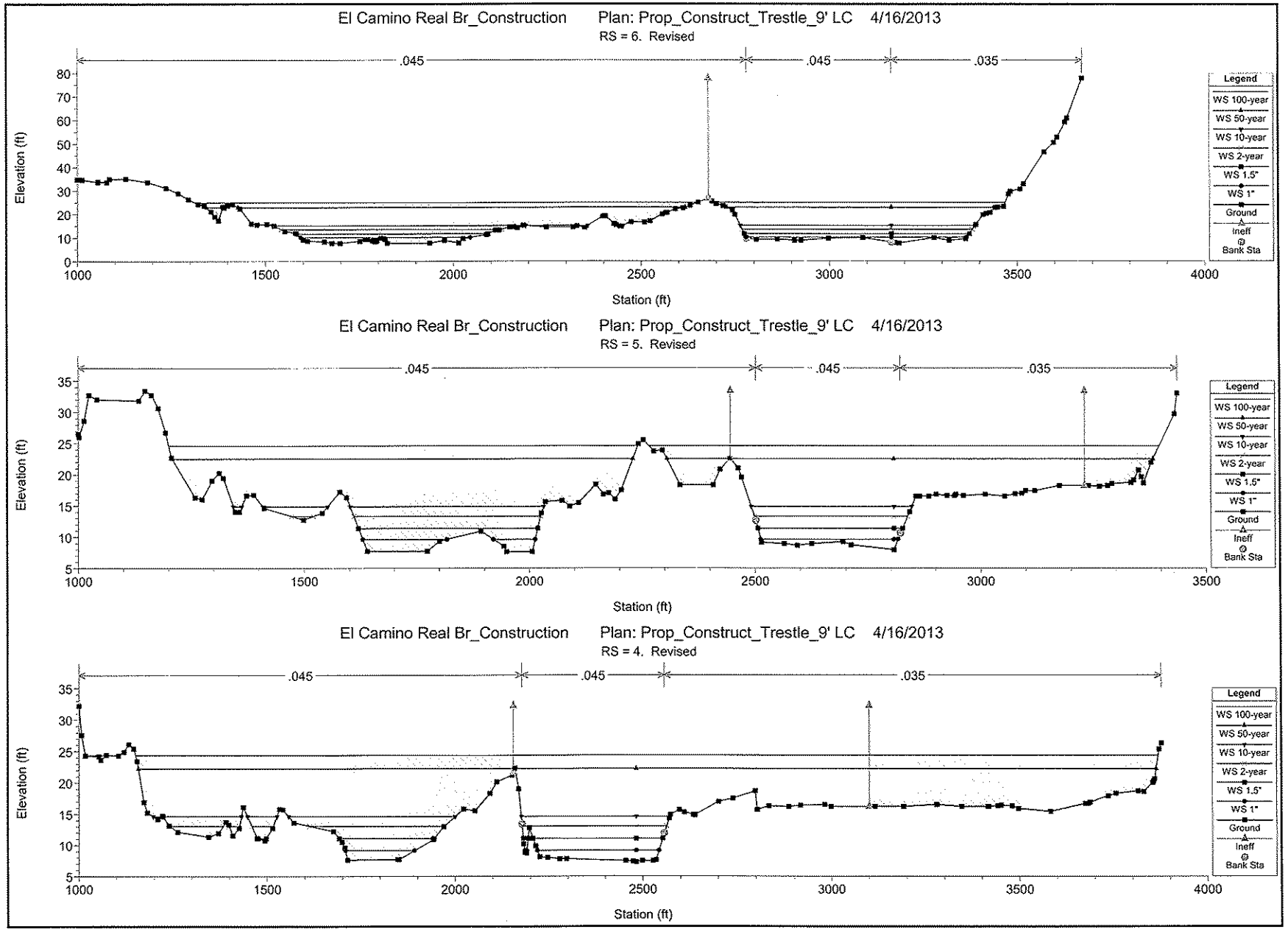
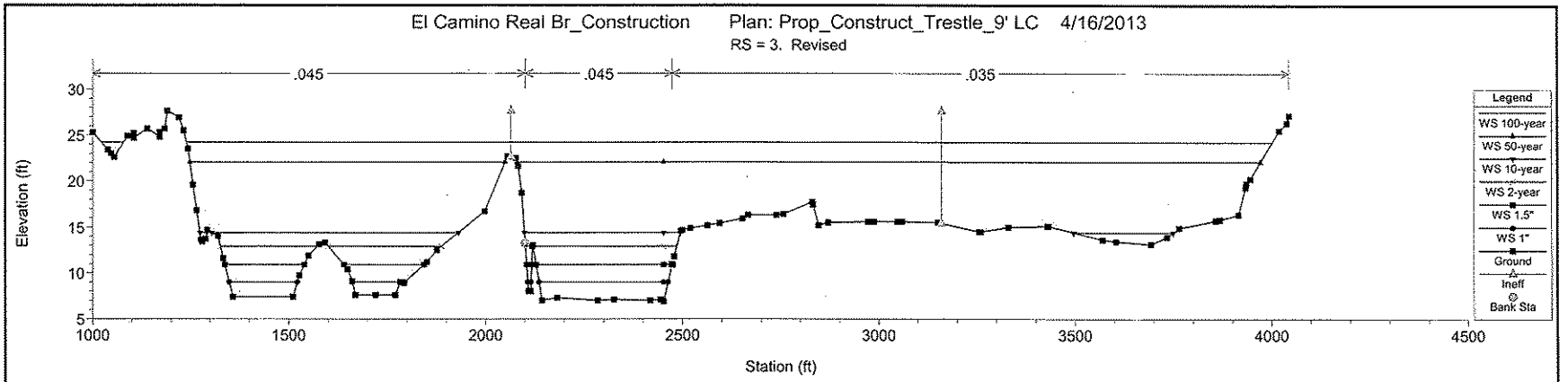
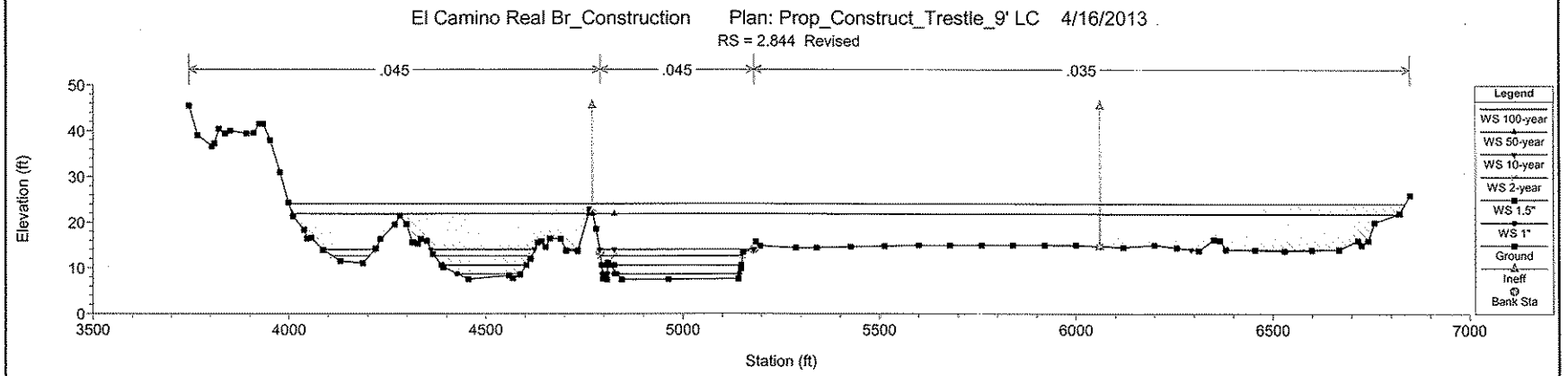
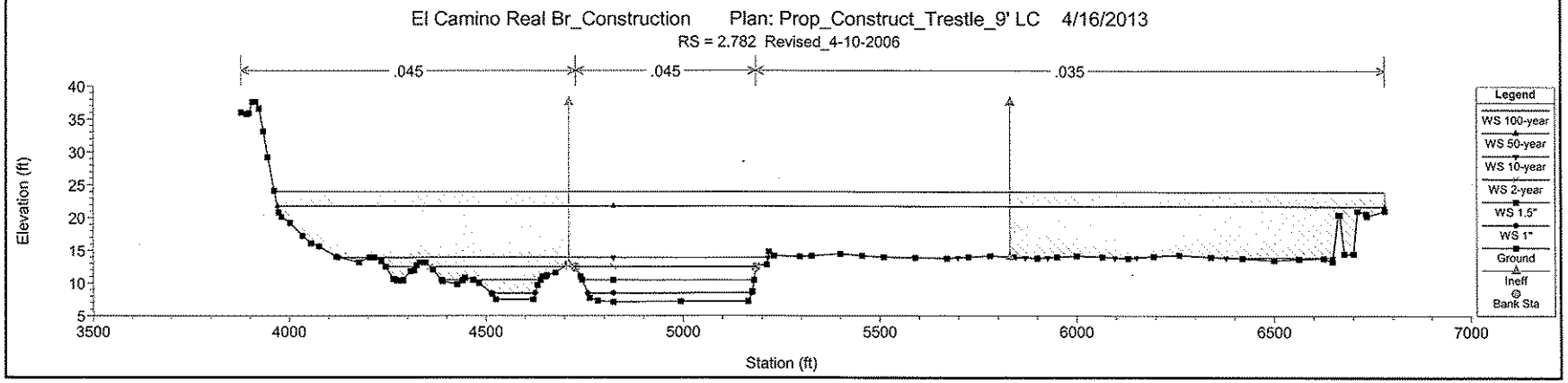
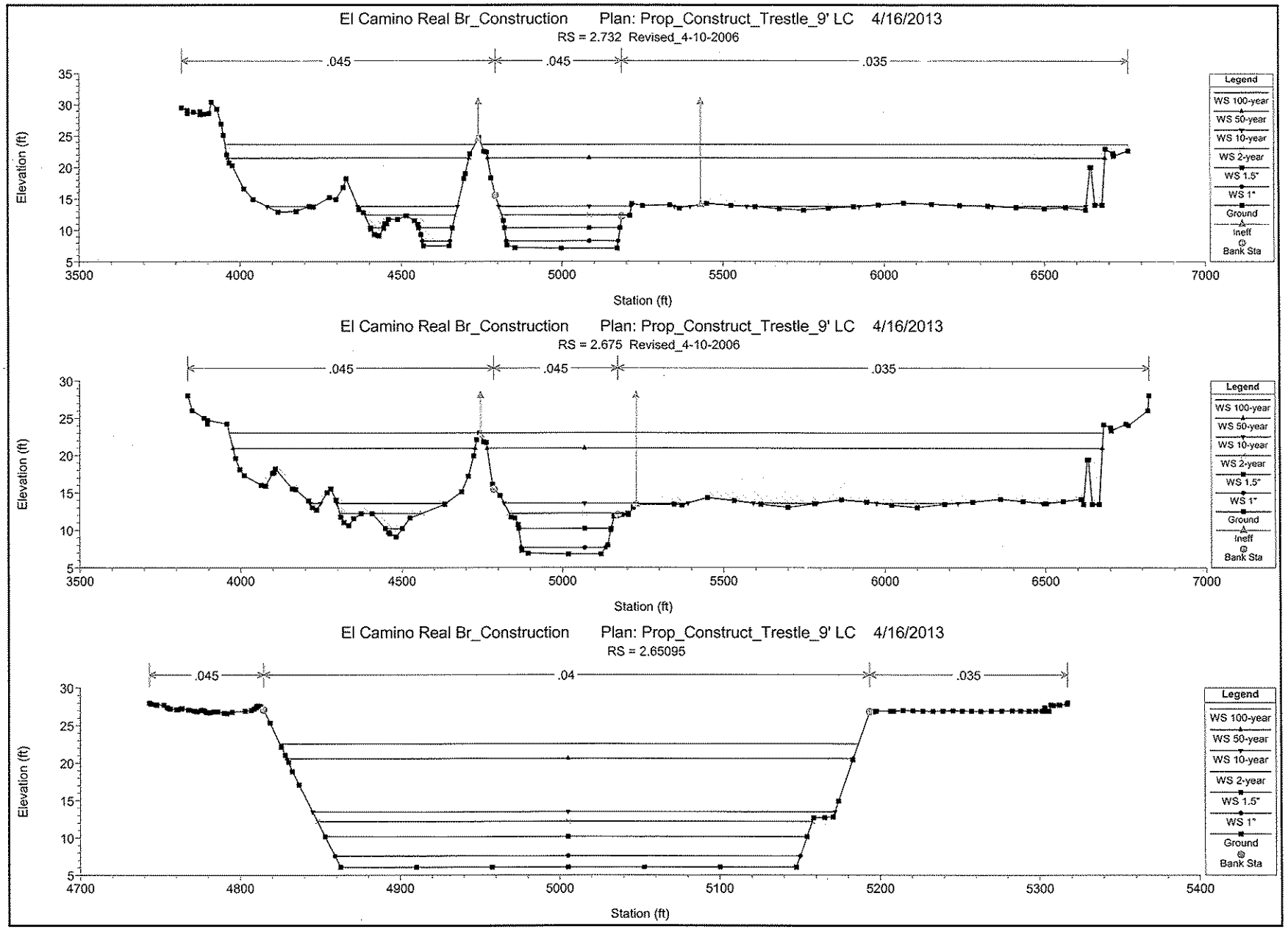
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

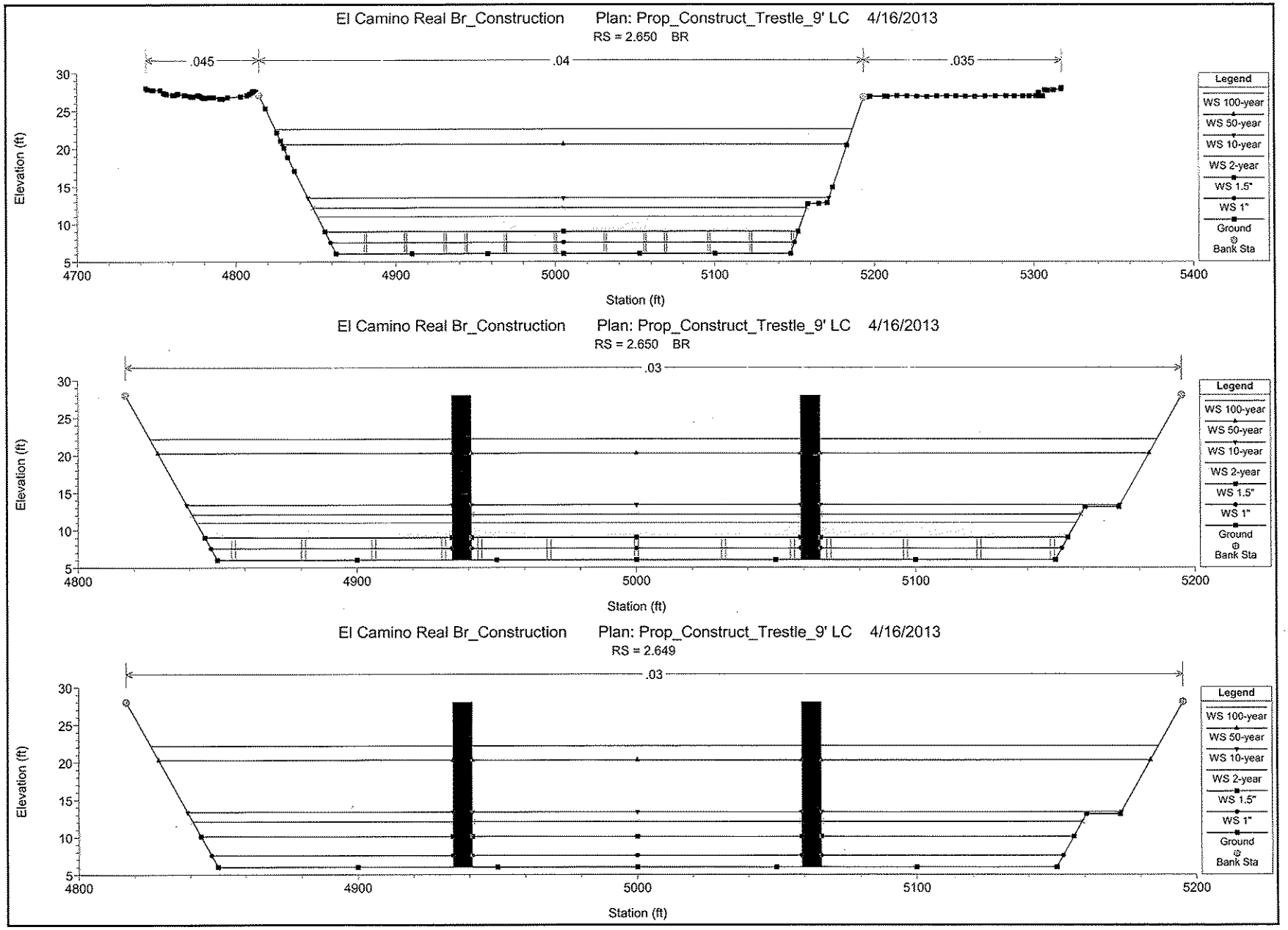

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 6. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 5. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 4. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

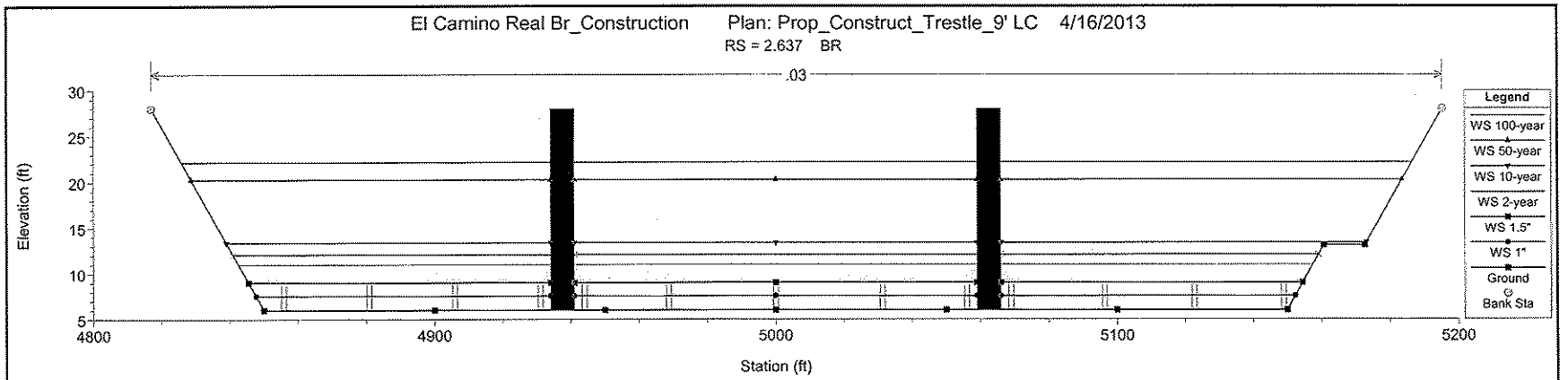

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 3. Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

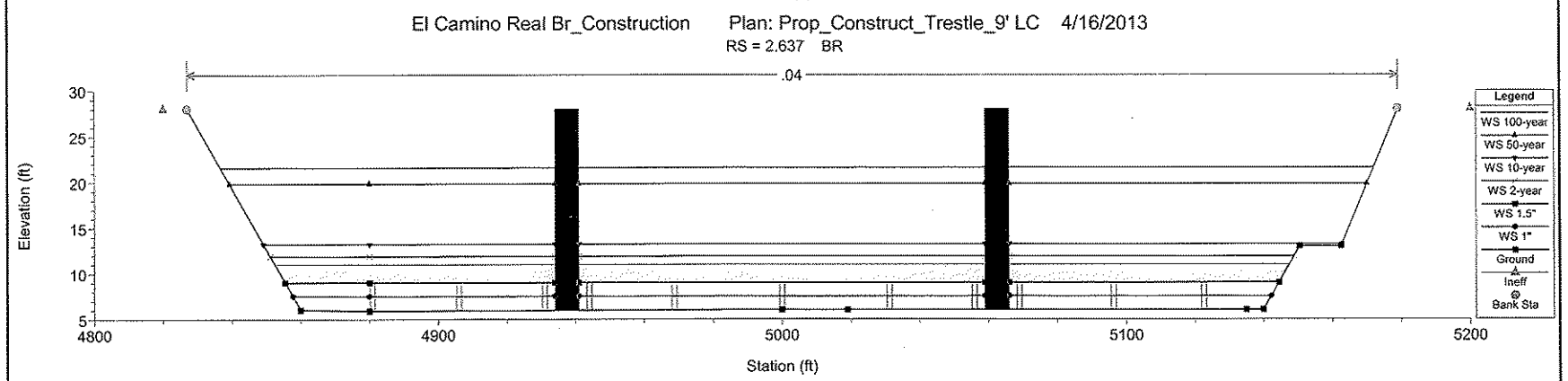

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.844 Revised
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

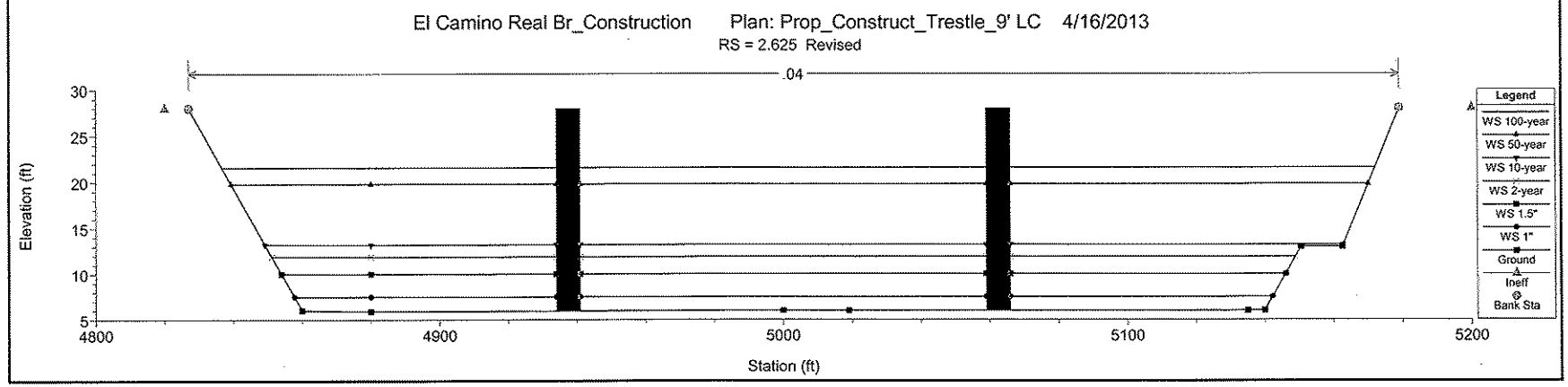

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.782 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

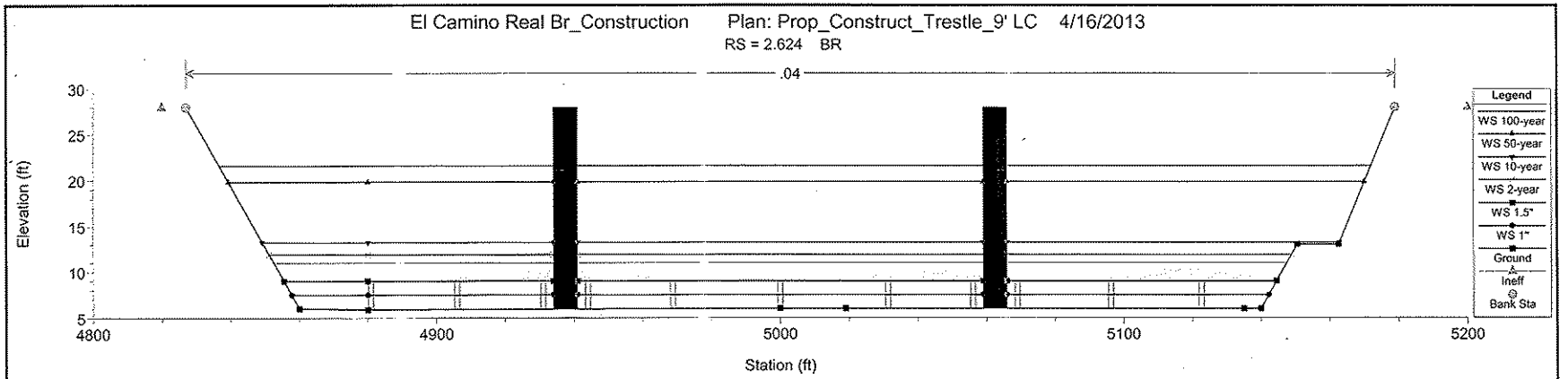

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.732 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.675 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.65095
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

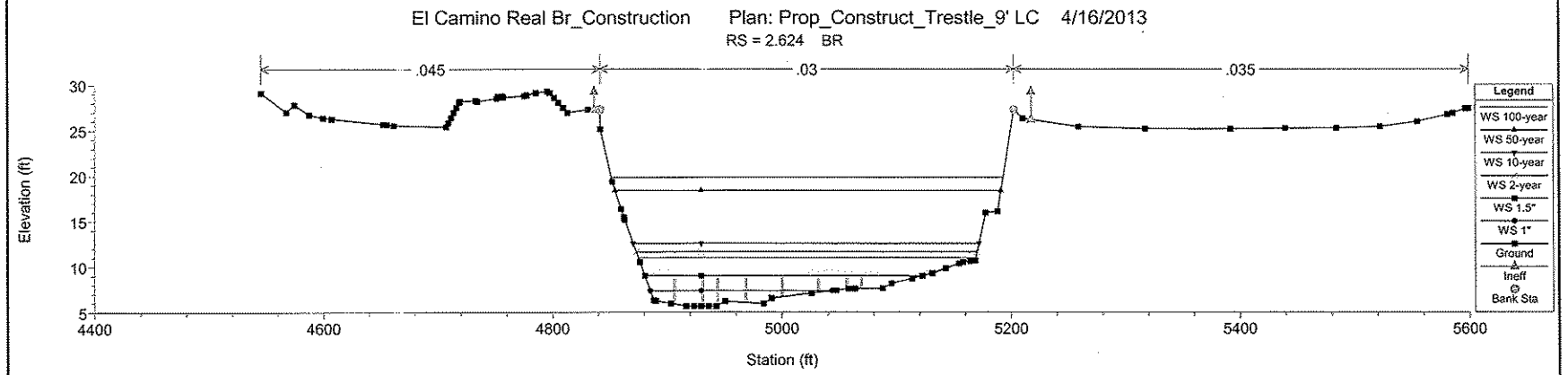

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.650 BR
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.650 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.649
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

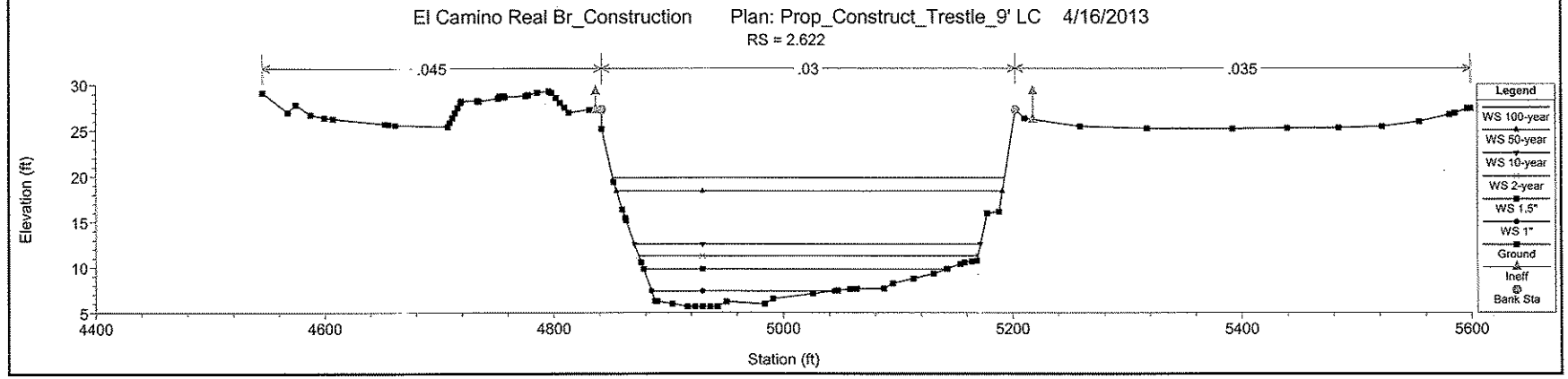

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.637 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

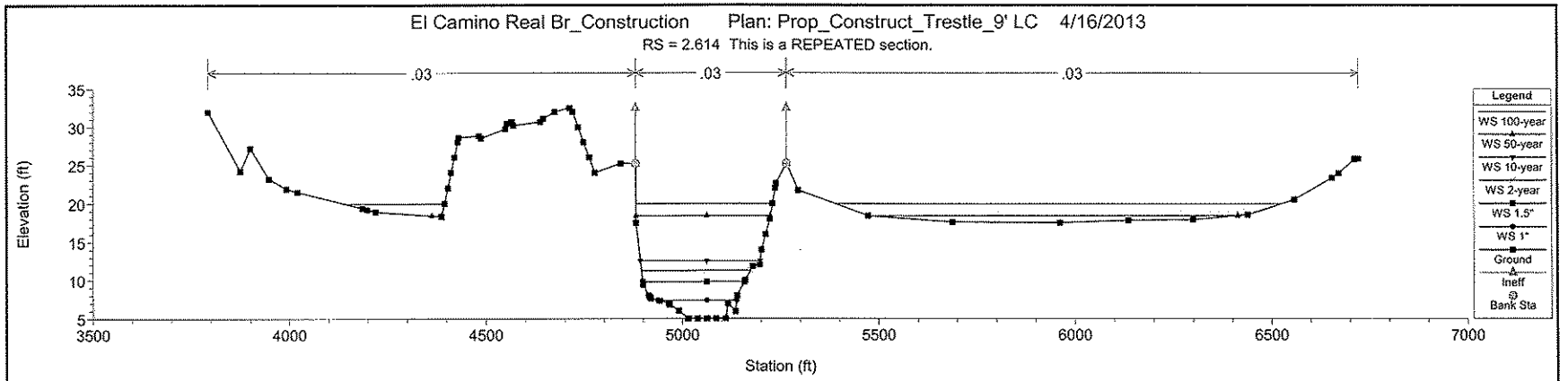

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.637 BR
.04
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

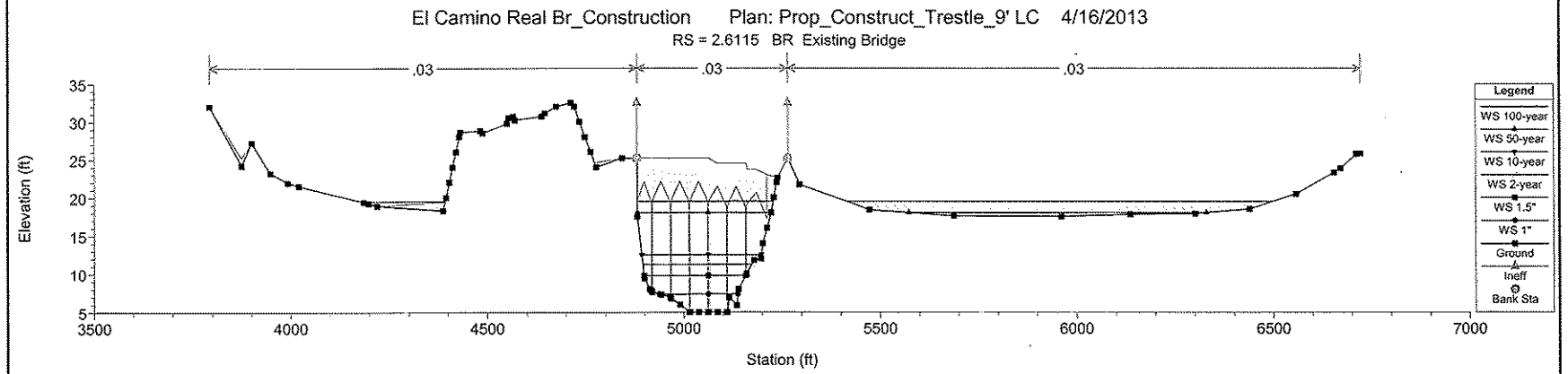

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.625 Revised
.04
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

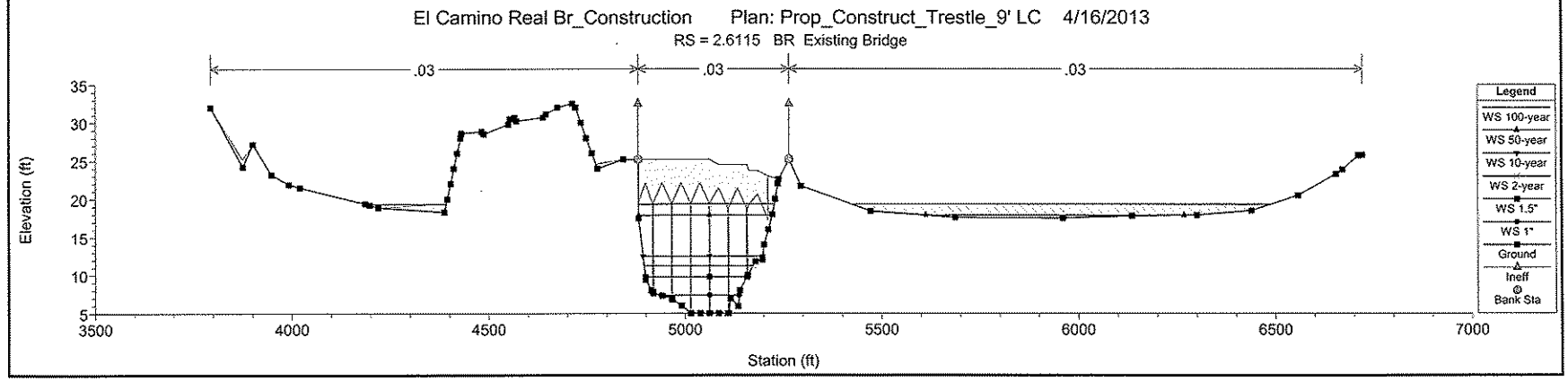

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.624 BR
.04
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

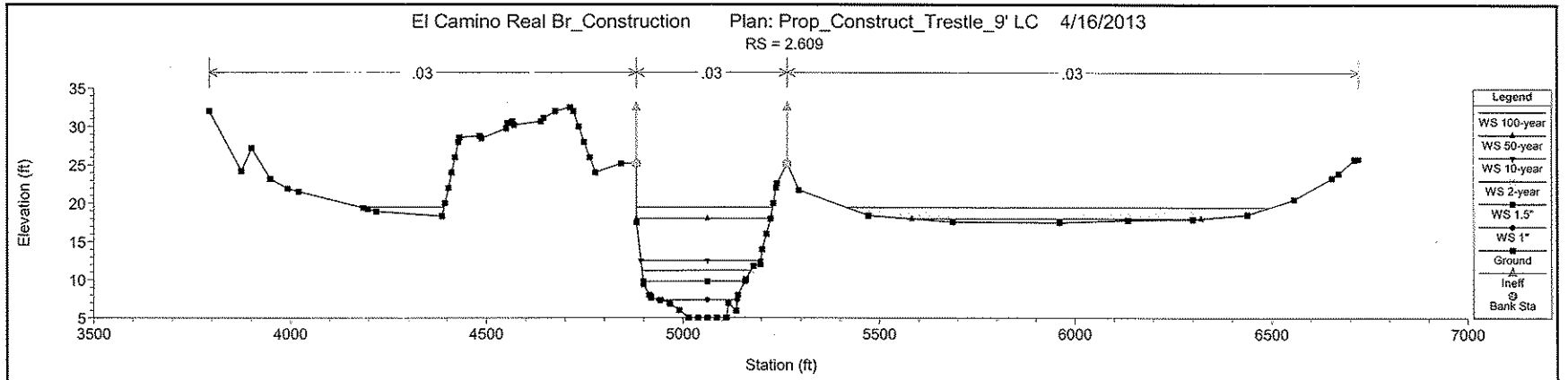

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.624 BR
.045
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

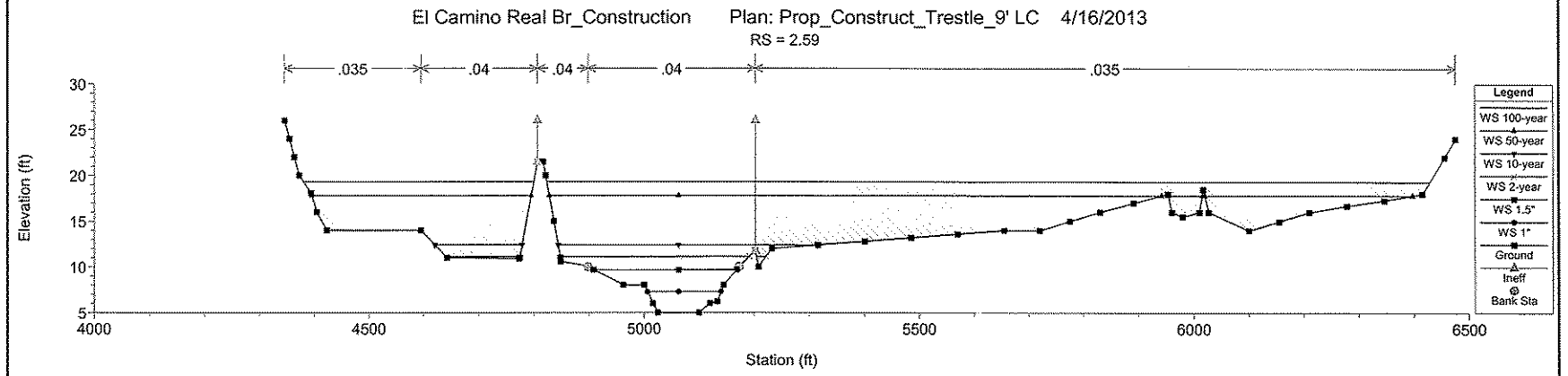

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.622
.045
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

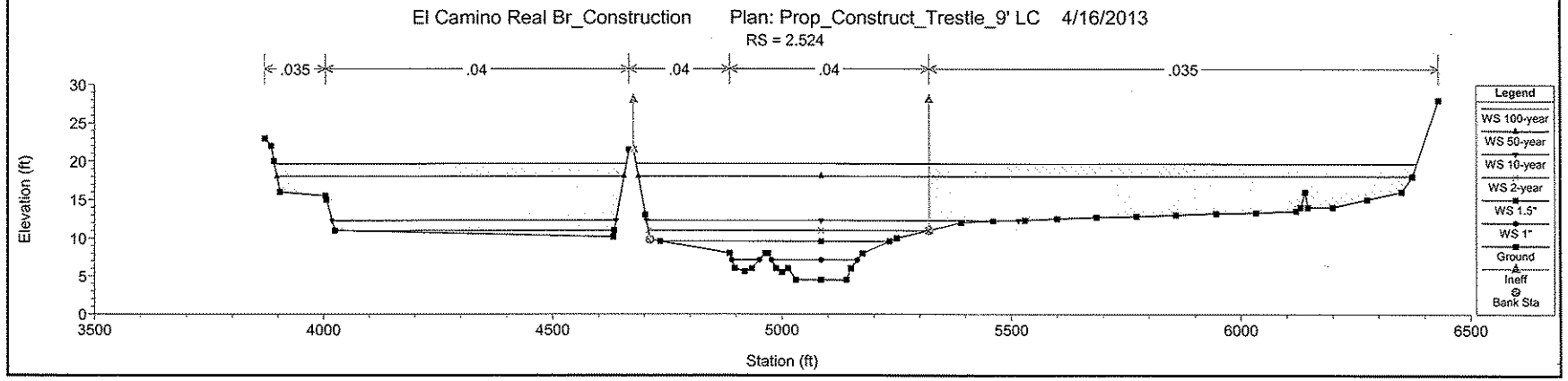

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.614 This is a REPEATED section.
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

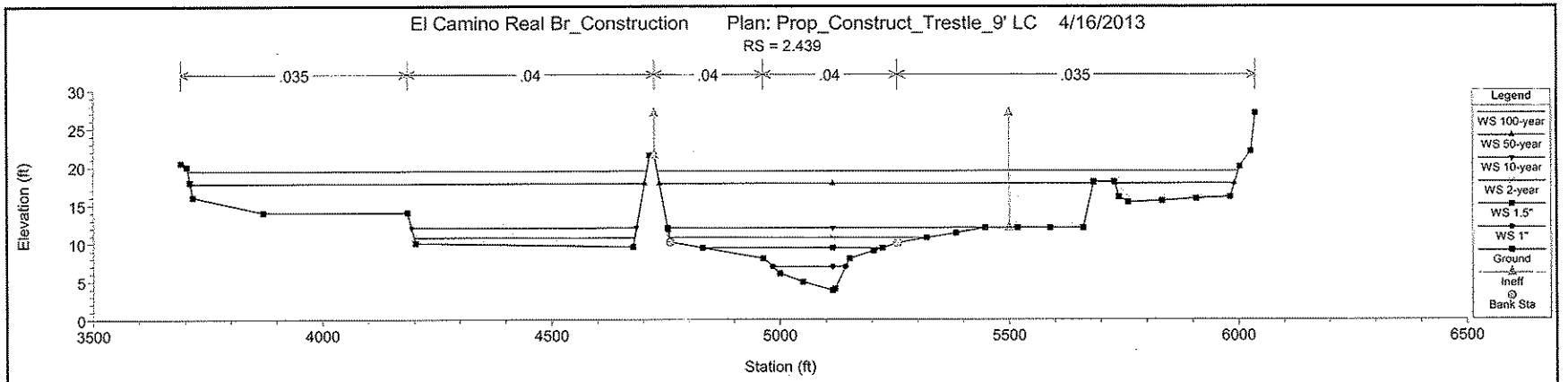

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.6115 BR Existing Bridge
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

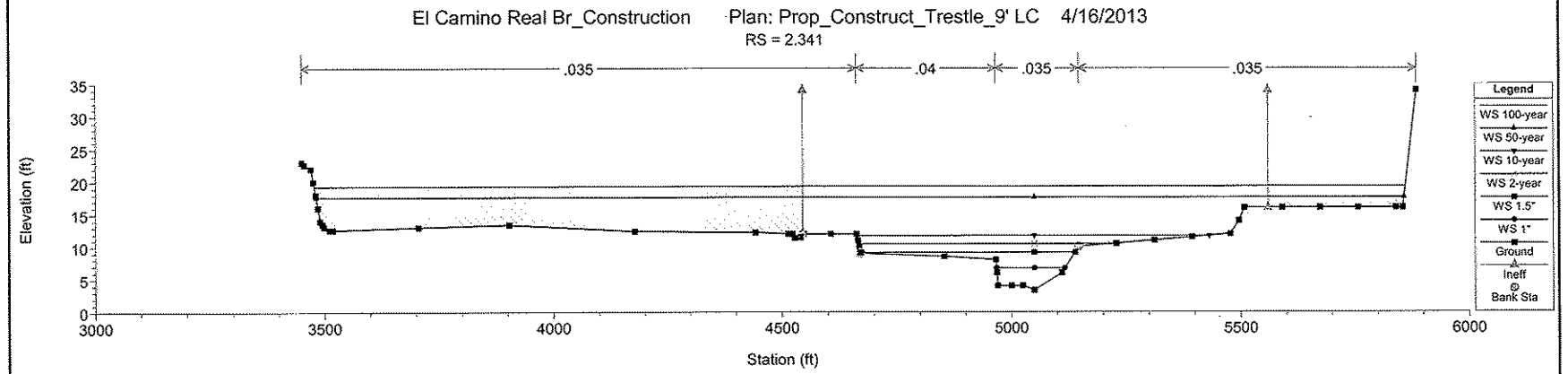

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.6115 BR Existing Bridge
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

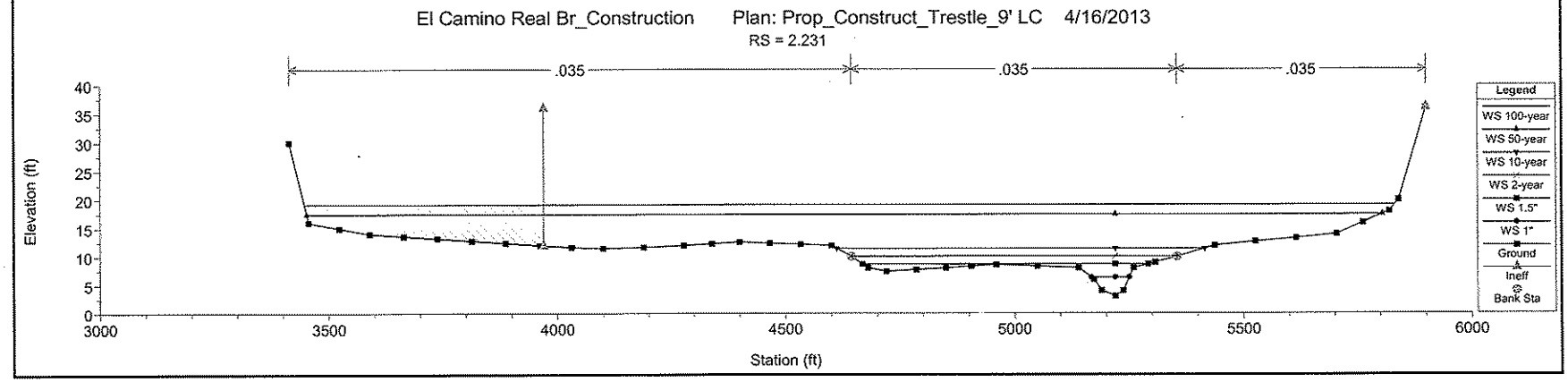

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.609
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

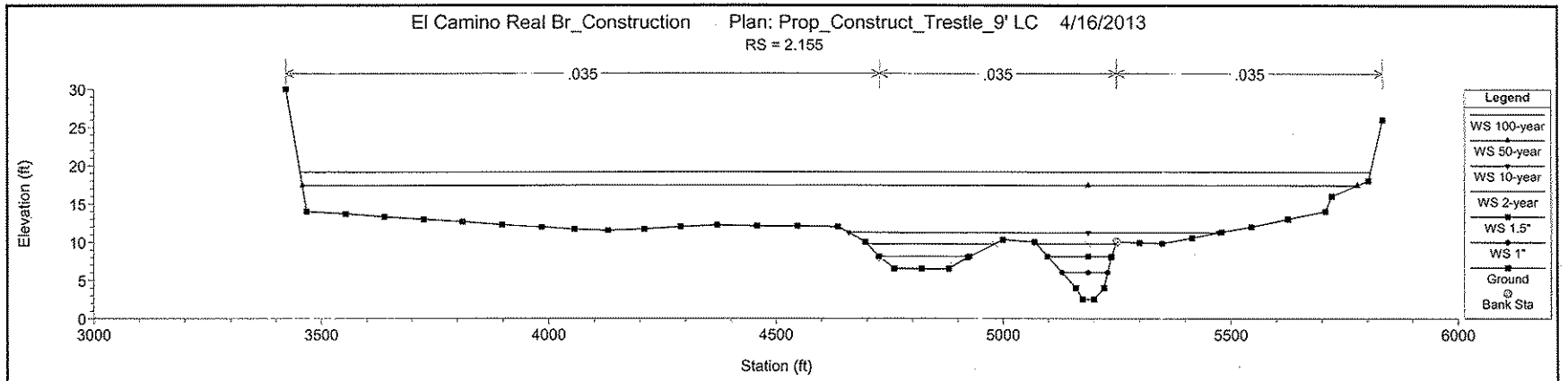

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.59
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

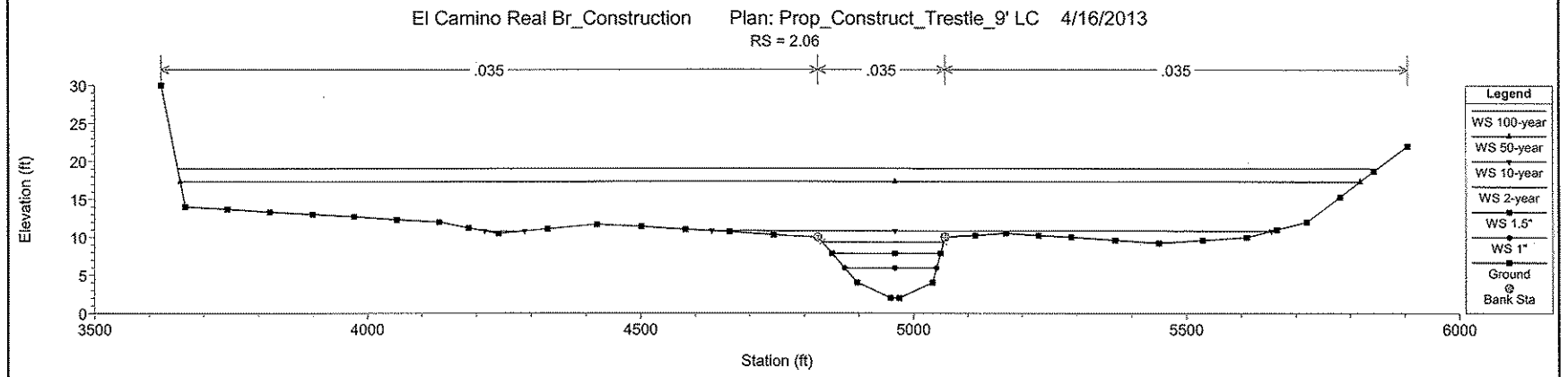

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.524
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

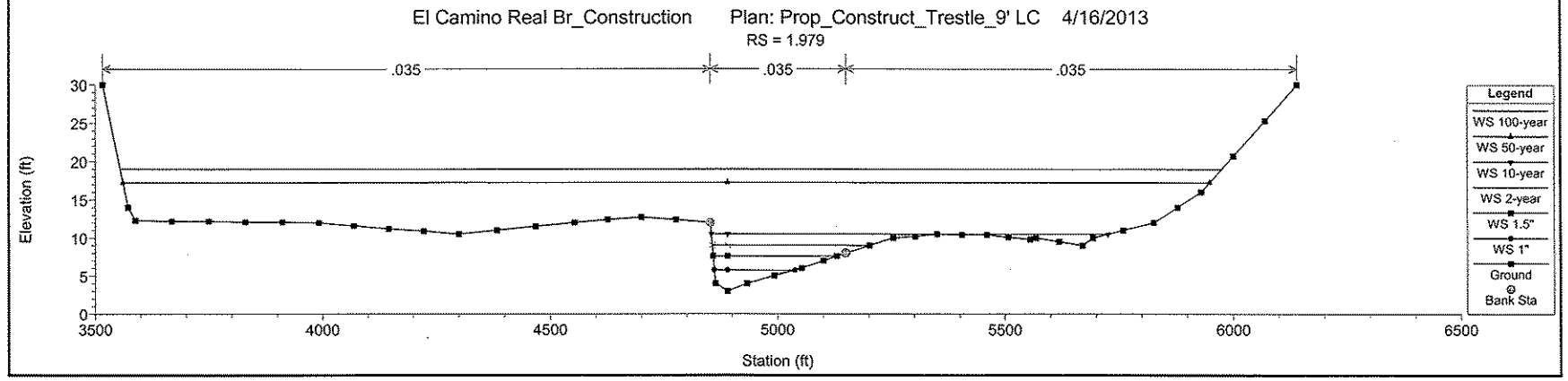

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.439
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.341
.035
.04
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.231
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.155
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 2.06
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_9' LC 4/16/2013
RS = 1.979
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

```
                    HEC-RAS Version 4.1.0 Jan 2010
                     U.S. Army Corps of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California

          X     X  XXXXXX    XXXX         XXXX       XX      XXXX
          X     X  X        X    X        X   X     X  X    X
          X     X  X        X             X   X    X    X   X
          XXXXXXX  XXXX     X       XXX   XXXX     XXXXXX    XXXX
          X     X  X        X             X  X     X    X        X
          X     X  X        X    X        X   X    X    X        X
          X     X  XXXXXX    XXXX         X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: El Camino Real Br_Construction
Project File : ECRBr_Construction.prj
Run Date and Time: 4/16/2013 3:34:20 PM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
Temporary Construction
Phase

The PROPOSED CONDITION ElCamino.p09 plan file was saved and
renamed for the future analyses with the existing bridge added to the geometry
file.

PLAN DATA

Plan Title: Prop_Construct_Trestle_9' LC
Plan File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.p30

Geometry Title: Prop_Construct_Trestle_LC-9'
Geometry File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.g26

Flow Title : Prop+Exis_Construction_Berm
Flow File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.f08

Plan Description:
Existing and proposed bridge with trestle LC at 9' elevation, 1.5' piles, 3'
tall piles

Plan Summary Information:

Number of: Cross Sections = 28 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 4 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Prop+Exis_Construction_Berm
Flow File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.f08

Flow Data (cfs)

River	Reach	RS	100-year	50-year
10-year	2-year	1.5"	1"	
RIVER-1	Reach-1	12	42800	32500
5900	3450	1624	426	
RIVER-1	Reach-1	2.844	42800	32500
5900	3450	1624	426	
RIVER-1	Reach-1	2.732	42800	32500
5900	3450	1624	426	
RIVER-1	Reach-1	2.675	42800	32500
5900	3450	1624	426	
RIVER-1	Reach-1	2.625	42800	32500
5900	3450	1624	426	
RIVER-1	Reach-1	2.614	40100	32500
5900	3450	1624	426	
RIVER-1	Reach-1	2.524	33415	27307
5900	3450	1624	426	
RIVER-1	Reach-1	2.439	34115	27307
5900	3450	1624	426	
RIVER-1	Reach-1	2.341	34815	27307
5900	3450	1624	426	
RIVER-1	Reach-1	2.231	42800	32500
5900	3450	1624	426	
RIVER-1	Reach-1	2.155	42800	32500
5900	3450	1624	426	

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
RIVER-1	Reach-1	100-year	
Known WS = 19			
RIVER-1	Reach-1	50-year	
Known WS = 17.24			

```
  RIVER-1          Reach-1          10-year
Known WS = 10.5
  RIVER-1          Reach-1          2-year
Normal S = 0.001
  RIVER-1          Reach-1          1.5"
Normal S = 0.001
  RIVER-1          Reach-1          1"
Normal S = 0.001
```

GEOMETRY DATA

Geometry Title: Prop_Construct_Trestle_LC-9'
Geometry File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.g26

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 12

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	35.6	1005.86	33.27	1013.08	31.83	1055.01	32.1	1099.25	30.47
1144.99	29.5	1176	31.58	1180.55	32.16	1224.52	29.29	1272.69	28.7
1321.29	25.1	1372.68	18.68	1498.17	18.68	1553.31	27.25	1584.04	26.05
1592.99	24.9	1603.16	24.7	1625.67	28.06	1665.26	25.4	1744.29	22.84
1791.24	20.4	1803.95	20.35	1815.94	20.71	1850.07	19.88	1852.08	20.1
1856.82	19.9	1878.37	20.77	1904.54	21.04	1951.26	20.01	1980.89	18.85
2021.94	18.8	2082.22	19.82	2177.87	19.99	2226.8	23.59	2260.35	26.81
2266.62	28	2276.55	28.01	2289.11	26.36	2341.63	24.48	2453.87	29.83
2463.88	30.9	2545.28	32.67	2603.12	30.76	2654	27.88	2670.13	26.1
2711.85	22.7	2774.21	20.74	2797.93	20.55	2877.43	22.79	2902.47	22.3
2935.73	27.6	2956.39	27.08	2981.85	25.02	3000.22	24.95	3060.28	26.72
3075.48	26.6	3122.59	24.89	3174.65	25.29	3205.29	26.8	3264.7	25.15
3287.43	17.9	3303.45	12.36	3319.08	11.84	3351.69	11.41	3622.04	11.32
3727.53	12.8	3734.46	13.1	3776.26	20.11	3778.5	20.05	3805.79	19.28
3830.09	19.1	3958.65	20.42	4161.16	20.39	4207.79	21.08	4296.23	20.35
4323.61	27.9	4332.48	29.22	4343.85	29.47	4369.91	29.17	4423.85	29.14
4453.69	28.6	4498.75	28.52	4531.82	27.51	4546.42	27.73	4568.52	27.35
4576.79	27.6	4591.03	27.38	4616.36	23.58	4679.05	22.34	4746.64	23.31
4773.16	23.1	4785.29	21.85	4818.03	17.15	4827.16	19.36	4857.86	29.1
4861.74	30.9	4871.15	31.21	4888.42	29.54	4905.42	28.94		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3287.43	.045	3778.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3287.43	3778.5	49.32	48	73.57	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3205.29		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 11.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	40.3	1017.77	32.69	1025.98	31.31	1068.34	31.84	1120.18	30.46
1125.95	30.8	1139.82	31.06	1186.39	30.89	1205.9	30.03	1215.36	29.19
1270.4	26.2	1319.99	23.06	1333.18	22.01	1387.97	22.58	1403.23	20.7
1427.05	20	1458.92	20.06	1475.5	21.56	1490.04	22.43	1501.97	21.59
1521.74	24.9	1544.11	27.77	1555.98	27.71	1576.39	27.13	1588.08	26.52
1592.53	25.6	1602.16	25.44	1644.13	31.55	1689.45	26.26	1716.32	25.39
1799.98	21	1821.54	19.32	1824.81	18.71	2071.33	18.71	2084.45	19.97
2148.41	20.8	2163.75	22.18	2190.78	24.07	2208.44	26.01	2245.42	28.48
2269.66	26.2	2324.04	22.89	2339.18	23.23	2497.01	28.39	2521.97	28.85
2546.84	30.3	2565.05	29.68	2587.75	28.39	2631.81	28.04	2662.57	28.41
2710.89	24.4	2807.45	21.06	2866.09	22.63	2901	26.32	2920.28	30.24
2940.22	29.2	2959.82	27.62	2964.07	27	2969.64	26.61	2989.81	27.21
3015.83	27.5	3041.11	28.24	3120.4	25.24	3169.54	25.37	3196.64	27.06
3260.42	25.6	3282.4	18.34	3300.55	12.14	3349.52	11.94	3381.12	11.52
3524.57	11.2	3619.7	11.39	3718.86	12.21	3738.3	13.08	3778.55	19.79
3849.99	19.6	3921.31	20.2	4036.71	20.5	4181.79	20.35	4194	20.53
4217.99	20	4243.34	19.95	4319.69	20.32	4337.47	20.86	4446.99	21.08
4496.05	20.9	4547.69	22.06	4563.82	21.98	4593.72	23.28	4605.59	23.35
4634.58	22.7	4681.06	22.26	4718.72	22.41	4726.07	21.78	4762.55	16.45
4772.93	19.9	4811.26	33.42	4821.04	32.65	4860.55	31.96		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3282.4	.045	3778.55	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3282.4	3778.55	347.68	339	548.49	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3196.64		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 10.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	61.6	1065.1	31.55	1066.72	30.96	1078.56	28.81	1133.55	30.82
1144.36	30.8	1163.16	29.72	1174.61	27.9	1194.28	26.28	1220.63	25.97
1272.47	24.6	1290.82	24.66	1313.56	23.75	1322.01	23.03	1330.79	23.38
1346.64	24.6	1352.33	24.76	1372.19	24.37	1377.21	24.54	1396.08	23.58
1409	23.3	1437.64	23.91	1457.07	23.5	1471.34	24.16	1487.88	23.48
1489.88	23.6	1504.34	22.5	1520.03	23.02	1551.94	24.67	1568.23	25.86
1572.66	26	1598.72	27.62	1653.76	25.37	1772.86	22.14	1802.96	20.84
1830.99	20.5	1846.37	19.78	1904.05	18.71	2126.59	18.71	2143.98	20.6
2181.47	20.3	2213.13	20.54	2228.29	20.02	2260.47	22.45	2285.56	23.91
2292.62	25.6	2303	26.9	2317.41	25.97	2339.99	23.98	2349.03	22.8
2373.01	20.9	2453.68	19.32	2467.97	19.43	2507.32	22.2	2533.93	21.88
2540.85	21.2	2603.98	24.58	2655.3	24.99	2669.58	24.91	2697.53	25.59
2749	26.4	2774.29	26.56	2817.77	21.14	2825.25	20.46	2903.54	27.83
2922.14	28.7	2959.73	26.34	2998.12	24.68	3063.82	31.09	3131.8	27
3139.33	26.8	3159.32	25.3	3185.34	23.98	3210.78	16.78	3228.28	11.78
3244.48	11.9	3252.18	11.68	3344.18	11.39	3386.35	11.54	3552.31	10.72
3679.96	11.5	3702.75	12.08	3737.94	17.39	3742.94	17.35	3759.57	17.33

3876.38	19.1	3950.62	18.95	4016.25	19.2	4059.21	19.11	4185.85	19.68
4245.42	20.7	4246.74	20.53	4274.78	15.27	4315.06	25.27	4357.64	25.53
4403.81	29	4407.41	30.26	4426.73	42.03	4430.62	43.13		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3210.78	.045	3742.94	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3210.78	3742.94	585.6	450	556.91	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	3063.82		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 9.

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	37	1016.9	33.7	1073.58	32.94	1121.8	33.23	1152.75	31.65
1161.67	30.1	1171.71	29.36	1198.09	28.64	1256.09	24.45	1282.45	24.17
1321.64	25.1	1382.49	25.44	1446.9	25.01	1463.43	24.47	1528.47	28.12
1533.87	28.1	1544.3	29.93	1559.42	28.86	1567.3	27.86	1581.06	29.5
1593.41	27.7	1627.08	27.96	1648.62	28.99	1680.4	29.4	1703.36	27.5
1712.61	28	1721.47	28.98	1732.48	28.9	1751.89	31.06	1766.04	33.19
1782.94	31.2	1800.28	27.57	1848.38	22.39	1882.05	21.62	1921.82	26.96
1943.46	27.3	1956.53	27.14	1966.87	26.49	2013.05	20.39	2114.35	24.06
2135.36	23.6	2151	23.9	2237.13	22.08	2307.12	21.91	2377.04	22.97
2399.54	22.4	2468.87	22.81	2473.19	23.63	2480.05	23.05	2491.91	24.59
2515.92	22.9	2524.23	22.84	2581.98	19.02	2637.55	22.51	2657.34	25.17
2674.82	24.2	2715.26	23.38	2740.33	21.83	2743.51	22	2751.97	21.28
2767.57	23.4	2821.64	23.57	2834.98	23.08	2844.63	22.26	2932.59	22.26
2951.05	22.9	2966.41	25.46	2986.32	27.06	2992.2	28.44	3039.79	23.8
3070.69	14.2	3080.08	11.42	3106.55	11.02	3321.87	10.64	3400.49	11.49
3522.98	10.7	3576.78	11.11	3603.66	11.87	3631.39	15.44	3637.71	15.64
3650.43	16.1	3668.33	18.59	3674.22	19.28	3691.74	18.65	3725.46	19.86
3742.81	20	3832.93	22.46	3869.75	30.39	3884.99	32.22	3889	36.15
3903.88	45.7	3915.36	57.56	3922.06	60.21	3934.59	69.86	3942.4	73.97
3955.33	78.1	3964.35	83.07	3985.23	95.58	3988.22	97.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	3070.69	.045	3637.71	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3070.69	3637.71	1127.52	452	287.85	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2992.2		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 8.

INPUT
Description:

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	28.6	1005.45	28.45	1024.27	33.23	1035.35	32.74	1041.71	32.87
1061.19	32.9	1083.84	32.75	1092.86	32.56	1121.25	32.64	1124.3	32.11
1131.29	31.8	1140.59	31.88	1164.62	31.19	1219.06	30.98	1239.9	29.91
1242.97	30.9	1255.6	30.95	1268.5	30.77	1302.14	28.93	1308.95	29.04
1332.76	27.9	1359.49	28.05	1365.6	30.06	1378.37	30.03	1393.75	30.12
1394.57	29.8	1400.54	25.66	1416.32	23.32	1419.41	23.16	1420.28	23.05
1433.25	20.9	1482.05	21.18	1502.76	23.35	1526.92	25.37	1557.55	26.22
1561.6	26.2	1564.42	26.18	1588.13	25.13	1595.86	24.52	1627.6	21.8
1633.43	21.9	1657.37	22.66	1671.61	23.28	1703.38	22.62	1750.91	20.6
1766.08	19.6	1786.31	18.96	1806.22	19.85	1834.37	20.97	1846.46	20.93
1861.46	20.2	1883.93	19.91	1955.91	21.79	1958.38	21.71	1965.3	21.71
2051.2	20	2121.94	17.86	2585.61	17.86	2628.16	21.64	2641.35	22.45
2649.73	23.1	2687.98	25.74	2697.64	26.82	2724.27	29.32	2737.82	29.24
2748.03	29.2	2759.02	27.76	2777.42	26.7	2794.59	25.17	2802.41	23.78
2827.53	15.9	2845.35	10.4	2848.93	10.33	2949.01	9.78	2990.53	9.84
3031.41	9.4	3047.38	9.32	3118.85	9.51	3158.36	10.28	3200.01	10.36
3237.46	10.2	3284.67	10.19	3336.84	10.23	3346.59	12.25	3386.84	18.59
3390.01	18.7	3403.66	19.41	3416.52	24.97	3420.62	26.92	3433.41	25.66
3439.42	25.1	3448.56	28.08	3468.3	34.15	3471.51	33.72	3481.4	33.27
3494.77	37.3	3511.58	42.12	3539.78	51.12	3556.19	52.41		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2827.53	.045	3390.01	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2827.53	3390.01	806.85	444	387.93	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2724.27		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 7.

INPUT
Description: Revised
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	29.8	1045	27.9	1085	27.6	1103	26.3	1115	26.3
1126	22	1135	17.5	1151	17.2	1163	19.7	1173	20.4
1225	17.8	1313	18.2	1329	18.8	1336	21.6	1351	23.1
1357	21.9	1361	20.1	1367	20.7	1371	19.5	1376	19.9
1380	19.2	1389	19.6	1392	20.4	1396	19.1	1438	19.4
1445	20.9	1452	23.1	1461	19.9	1533	18.8	1577	20.5
1588	21.6	1602	24.8	1609	24.8	1620	23.3	1632	19.9
1646	17.2	1729	15.7	1761	14.5	1784	14.8	1794	16
1802	16.3	1826	15.5	1839	14.5	1924	12.1	1953	9.1
1958	7.6	2017	7.7	2023	9.3	2037	11.2	2108	13.5
2143	20.2	2151	20.9	2167	20.7	2194	17	2237	14.7
2272	15.8	2284	17	2317	17.8	2341	17.7	2365	17.8
2415	17.3	2437	16.7	2468	17.4	2484	17.6	2523	18.4
2565	18.9	2578	19.6	2580	20	2586	20.1	2598	21.1
2647	24.9	2655	24.7	2675	26.8	2689	26.5	2767	22.9
2800	22.5	2807	22.2	2824	17.1	2835	13.3	2843	11
2878	10.1	2919	10	3013	9.5	3101	9.4	3222	10.6
3243	10.7	3296	10.3	3318	13.8	3349	18.8	3377	20.2
3397	19.3	3436	20.9	3465	22.1	3476	22.8	3490	25.5
3499	26.2	3505	26.3	3516	29	3524	30.8	3546	31.4

3585	37	3587	37.5	3590	37.1	3597	37.4	3613	37.9
3620	37.9	3625	38.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2835	.045	3318	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2835	3318	692.7	497	459.02	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2674.77		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 6.

INPUT
Description: Revised
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	34.8	1013	34.7	1055	33.7	1055	33.9	1078	33.7
1086	35	1129	35.1	1187	33.7	1237	31.2	1269	28.9
1296	26.3	1322	24.3	1338	23.7	1356	21.1	1366	18.9
1376	17.3	1387	23.1	1391	22.8	1400	23.7	1413	24.3
1433	22.4	1463	15.9	1478	15.5	1504	15.7	1523	15
1552	12.7	1580	12	1600	9.1	1612	8.6	1656	8.3
1676	7.7	1698	7.7	1751	8.5	1765	9.3	1771	9.3
1784	8.6	1787	8.8	1791	8.3	1794	8.4	1796	8.9
1807	9.8	1816	9.6	1818	9.2	1824	7.7	1937	7.7
1976	8.8	2014	7.8	2026	9.6	2088	11.3	2111	13.2
2122	13.2	2150	14.5	2161	14.6	2170	14.1	2186	15.2
2247	14.5	2318	14.5	2329	14.9	2349	14.3	2397	19
2402	19.3	2403	19.3	2405	19	2427	15.9	2433	15.4
2444	14.8	2447	14.8	2473	16.6	2509	16.5	2524	17
2556	20	2565	20.6	2569	20.7	2591	22.2	2612	22.6
2631	23.7	2652	25.1	2679	26.7	2689	25.5	2700	24.4
2718	23.6	2743	21.7	2749	19.8	2780	9.7	2806	9.2
2862	9.3	2907	8.8	2925	8.8	2998	9.7	3089	10
3165	8.1	3173	7.9	3185	7.7	3279	9.9	3319	8.8
3363	9.5	3390	15.5	3409	19.8	3418	20.3	3428	20.7
3441	22.8	3449	22.9	3464	23.2	3477	28.5	3482	29.7
3508	30.7	3517	32.9	3572	46.4	3598	50.5	3607	52.7
3628	59.1	3633	60.8	3673	77.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2780	.045	3165	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2780	3165	642.39	511	528.63	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2678.79		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 5.

INPUT
Description: Revised
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	26.5	1002	26	1013	28.6	1024	32.7	1042	32
1135	31.8	1149	33.4	1163	32.7	1178	30.6	1194	26.7
1207	22.7	1259	16.3	1275	16	1297	19	1313	20.2
1322	19.4	1348	14	1357	14	1373	16.6	1389	16.7
1412	14.6	1499	12.7	1540	13.8	1579	17.2	1594	16.3
1640	7.7	1773	7.7	1800	9.3	1892	10.9	1943	8.5
1949	7.6	2006	7.6	2026	13.8	2035	15.6	2072	15.8
2089	14.9	2109	15.4	2147	18.4	2164	16.8	2176	17
2190	16	2204	17.5	2242	24.9	2253	25.5	2276	23.7
2295	23.9	2334	18.3	2408	18.3	2423	20.8	2445	22.5
2463	21	2470	19.5	2502	12.6	2514	9.1	2564	8.9
2593	8.6	2625	8.9	2694	9.2	2712	8.7	2807	7.9
2822	10.6	2842	14	2856	16.5	2864	16.5	2885	16.5
2901	16.8	2925	16.6	2942	16.6	2945	16.8	2962	16.6
3010	16.8	3053	16.5	3076	16.9	3091	17	3099	17.4
3120	17.4	3174	18.2	3238	18.2	3263	18.1	3281	18.2
3291	18.5	3333	18.7	3339	19.1	3350	20.7	3356	19.6
3361	18.6	3378	21.9	3430	29.7	3436	33		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2502	.045	2822	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2502	2822	578.02	495	791.59	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2446.02		T
3230	3436		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 4.

INPUT
Description: Revised
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	32.2	1007	27.6	1017	24.3	1053	24.2	1058	23.6
1073	24.4	1105	24.3	1120	24.9	1133	26.1	1146	25.4
1155	23.4	1173	16.9	1182	15.2	1210	14.1	1223	14.7
1240	13.1	1263	12.1	1345	11.3	1371	11.9	1391	13.7
1398	13.3	1409	11.5	1426	12.7	1437	16.1	1474	11.1
1494	10.7	1515	12.7	1533	15.8	1542	15.7	1571	13.6
1676	12.2	1699	10.5	1706	9.6	1713	7.6	1847	7.7
1851	7.7	1942	10.9	1970	13	2023	15.8	2053	15.5
2093	18.3	2111	20.1	2152	21.2	2159	22.3	2169	19
2178	13.4	2182	10.2	2186	8.8	2190	8.7	2197	12.8
2214	9.9	2225	8.1	2246	8	2278	7.8	2296	7.8
2454	7.5	2474	7.4	2482	7.3	2499	7.5	2527	7.5
2535	7.6	2557	11.9	2570	14.3	2573	14.9	2597	15.7
2610	15.3	2634	14.9	2638	14.8	2639	14.9	2701	17
2739	17.5	2798	18.7	2803	15.7	2804	15.7	2834	16.3
2887	16.2	2918	16.4	2982	16.5	2999	16.2	3115	16.2
3192	16.2	3279	16.5	3281	16.5	3346	16.2	3416	16.2
3418	16.2	3442	16.3	3451	16.4	3480	16.3	3497	15.9
3582	15.4	3675	16.7	3682	16.7	3687	16.9	3735	17.9

3756	18.3	3815	18.7	3830	18.6	3854	20	3856	20.2
3859	20.6	3871	25.3	3877	26.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2178	.045	2557	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2178	2557	537.07	495	500.63	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2155		T
3100	3877		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 3.

INPUT
Description: Revised
The X1 and GR information below is all generated from new sections cut from the topo received from Jas...saved as fairbanks.dtm. The X1 Id's currently indicate the station along the stream alignment, with the zero station of the stream at the upstream end. For this Hec-Clomr analysis, the X1 and GR information listed below is for all sections upstream of the Howard Chang CX 2.8444. CX geometry begins with Sta. 1000 at the left end

Date: 11-08-02

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	25.3	1039	23.4	1047	23	1055	22.6	1089	24.9
1105	25.2	1105	24.7	1139	25.7	1171	24.8	1171	25.3
1184	25.7	1191	27.6	1220	26.9	1232	25.5	1244	23.5
1256	19.6	1266	16.8	1277	13.6	1280	13.4	1288	13.7
1293	14.7	1320	14	1333	11.6	1358	7.4	1511	7.4
1527	9.7	1550	11.9	1577	13.1	1592	13.3	1650	10.4
1661	9.1	1669	7.6	1720	7.6	1770	7.6	1783	9
1792	8.9	1851	11.2	1876	12.5	1998	16.7	2056	22.7
2077	22.5	2083	21.6	2092	18.7	2101	13.2	2109	8
2115	8	2119	12.9	2120	13	2144	7	2182	7.3
2285	7	2326	7.1	2418	7	2444	7.1	2452	6.9
2474	10.9	2479	11.8	2496	14.6	2500	14.7	2520	14.9
2563	15.2	2594	15.4	2652	15.9	2666	16.3	2738	16.3
2756	16.4	2830	17.7	2832	17.4	2846	15.2	2871	15.5
2973	15.6	2987	15.6	3048	15.6	3060	15.6	3151	15.5
3256	14.5	3260	14.5	3330	15	3430	15.1	3431	15.1
3432	15.1	3570	13.6	3604	13.4	3693	13.1	3734	13.9
3765	14.9	3858	15.7	3868	15.8	3916	16.3	3934	19.3
3936	19.7	3946	20.2	4019	25.5	4039	26.3	4044	27.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2101	.045	2474	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2101	2474	715	765	795	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1000	2065		T
3160	4044		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.844

INPUT
Description: Revised
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3745	45.5	3767	39	3803	36.6	3810	37.2	3821	40.4
3837	39.4	3850	40	3892	39.4	3910	39.5	3924	41.5
3934	41.5	3952	37.9	3977	30.9	3998	24.3	4010	21.3
4038	18.3	4046	16.4	4056	16.6	4086	13.9	4130	11.5
4187	11	4220	14.2	4232	16.3	4268	19.5	4281	21.4
4298	19.6	4313	15.6	4316	15.5	4327	15.3	4334	16.3
4350	15.9	4365	13	4392	10.1	4456	7.5	4559	8.3
4569	7.7	4587	8.5	4613	11.9	4632	15.5	4641	15.8
4652	14.5	4663	16.4	4690	16.3	4704	13.7	4733	13.6
4764	22.8	4770	22.1	4780	18.5	4790	13.4	4798	7.6
4807	7.4	4810	11.1	4845	7.4	4964	7.5	5141	7.6
5147	9.9	5153	13.4	5180	14	5185	15.7	5196	14.8
5287	14.4	5340	14.4	5427	14.6	5513	14.8	5600	15
5680	15	5760	15	5840	15	5920	15	6000	15
6060	14.7	6120	14.5	6200	15	6256	14.4	6312	13.8
6350	16.2	6366	16	6380	14	6455	13.9	6530	13.7
6599	13.9	6668	14	6716	16	6725	15	6742	16
6758	20	6822	22	6848	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3745	.045	4790	.045	5180	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4790	5180	325	325	325	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3745	4770		T
6060	6848		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.782

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3877	36	3892	35.8	3897	35.9	3906	37.6	3914	37.6
3923	36.6	3934	33.1	3945	29.2	3961	24.1	3973	20.8
3980	20.1	4002	19.2	4034	17.2	4055	16.1	4076	15.6
4120	14	4177	13.2	4204	13.9	4216	13.9	4234	13.3
4245	12.5	4264	10.6	4275	10.4	4288	10.4	4308	11.8
4317	11.9	4323	12.7	4331	13.2	4345	13.2	4365	12
4389	10.3	4426	9.8	4427	9.8	4440	10.4	4446	10.8

4467	10.5	4482	10	4516	8.3	4525	7.5	4620	7.5
4631	9.7	4644	11	4650	11	4654	11.2	4676	11.6
4708	12.9	4727	12.4	4740	11	4763	7.7	4784	7.3
4823	7.1	4994	7.2	5165	7.2	5176	8.7	5184	12.4
5187	12.6	5212	12.8	5218	14.8	5230	14.2	5296	14.1
5326	14.2	5327	14.2	5400	14.5	5455	14.2	5510	14
5590	13.9	5670	13.8	5725	14	5780	14.2	5840	14
5900	13.8	5950	14	6000	14.2	6065	14	6130	13.8
6195	14.1	6260	14.3	6340	14	6420	13.8	6500	13.5
6563	13.7	6626	13.8	6648	13.3	6663	20.5	6666	20.5
6678	14.5	6701	14.5	6711	21.1	6733	20.7	6735	20.3
6780	21.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3877	.045	4727	.045	5184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4727	5184	265	265	265	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3877	4710		T
5830	6780		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.732

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3819	29.5	3837	29.1	3837	28.6	3856	28.8	3877	28.4
3877	28.9	3889	28.5	3904	28.6	3912	30.4	3929	29.3
3942	26.9	3949	25.1	3959	22	3967	20.7	3976	20.3
4012	16.6	4041	14.9	4118	12.9	4174	13	4214	13.8
4227	13.7	4277	15.2	4297	14.9	4320	16.8	4329	18.2
4368	13.3	4382	12.8	4405	10.2	4416	9.3	4425	9.2
4430	9.1	4445	10.3	4449	11	4454	11	4460	11.7
4488	11.7	4515	12.3	4541	11.5	4551	10.9	4560	9.3
4569	7.5	4649	7.5	4659	10.3	4695	18.2	4700	19
4714	22.1	4742	24.7	4758	22.5	4766	22.4	4780	18.3
4793	15.5	4818	11.5	4829	7.6	4854	7.2	4998	7.1
5171	7.1	5185	12.2	5211	12.3	5216	14.2	5250	13.9
5335	14	5365	13.5	5450	14.2	5525	13.9	5600	13.7
5675	13.4	5750	13.2	5827	13.5	5905	13.7	5982	14
6060	14.3	6148	14.1	6236	13.9	6324	13.8	6412	13.6
6500	13.4	6566	13.6	6628	13.2	6642	20	6645	20
6657	14	6679	14	6690	22.9	6713	22.2	6715	21.8
6760	22.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3819	.045	4793	.045	5185	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4793	5185	300	300	300	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3819	4740		T
5430	6760		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.675

INPUT
Description: Revised_4-10-2006
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3836	28	3850	26	3887	25	3897	24.2	3898	24.7
3958	24.2	3984	19.6	3997	18.1	4011	17.3	4063	16
4077	15.9	4099	17.6	4104	17.7	4108	18.2	4160	15.5
4170	15.4	4210	13.9	4222	13	4235	12.7	4268	15
4279	15.5	4295	14	4310	11.7	4320	11	4334	10.6
4350	11.5	4373	12.2	4407	12.2	4458	9.7	4462	9.5
4482	9.1	4525	11.6	4633	13.4	4686	15.1	4707	17.2
4724	19.9	4733	22.1	4742	23	4755	21.8	4763	21.7
4782	16.1	4787	15.4	4806	14.6	4840	11.7	4852	11.6
4862	10.7	4873	7.3	4893	6.9	5018	6.8	5119	6.8
5139.2	8	5149.2	10	5159.5	11.8	5171.6	12	5185.6	12
5202.4	12.2	5204	12	5219	13	5228	13.4	5346	13.4
5370	13.3	5450	14.3	5533	13.9	5616	13.4	5700	13
5782	13.5	5865	14	5943	13.7	6021	13.3	6100	13
6186	13.4	6273	13.7	6360	14.1	6430	13.8	6500	13.5
6555	13.8	6610	14.1	6618	13.4	6630	19.4	6634	19.4
6645	13.4	6667	13.4	6681	24.1	6703	23.7	6705	23.3
6750	24.2	6758	24	6818	26	6822	28		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3836	.045	4787	.045	5171.6	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4787	5171.6	147.97	123	97.11	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3836	4745		T
5228	6822		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.65095

INPUT
Description:
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4743.24	28	4744.29	27.85	4747.08	27.77	4747.83	27.71	4747.9	27.75
4752.41	27.71	4754.37	27.37	4755.35	27.26	4756.4	27.2	4760.31	27.1
4761.36	27.09	4763.02	27.22	4763.39	27.23	4763.69	27.26	4767.6	27.06
4768.35	27.05	4771.36	26.94	4772.26	26.87	4773.24	26.85	4775.72	27.02
4776.55	27.06	4777.75	26.95	4778.88	26.77	4779.63	26.72	4780.68	26.69
4781.89	26.76	4783.62	26.81	4786.17	26.81	4790.01	26.62	4790.31	26.61
4791.81	26.58	4795.04	26.77	4803.17	26.9	4807.15	27.03	4808.73	27.19
4810.01	27.39	4810.68	27.56	4811.36	27.62	4812.34	27.53	4812.94	27.53
4814.37	27.11	4814.74	27.05	4818.68	25.32	4825.73	22.11	4828.22	21.04
4830.29	20.09	4832.57	18.87	4836.72	17.08	4862.63	6.06	4910.14	6.06
4957.64	6.06	5005.15	6.06	5052.66	6.06	5100.16	6.06	5147.67	6.06
5158.45	12.68	5165.28	12.72	5170.59	12.81	5173.99	14.91	5182.97	20.44

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 5193.52    26.8 5194.57    26.8 5195.83   26.81 5195.95    26.8 5197.08   26.87
 5197.76    26.9 5206.63    26.9 5208.44   26.89 5214.45   26.97 5220.69   26.94
 5226.93    26.9 5233.25   26.87 5239.41   26.91 5245.65   26.95 5251.52   26.92
 5257.38   26.89 5263.32   26.87 5269.79    26.9 5276.33   26.92 5282.87   26.95
 5288.13   26.93  5293.4   26.91 5297.53   26.93 5301.67   26.95 5302.27    26.9
 5303.17   27.35 5303.47   27.35  5304.3    26.9 5305.95    26.9 5307.01   27.71
 5308.66   27.68 5308.81   27.65 5312.19   27.71  5312.8    27.7 5317.31   27.85
 5317.61      28

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4743.24    .045 4814.74     .04 5193.52    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4814.74 5193.52             32.03      30   27.89              .1       .3

BRIDGE


RIVER: RIVER-1
REACH: Reach-1             RS: 2.650

INPUT
Description:
Distance from Upstream XS =      .01
Deck/Roadway Width        =     29.9
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       2
    Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 4814.74      11        9 5193.52      11        9

Upstream Bridge Cross Section Data
Station Elevation Data    num=      96
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 4743.24      28 4744.29   27.85 4747.08   27.77 4747.83   27.71  4747.9   27.75
 4752.41   27.71 4754.37   27.37 4755.35   27.26  4756.4    27.2 4760.31    27.1
 4761.36   27.09 4763.02   27.22 4763.39   27.23 4763.69   27.26  4767.6   27.06
 4768.35   27.05 4771.36   26.94 4772.26   26.87 4773.24   26.85 4775.72   27.02
 4776.55   27.06 4777.75   26.95 4778.88   26.77 4779.63   26.72 4780.68   26.69
 4781.89   26.76 4783.62   26.81 4786.17   26.81 4790.01   26.62 4790.31   26.61
 4791.81   26.58 4795.04   26.77 4803.17    26.9 4807.15   27.03 4808.73   27.19
 4810.01   27.39 4810.68   27.56 4811.36   27.62 4812.34   27.53 4812.94   27.53
 4814.37   27.11 4814.74   27.05 4818.68   25.32 4825.73   22.11 4828.22   21.04
 4830.29   20.09 4832.57   18.87 4836.72   17.08 4862.63    6.06 4910.14    6.06
 4957.64    6.06 5005.15    6.06 5052.66    6.06 5100.16    6.06 5147.67    6.06
 5158.45   12.68 5165.28   12.72 5170.59   12.81 5173.99   14.91 5182.97   20.44
 5193.52    26.8 5194.57    26.8 5195.83   26.81 5195.95    26.8 5197.08   26.87
 5197.76    26.9 5206.63    26.9 5208.44   26.89 5214.45   26.97 5220.69   26.94
 5226.93    26.9 5233.25   26.87 5239.41   26.91 5245.65   26.95 5251.52   26.92
 5257.38   26.89 5263.32   26.87 5269.79    26.9 5276.33   26.92 5282.87   26.95
 5288.13   26.93  5293.4   26.91 5297.53   26.93 5301.67   26.95 5302.27    26.9
 5303.17   27.35 5303.47   27.35  5304.3    26.9 5305.95    26.9 5307.01   27.71
 5308.66   27.68 5308.81   27.65 5312.19   27.71  5312.8    27.7 5317.31   27.85
 5317.61      28

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4743.24    .045 4814.74     .04 5193.52    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       4814.74 5193.52              .1       .3
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Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4817      11        9  5195.3      11        9

Downstream Bridge Cross Section Data
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4817      28    4850       6    4900       6    4950       6    5000       6
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65    13.1
  5195.3      28

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4817    .045    4817     .03  5195.3    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4817  5195.3              .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =      11
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  15

Pier Data
Pier Station     Upstream= 4830.75    Downstream= 4830.75
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 4880.88    Downstream= 4880.88
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 4905.94    Downstream= 4905.94
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream=    4931    Downstream=    4931
Upstream     num=       2
    Width   Elev    Width   Elev
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```
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream=    4944    Downstream=    4944
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream= 4968.75    Downstream= 4968.75
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream=    5000    Downstream=    5000
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream= 5031.25    Downstream= 5031.25
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream=    5056    Downstream=    5056
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream=    5069    Downstream=    5069
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream=  5096.3    Downstream=  5096.3
Upstream      num=        2
    Width   Elev    Width   Elev
```



```
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream= 5122.63    Downstream= 5122.63
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream= 5148.94    Downstream= 5148.94
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream= 5175.25    Downstream= 5175.25
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Pier Data
Pier Station     Upstream=            Downstream= 4855.81
Upstream      num=        0

Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5       9

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd            =
           Submerged Inlet + Outlet Cd =       .8
           Max Low Cord                  =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
```

```
REACH: Reach-1            RS: 2.649

INPUT
Description:
Station Elevation Data     num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4817      28    4850       6    4900       6    4950       6    5000       6
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65    13.1
  5195.3      28

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4817    .045    4817     .03  5195.3    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4817  5195.3              93.8    93.8    93.8              .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

BRIDGE


RIVER: RIVER-1
REACH: Reach-1            RS: 2.637

INPUT
Description:
Distance from Upstream XS =      .01
Deck/Roadway Width        =    93.78
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4817      11       9  5195.3      11       9

Upstream Bridge Cross Section Data
Station Elevation Data     num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4817      28    4850       6    4900       6    4950       6    5000       6
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65    13.1
  5195.3      28

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4817    .045    4817     .03  5195.3    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4817  5195.3            .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4827      11       9 5202.56      11       9

Downstream Bridge Cross Section Data
Station Elevation Data     num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4827      28    4860       6    4880     5.9    5000       6    5019       6
    5135       6    5140       6  5150.5      13  5162.5      13    5179      28
```



```
Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4827    .045    4827     .04    5179    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179            .3       .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820               T
    5200    5179               T
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =      11
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  15

Pier Data
Pier Station     Upstream= 4830.75    Downstream= 4830.75
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 4855.81    Downstream=
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       0


Pier Data
Pier Station     Upstream= 4880.88    Downstream= 4880.88
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 4905.94    Downstream= 4905.94
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream=    4931    Downstream=    4931
Upstream     num=       2
```

```
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream=    4944    Downstream=    4944
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 4968.75    Downstream= 4968.75
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream=    5000    Downstream=    5000
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 5031.25    Downstream= 5031.25
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream=    5056    Downstream=    5056
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream=    5069    Downstream=    5069
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream=  5096.3    Downstream=  5096.3
Upstream     num=        2
```



```
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 5122.63    Downstream= 5122.63
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 5148.94    Downstream= 5148.94
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 5175.25    Downstream= 5175.25
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =       .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.625

INPUT
Description: Revised
Station Elevation Data    num=      10
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
    4827       28    4860       6    4880     5.9    5000       6    5019       6
```

```
    5135       6    5140       6  5150.5      13  5162.5      13    5179      28

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4827    .045    4827     .04    5179    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4827    5179             25.1      30   35.99              .3       .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820               T
    5200    5179               T
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

BRIDGE


RIVER: RIVER-1
REACH: Reach-1            RS: 2.624

INPUT
Description:
Distance from Upstream XS =      .01
Deck/Roadway Width        =    29.98
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4827      11       9    5179      11       9

Upstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4827      28    4860       6    4880     5.9    5000       6    5019       6
    5135       6    5140       6  5150.5      13  5162.5      13    5179      28

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4827    .045    4827     .04    5179    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179              .3       .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820               T
    5200    5179               T
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 4841.79      11       9 5202.56      11       9

Downstream Bridge Cross Section Data
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 4545.46   29.09 4567.69   26.96 4574.69   27.78 4587.66   26.69 4599.67   26.34
 4607.41   26.23 4652.36   25.66 4655.82    25.6  4661.7   25.52 4707.41   25.36
 4709.37   25.82 4711.71   26.37    4714   26.91 4716.35   27.46 4718.66      28
```



```
 4719.31   28.16 4733.29   28.22 4734.68   28.14 4751.62   28.47 4752.71   28.68
  4755.9   28.74 4757.02    28.6 4775.62   28.74 4777.64   28.84 4785.59   29.09
 4795.81   29.23 4797.99   29.09 4801.69   28.54 4805.45      28 4809.38   27.46
 4813.24   26.91  4831.3   27.24 4841.79   27.24 4841.85   25.12  4852.1   19.38
 4859.82   16.34 4862.36   15.42 4863.03   15.13 4876.22   10.51 4888.28    6.28
  4889.4    6.27 4890.08    6.21 4903.26    5.96 4916.45    5.65 4916.78    5.65
 4923.15    5.65 4929.52    5.65 4929.85    5.65 4936.23    5.65  4942.6    5.65
 4942.93    5.65 4950.49    6.18 4983.93    5.93 4990.99    6.51 5025.78    7.07
 5047.13    7.41 5058.04    7.58 5063.63    7.59 5087.45    7.63 5095.18    8.18
 5113.33    8.72 5131.14    9.27 5142.91    9.81  5154.5   10.36  5158.2   10.52
 5164.36   10.62  5168.7   10.69 5177.82   15.93 5188.24   16.09 5202.56   27.24
 5210.63   26.28 5259.01   25.38 5317.52   25.17 5392.03   25.14 5439.67   25.22
 5484.38   25.25  5522.3   25.41 5554.66   25.96 5580.95   26.72 5585.55   26.88
 5596.39   27.37 5596.56    27.4 5599.28    27.4

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4545.46    .045 4841.79     .03 5202.56    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       4841.79 5202.56              .3       .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
 4545.464836.617               T
 5217.84 5599.28               T

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =      11
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  14

Pier Data
Pier Station     Upstream= 4830.75    Downstream= 4830.75
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9

Pier Data
Pier Station     Upstream= 4880.88    Downstream=
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5       5     1.5      9
Downstream     num=       0


Pier Data
Pier Station     Upstream= 4905.94    Downstream= 4905.94
Upstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9
Downstream     num=       2
    Width   Elev    Width   Elev
      1.5     5.9     1.5      9

Pier Data
```

```
Pier Station      Upstream=    4931    Downstream=    4931
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station      Upstream=    4944    Downstream=    4944
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station      Upstream= 4968.75    Downstream= 4968.75
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station      Upstream=    5000    Downstream=    5000
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station      Upstream= 5031.25    Downstream= 5031.25
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5       5     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5       5     1.5      9

Pier Data
Pier Station      Upstream=    5056    Downstream=    5056
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5       5     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5       5     1.5      9

Pier Data
Pier Station      Upstream=    5069    Downstream=    5069
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
```



```
Pier Station      Upstream=  5096.3    Downstream=  5096.3
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station      Upstream= 5122.63    Downstream=
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        0


Pier Data
Pier Station      Upstream= 5148.94    Downstream= 5148.94
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Pier Data
Pier Station      Upstream= 5175.25    Downstream= 5175.25
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      9

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
Selected Low flow Methods = Highest Energy Answer

High Flow Method
      Pressure and Weir flow
          Submerged Inlet Cd          =
          Submerged Inlet + Outlet Cd =      .8
          Max Low Cord                =

Additional Bridge Parameters
      Add Friction component to Momentum
      Do not add Weight component to Momentum
      Class B flow critical depth computations use critical depth
          inside the bridge at the upstream end
      Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.622

INPUT
Description:
Station Elevation Data    num=      83
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
```

4545.46	29.09	4567.69	26.96	4574.69	27.78	4587.66	26.69	4599.67	26.34
4607.41	26.23	4652.36	25.66	4655.82	25.6	4661.7	25.52	4707.41	25.36
4709.37	25.82	4711.71	26.37	4714	26.91	4716.35	27.46	4718.66	28
4719.31	28.16	4733.29	28.22	4734.68	28.14	4751.62	28.47	4752.71	28.68
4755.9	28.74	4757.02	28.6	4775.62	28.74	4777.64	28.84	4785.59	29.09
4795.81	29.23	4797.99	29.09	4801.69	28.54	4805.45	28	4809.38	27.46
4813.24	26.91	4831.3	27.24	4841.79	27.24	4841.85	25.12	4852.1	19.38
4859.82	16.34	4862.36	15.42	4863.03	15.13	4876.22	10.51	4888.28	6.28
4889.4	6.27	4890.08	6.21	4903.26	5.96	4916.45	5.65	4916.78	5.65
4923.15	5.65	4929.52	5.65	4929.85	5.65	4936.23	5.65	4942.6	5.65
4942.93	5.65	4950.49	6.18	4983.93	5.93	4990.99	6.51	5025.78	7.07
5047.13	7.41	5058.04	7.58	5063.63	7.59	5087.45	7.63	5095.18	8.18
5113.33	8.72	5131.14	9.27	5142.91	9.81	5154.5	10.36	5158.2	10.52
5164.36	10.62	5168.7	10.69	5177.82	15.93	5188.24	16.09	5202.56	27.24
5210.63	26.28	5259.01	25.38	5317.52	25.17	5392.03	25.14	5439.67	25.22
5484.38	25.25	5522.3	25.41	5554.66	25.96	5580.95	26.72	5585.55	26.88
5596.39	27.37	5596.56	27.4	5599.28	27.4				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4545.46	.045	4841.79	.03	5202.56	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4841.79	5202.56	29.1	42.2	58.21	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4545.46	4836.617		T
5217.84	5599.28		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.614

INPUT
Description: This is a REPEATED section.
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5
4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7
4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5
5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4
5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.03	5265.5	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4881.3	5265.5	27	27	27	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

BRIDGE

RIVER: RIVER-1
REACH: Reach-1 RS: 2.6115

INPUT
Description: Existing Bridge
Distance from Upstream XS = .1
Deck/Roadway Width = 26.8
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Upstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5
4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7
4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5
5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4
5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

3793.5	.03	4881.3	.03	5265.5	.03

Bank Sta: Left Right Coeff Contr. Expan.
4881.3 5265.5 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

Downstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Downstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5
4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7
4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5
5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4
5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.03	5265.5	.03

Bank Sta: Left Right Coeff Contr. Expan.
4881.3 5265.5 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

3793.5	4881	T
5265.5	6721.8	T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 17.6
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 7

Pier Data
Pier Station Upstream= 4918.4 Downstream= 4918.4
Upstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Downstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Pier Data
Pier Station Upstream= 4918.4 Downstream= 4918.4
Upstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Downstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Pier Data
Pier Station Upstream= 4966.4 Downstream= 4966.4
Upstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Downstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Pier Data
Pier Station Upstream= 5014.4 Downstream= 5014.4
Upstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Downstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Pier Data
Pier Station Upstream= 5062.4 Downstream= 5062.4
Upstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Downstream num= 2

Width	Elev	Width	Elev
3	5	3	22

Pier Data
Pier Station Upstream= 5110.4 Downstream= 5110.4
Upstream num= 2

Width	Elev	Width	Elev
3	5	3	22

```
Downstream      num=        2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station      Upstream=  5158.4    Downstream=  5158.4
Upstream      num=        2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream      num=        2
    Width   Elev    Width   Elev
        3       5       3     22

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd              =
           Submerged Inlet + Outlet Cd =        .8
           Max Low Cord                    =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 2.609

INPUT
Description:
Station Elevation Data     num=      76
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
  3793.5       32   3875.1     24.2   3900.8     27.2   3948.4     23.2   3992.5     21.9
  4020.9     21.5   4185.9     19.4   4198.6     19.2   4220.2     18.9     4388     18.3
  4395.2       20   4403.8       22   4412.2       24   4420.8       26   4429.3       28
  4431.7     28.6     4483     28.8   4488.1     28.5   4550.3    29.74   4554.3     30.5
    4566     30.7   4570.1     30.2   4638.4     30.7   4645.8     31.1     4675       32
  4712.5     32.5   4720.5       32   4734.1       30   4747.9       28   4762.3       26
  4776.5       24   4842.8     25.2   4881.3     25.2   4881.4     17.5   4899.6      9.4
  4913.3        8   4917.8      7.8     4919      7.6   4942.4      7.3   4965.8        7
    4967      6.8   4990.4        6   5013.8        5     5015        5   5038.4        5
  5061.8        5     5063        5   5086.4        5   5109.8        5     5111        5
  5115.5      6.9   5135.4      5.9   5139.6        8   5160.3       10   5179.5     11.8
    5197       12   5201.6       14   5212.4       16     5223       18     5230       20
  5236.9       22   5239.1     22.6   5265.5     25.2   5295.1     21.7   5472.7     18.4
  5687.5     17.6     5961     17.5   6135.9     17.8     6300     17.9   6439.2     18.5
    6558     20.5   6654.5     23.3   6671.4     23.9   6711.2     25.7   6711.8     25.8
  6721.8     25.8

Manning's n Values         num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
  3793.5     .03   4881.3     .03   5265.5     .03
```



```
Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
        4881.3  5265.5              100     100      90              .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
  3793.5    4881               T
  5265.5  6721.8               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 2.59

INPUT
Description:
Station Elevation Data     num=      54
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
  4345.5       26   4354.4       24   4363.1       22   4372.1       20   4393.8     18.1
  4404.3       16   4422.7       14   4594.7       14   4642.3       11     4773    10.89
  4774.2       11   4806.4     21.5   4816.4     21.5     4821       20     4836       15
    4848       11   4848.3    10.57   4897.7     10.1     4898       10     4962        8
    5000        8     5016        6     5025        5     5100        5     5120        6
  5133.3      6.2   5144.5        8   5173.2       10   5202.4     11.8     5208       10
    5232       12     5316     12.4     5401     12.8     5485     13.2     5570     13.6
    5655       14     5720       14     5775       15     5830       16     5891       17
    5953       18     5960       16     5980     15.5     6010       16     6017     18.5
    6027       16     6100       14     6155       15     6210       16     6278     16.7
    6346     17.3     6415       18     6455       22     6475       24

Manning's n Values         num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
  4345.5     .035   4594.7     .04   4806.4     .04     4898     .04   5202.4     .035

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
        4898  5173.2              345     345     340              .2       .4
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
  4345.5  4806.4               T
  5202.4    6475               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 2.524

INPUT
Description:
Station Elevation Data     num=      47
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
    3871       23     3885       22     3891       20     3904       16     4004     15.5
    4006       15     4024       11     4632    10.17     4634       11     4666     21.5
    4676     21.5     4702       13     4712      9.8     4886        8     4897        6
    4919      5.6     4934        6     4964        8     4969        8     4987        6
    5000      5.5     5013        6     5030      4.5     5085      4.5     5140      4.5
    5150        6     5175        8     5250       10     5320       11     5390       12
    5460     12.2     5530     12.3     5600     12.5     5686     12.7     5773     12.8
    5859       13     5946     13.2     6033     13.3     6120     13.5     6130       14
    6140       16     6146       14     6200       14     6275       15     6350       16
    6373       18     6430       28

Manning's n Values         num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
```

3871	.035	4004	.04	4666	.04	4886	.04	5320	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4712 5320 450 450 450 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3871	4676		T
5320	6430		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.439

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3692	20.5	3705	20	3711	18	3718	16	3871	14
4186	14	4204	10	4678	9.5	4715	21.5	4725	21.5
4754	12	4755	11.8	4760	10.1	4964	8	5000	6
5050	4.9	5115	3.8	5120	4	5152	8	5204	9
5256	10	5320	10.7	5384	11.3	5448	12	5519	12
5590	12	5662	12	5685	18	5730	18	5740	16
5760	15.3	5834	15.5	5908	15.8	5982	16	6003	20
6027	22	6037	27						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3692	.035	4186	.04	4725	.04	4964	.04	5256	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4760 5256 520 520 520 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3692	4725		T
5500	6037		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.341

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3449.9	23	3455	22.6	3470	22	3475	20	3480	18
3485	16	3490	14	3495	13.52	3498	13.1	3511	12.6
3518	12.6	3705	13	3903	13.4	4177	12.4	4442	12.2
4514	12	4522	12	4527	11.35	4540	11.45	4545	12
4548	12	4606	12	4662	12	4665	11	4668	10
4671	9	4853	8.5	4966	8	4968	6	4970	4
5000	4	5025	4	5050	3.3	5110	6	5147	10
5229	10.5	5312	11	5394	11.5	5477	12	5496	14
5508	16	5591	16	5674	16	5757	16	5840	16
5855	16	5885	34						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3449.9	.035	4662	.04	4966	.035	5147	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4671 5147 550 580 600 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3449.9	4545		T
5560	5885		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.231

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3413	.035	4644	.035	5355	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4644 5355 300 400 430 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3413	3970		T
5900	5900		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.155

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5
4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4
5175	2.5	5200	2.5	5222	4	5238	8	5250	10
5300	9.9	5350	9.8	5415	10.5	5480	11.3	5545	12
5626	13	5708	14	5722	16	5803	18	5834	26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3422	.035	4728	.035	5250	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

4728	5250			330	500	450		.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.06

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3622	30	3666	14	3743	13.7	3821	13.3	3899	13
3976	12.7	4054	12.3	4132	12	4186	11.2	4240	10.5
4330	11.1	4420	11.7	4501	11.4	4582	11	4663	10.7
4744	10.3	4825	10	4897	4	4958	2	4974	2
5035	4	5058	10	5114	10.2	5170	10.5	5230	10.2
5290	10	5370	9.6	5450	9.2	5530	9.6	5610	10
5665	11	5720	12	5781	15.3	5843	10.7	5905	22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3622	.035	4825	.035	5058	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4825	5058	480	430	330	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 1.979

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3516	30	3572	14	3588	12.3	3668	12.2	3749	12.2
3830	12.1	3911	12.1	3992	12	4069	11.6	4146	11.2
4223	10.9	4300	10.5	4384	11	4468	11.5	4553	12
4626	12.4	4700	12.7	4776	12.4	4852	12	4863	4
4890	3	4933	4	4993	5	5053	6	5101	7
5150	8	5202	9	5254	10	5302	10.2	5350	10.5
5405	10.4	5460	10.4	5507	10.1	5555	9.8	5568	10
5619	9.5	5670	9	5693	10	5759	11	5826	12
5878	14	5930	16	6000	20.7	6070	25.3	6140	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3516	.035	4852	.035	5150	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4852	5150	400	400	400	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3	n4	n5
Reach-1	12	.045	.045	.035		
Reach-1	11.	.045	.045	.035		
Reach-1	10.	.045	.045	.035		
Reach-1	9.	.045	.045	.035		
Reach-1	8.	.045	.045	.035		
Reach-1	7.	.045	.045	.035		
Reach-1	6.	.045	.045	.035		
Reach-1	5.	.045	.045	.035		
Reach-1	4.	.045	.045	.035		
Reach-1	3.	.045	.045	.035		
Reach-1	2.844	.045	.045	.035		
Reach-1	2.782	.045	.045	.035		
Reach-1	2.732	.045	.045	.035		
Reach-1	2.675	.045	.045	.035		
Reach-1	2.65095	.045	.04	.035		
Reach-1	2.650	Bridge				
Reach-1	2.649	.045	.03	.035		
Reach-1	2.637	Bridge				
Reach-1	2.625	.045	.04	.035		
Reach-1	2.624	Bridge				
Reach-1	2.622	.045	.03	.035		
Reach-1	2.614	.03	.03	.03		
Reach-1	2.6115	Bridge				
Reach-1	2.609	.03	.03	.03		
Reach-1	2.59	.035	.04	.04	.04	.035
Reach-1	2.524	.035	.04	.04	.04	.035
Reach-1	2.439	.035	.04	.04	.04	.035
Reach-1	2.341	.035	.04	.035	.035	
Reach-1	2.231	.035	.035	.035		
Reach-1	2.155	.035	.035	.035		
Reach-1	2.06	.035	.035	.035		
Reach-1	1.979	.035	.035	.035		

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	12	49.32	48	73.57
Reach-1	11.	347.68	339	548.49
Reach-1	10.	585.6	450	556.91
Reach-1	9.	1127.52	452	287.85
Reach-1	8.	806.85	444	387.93
Reach-1	7.	692.7	497	459.02
Reach-1	6.	642.39	511	528.63
Reach-1	5.	578.02	495	791.59
Reach-1	4.	537.07	495	500.63
Reach-1	3.	715	765	795
Reach-1	2.844	325	325	325
Reach-1	2.782	265	265	265
Reach-1	2.732	300	300	300
Reach-1	2.675	147.97	123	97.11
Reach-1	2.65095	32.03	30	27.89
Reach-1	2.650	Bridge		
Reach-1	2.649	93.8	93.8	93.8
Reach-1	2.637	Bridge		
Reach-1	2.625	25.1	30	35.99
Reach-1	2.624	Bridge		
Reach-1	2.622	29.1	42.2	58.21
Reach-1	2.614	27	27	27

Reach-1	2.6115	Bridge			
Reach-1	2.609		100	100	90
Reach-1	2.59		345	345	340
Reach-1	2.524		450	450	450
Reach-1	2.439		520	520	520
Reach-1	2.341		550	580	600
Reach-1	2.231		300	400	430
Reach-1	2.155		330	500	450
Reach-1	2.06		480	430	330
Reach-1	1.979		400	400	400

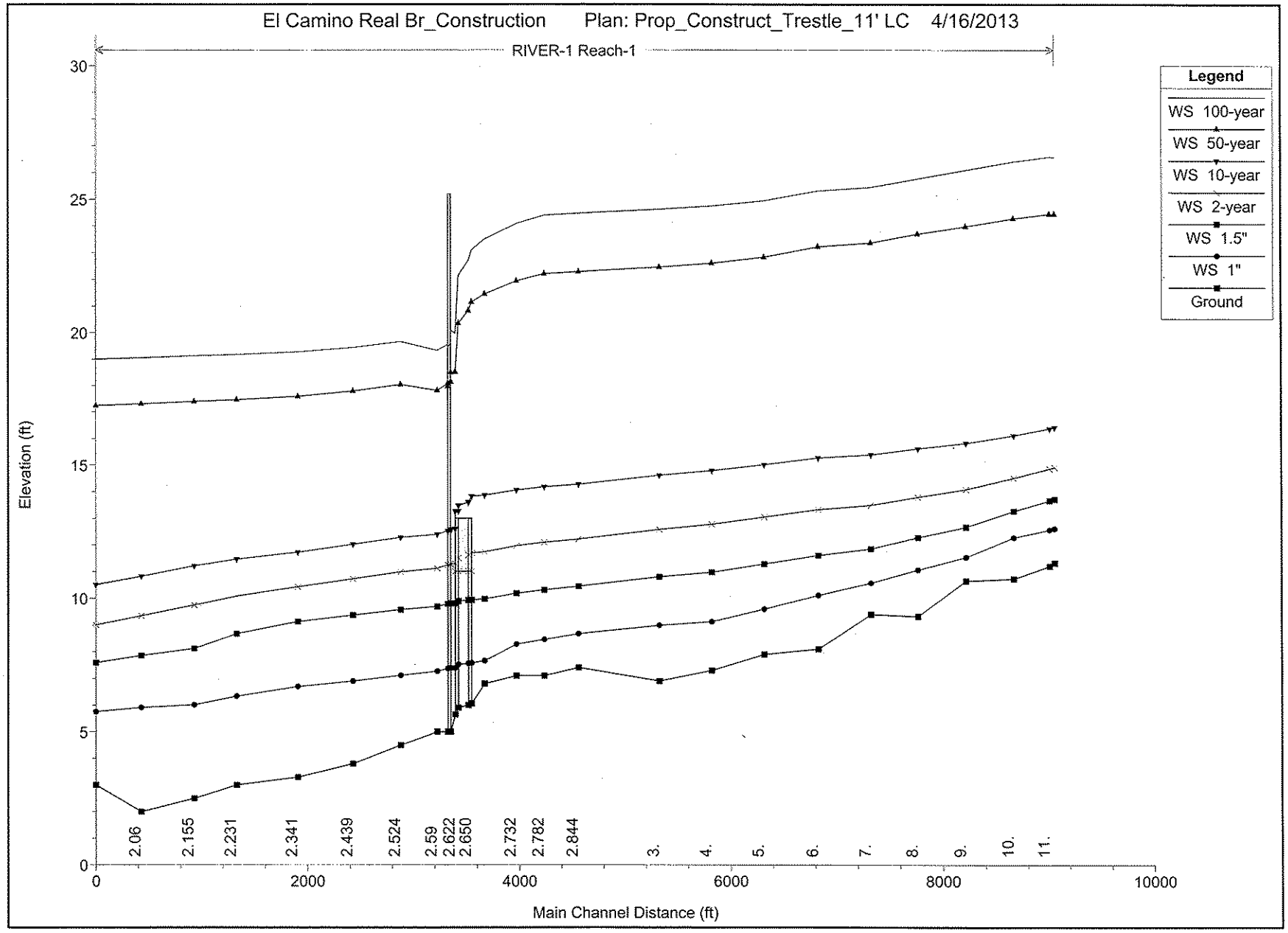
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.		Contr.	Expan.
Reach-1	12		.1	.3
Reach-1	11.		.1	.3
Reach-1	10.		.1	.3
Reach-1	9.		.1	.3
Reach-1	8.		.1	.3
Reach-1	7.		.1	.3
Reach-1	6.		.1	.3
Reach-1	5.		.1	.3
Reach-1	4.		.1	.3
Reach-1	3.		.1	.3
Reach-1	2.844		.1	.3
Reach-1	2.782		.1	.3
Reach-1	2.732		.1	.3
Reach-1	2.675		.1	.3
Reach-1	2.65095		.1	.3
Reach-1	2.650	Bridge		
Reach-1	2.649		.3	.5
Reach-1	2.637	Bridge		
Reach-1	2.625		.3	.5
Reach-1	2.624	Bridge		
Reach-1	2.622		.3	.5
Reach-1	2.614		.3	.5
Reach-1	2.6115	Bridge		
Reach-1	2.609		.3	.5
Reach-1	2.59		.2	.4
Reach-1	2.524		.1	.3
Reach-1	2.439		.1	.3
Reach-1	2.341		.1	.3
Reach-1	2.231		.1	.3
Reach-1	2.155		.1	.3
Reach-1	2.06		.1	.3
Reach-1	1.979		.1	.3

ATTACHMENT 6

1.0-, 1.3-, 2-, 10-, 50- and 100-Year Construction Phase Condition HEC-RAS Analysis

Option 1 - Temporary Trestle Construction


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RIVER-1 Reach-1
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Elevation (ft)
Main Channel Distance (ft)
0
5
10
15
20
25
30
0
2000
4000
6000
8000
10000
2.06
2.155
2.231
2.341
2.439
2.524
2.59
2.622
2.650
2.732
2.782
2.844
3.
4.
5.
6.
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8.
9.
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11.

HEC-RAS Plan: 5'Tall_2"Deck River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	12	100-year	42800.00	11.32	26.57		26.80	0.000469	4.22	11602.24	2839.00	0.20
Reach-1	12	50-year	32500.00	11.32	24.44		24.68	0.000589	4.25	8816.99	2251.73	0.21
Reach-1	12	10-year	5900.00	11.32	16.42		16.54	0.000921	2.77	2129.90	462.52	0.23
Reach-1	12	2-year	3450.00	11.32	14.91		15.00	0.001108	2.39	1443.01	449.18	0.24
Reach-1	12	1.5"	1624.00	11.32	13.71		13.76	0.001102	1.78	910.68	438.56	0.22
Reach-1	12	1"	426.00	11.32	12.61		12.62	0.000810	0.98	435.97	411.24	0.17
Reach-1	11.	100-year	42800.00	11.20	26.58		26.76	0.000375	3.79	13158.12	2896.96	0.18
Reach-1	11.	50-year	32500.00	11.20	24.44		24.64	0.000501	3.93	9871.42	2453.24	0.20
Reach-1	11.	10-year	5900.00	11.20	16.37		16.49	0.000917	2.75	2146.42	469.91	0.23
Reach-1	11.	2-year	3450.00	11.20	14.86		14.95	0.001130	2.39	1443.54	456.36	0.24
Reach-1	11.	1.5"	1624.00	11.20	13.66		13.71	0.001163	1.80	901.88	445.64	0.22
Reach-1	11.	1"	426.00	11.20	12.57		12.58	0.000935	1.00	424.19	427.54	0.18
Reach-1	10.	100-year	42800.00	10.72	26.41		26.61	0.000374	3.83	12293.27	2891.77	0.18
Reach-1	10.	50-year	32500.00	10.72	24.27		24.46	0.000421	3.66	9783.82	2263.10	0.18
Reach-1	10.	10-year	5900.00	10.72	16.11		16.21	0.000748	2.49	2371.86	524.18	0.20
Reach-1	10.	2-year	3450.00	10.72	14.51		14.58	0.001000	2.22	1553.46	500.08	0.22
Reach-1	10.	1.5"	1624.00	10.72	13.27		13.32	0.001126	1.72	943.88	487.58	0.22
Reach-1	10.	1"	426.00	10.72	12.27		12.28	0.000816	0.92	461.79	477.46	0.17
Reach-1	9.	100-year	42800.00	10.64	26.09		26.39	0.000517	4.54	9947.94	2198.01	0.21
Reach-1	9.	50-year	32500.00	10.64	23.97		24.23	0.000532	4.16	8218.26	1782.16	0.21
Reach-1	9.	10-year	5900.00	10.64	15.82		15.90	0.000605	2.25	2624.10	577.20	0.18
Reach-1	9.	2-year	3450.00	10.64	14.08		14.15	0.000931	2.09	1647.96	549.70	0.21
Reach-1	9.	1.5"	1624.00	10.64	12.67		12.72	0.001576	1.84	884.88	534.00	0.25
Reach-1	9.	1"	426.00	10.64	11.53		11.56	0.004465	1.49	285.17	511.90	0.35
Reach-1	8.	100-year	42800.00	9.32	25.77		26.14	0.000584	4.90	8887.23	1894.95	0.22
Reach-1	8.	50-year	32500.00	9.32	23.69		23.98	0.000554	4.33	7598.25	1756.74	0.21
Reach-1	8.	10-year	5900.00	9.32	15.61		15.67	0.000401	2.03	2908.18	539.45	0.15
Reach-1	8.	2-year	3450.00	9.32	13.79		13.84	0.000503	1.78	1941.64	521.98	0.16
Reach-1	8.	1.5"	1624.00	9.32	12.27		12.30	0.000596	1.40	1160.85	507.44	0.16
Reach-1	8.	1"	426.00	9.32	11.06		11.07	0.000479	0.77	550.89	497.61	0.13
Reach-1	7.	100-year	42800.00	9.40	25.45		25.86	0.000663	5.25	8746.31	2323.11	0.24
Reach-1	7.	50-year	32500.00	9.40	23.36		23.71	0.000672	4.79	7178.46	2202.81	0.23
Reach-1	7.	10-year	5900.00	9.40	15.38		15.47	0.000534	2.31	2562.82	875.21	0.18

HEC-RAS Plan: 5'Tall_2"Deck River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7.	2-year	3450.00	9.40	13.49		13.56	0.000804	2.11	1632.85	714.31	0.20
Reach-1	7.	1.5"	1624.00	9.40	11.85		11.91	0.001455	1.89	858.17	596.44	0.25
Reach-1	7.	1"	426.00	9.40	10.57		10.60	0.003626	1.56	273.85	489.19	0.33
Reach-1	6.	100-year	42800.00	8.10	25.31		25.58	0.000361	3.98	10550.07	2125.13	0.18
Reach-1	6.	50-year	32500.00	8.10	23.23		23.44	0.000346	3.55	8959.07	1993.57	0.17
Reach-1	6.	10-year	5900.00	8.10	15.27		15.31	0.000182	1.46	3675.22	1487.76	0.11
Reach-1	6.	2-year	3450.00	8.10	13.33		13.36	0.000225	1.25	2471.65	1191.93	0.11
Reach-1	6.	1.5"	1624.00	8.10	11.60		11.62	0.000295	0.98	1429.54	1107.22	0.11
Reach-1	6.	1"	426.00	8.10	10.11		10.12	0.000451	0.60	543.94	1038.47	0.12
Reach-1	5.	100-year	42800.00	7.90	24.94		25.32	0.000637	5.31	8844.49	2181.30	0.23
Reach-1	5.	50-year	32500.00	7.90	22.83		23.17	0.000704	5.08	7187.42	2106.56	0.24
Reach-1	5.	10-year	5900.00	7.90	15.01		15.14	0.000695	2.92	2046.64	960.80	0.21
Reach-1	5.	2-year	3450.00	7.90	13.05		13.15	0.000871	2.54	1366.88	777.62	0.22
Reach-1	5.	1.5"	1624.00	7.90	11.29		11.35	0.001150	2.06	789.58	716.63	0.23
Reach-1	5.	1"	426.00	7.90	9.59		9.63	0.002987	1.63	261.30	583.71	0.31
Reach-1	4.	100-year	42800.00	7.30	24.75		24.99	0.000390	4.22	11020.99	2821.15	0.18
Reach-1	4.	50-year	32500.00	7.30	22.60		22.82	0.000427	4.03	8996.96	2706.91	0.19
Reach-1	4.	10-year	5900.00	7.30	14.78		14.87	0.000400	2.33	2550.53	1166.33	0.16
Reach-1	4.	2-year	3450.00	7.30	12.77		12.83	0.000454	1.95	1766.54	928.73	0.16
Reach-1	4.	1.5"	1624.00	7.30	10.97		11.01	0.000449	1.48	1100.30	624.25	0.15
Reach-1	4.	1"	426.00	7.30	9.13		9.14	0.000481	0.91	466.83	513.88	0.14
Reach-1	3.	100-year	42800.00	6.90	24.62		24.80	0.000289	3.69	12659.50	2840.57	0.16
Reach-1	3.	50-year	32500.00	6.90	22.46		22.62	0.000321	3.55	10291.53	2706.26	0.16
Reach-1	3.	10-year	5900.00	6.90	14.61		14.68	0.000337	2.22	2682.39	1366.71	0.15
Reach-1	3.	2-year	3450.00	6.90	12.58		12.63	0.000354	1.83	1893.31	888.46	0.14
Reach-1	3.	1.5"	1624.00	6.90	10.80		10.82	0.000305	1.31	1236.59	756.42	0.12
Reach-1	3.	1"	426.00	6.90	8.99		8.99	0.000203	0.70	609.93	640.62	0.09
Reach-1	2.844	100-year	42800.00	7.40	24.47		24.60	0.000207	3.02	14938.47	2840.59	0.13
Reach-1	2.844	50-year	32500.00	7.40	22.28		22.39	0.000237	2.93	12112.01	2811.50	0.14
Reach-1	2.844	10-year	5900.00	7.40	14.26		14.36	0.000541	2.52	2344.50	1178.50	0.18
Reach-1	2.844	2-year	3450.00	7.40	12.21		12.28	0.000610	2.18	1585.43	684.01	0.18
Reach-1	2.844	1.5"	1624.00	7.40	10.44		10.48	0.000692	1.70	956.58	560.01	0.18
Reach-1	2.844	1"	426.00	7.40	8.67		8.69	0.001065	1.17	364.84	483.46	0.19

HEC-RAS Plan: 5'Tall_2"Deck River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.782	100-year	42800.00	7.10	24.40		24.53	0.000196	3.04	14614.22	2819.94	0.13
Reach-1	2.782	50-year	32500.00	7.10	22.21		22.32	0.000206	2.84	12160.95	2812.12	0.13
Reach-1	2.782	10-year	5900.00	7.10	14.17		14.23	0.000269	1.91	3187.03	2244.67	0.13
Reach-1	2.782	2-year	3450.00	7.10	12.09		12.13	0.000325	1.65	2094.03	847.26	0.14
Reach-1	2.782	1.5"	1624.00	7.10	10.30		10.33	0.000331	1.25	1301.53	647.59	0.13
Reach-1	2.782	1"	426.00	7.10	8.46		8.47	0.000472	0.83	515.48	528.43	0.13
Reach-1	2.732	100-year	42800.00	7.10	24.08		24.43	0.000513	4.81	9133.50	2796.62	0.21
Reach-1	2.732	50-year	32500.00	7.10	21.94		22.22	0.000513	4.38	7687.62	2683.71	0.20
Reach-1	2.732	10-year	5900.00	7.10	14.05		14.14	0.000414	2.34	2583.26	2084.27	0.16
Reach-1	2.732	2-year	3450.00	7.10	11.96		12.02	0.000489	2.02	1707.39	620.10	0.17
Reach-1	2.732	1.5"	1624.00	7.10	10.18		10.22	0.000505	1.53	1061.59	499.57	0.16
Reach-1	2.732	1"	426.00	7.10	8.28		8.29	0.000940	1.09	389.73	433.77	0.18
Reach-1	2.675	100-year	42800.00	6.80	23.51		24.18	0.001077	6.58	6559.68	2729.74	0.30
Reach-1	2.675	50-year	32500.00	6.80	21.45		21.98	0.001041	5.87	5576.56	2670.49	0.29
Reach-1	2.675	10-year	5900.00	6.80	13.86		13.98	0.000664	2.76	2177.67	1883.08	0.20
Reach-1	2.675	2-year	3450.00	6.80	11.73		11.83	0.000857	2.54	1360.84	483.50	0.22
Reach-1	2.675	1.5"	1624.00	6.80	9.97		10.03	0.000812	1.93	840.20	329.08	0.20
Reach-1	2.675	1"	426.00	6.80	7.66		7.72	0.005501	2.08	204.80	261.57	0.41
Reach-1	2.65095	100-year	42800.00	6.06	23.10	14.78	24.02	0.001170	7.70	5555.69	363.83	0.35
Reach-1	2.65095	50-year	32500.00	6.06	21.15	13.38	21.84	0.001027	6.70	4851.57	356.16	0.32
Reach-1	2.65095	10-year	5900.00	6.06	13.82	8.41	13.92	0.000338	2.52	2344.04	327.83	0.17
Reach-1	2.65095	2-year	3450.00	6.06	11.69	7.70	11.76	0.000329	2.07	1668.55	307.45	0.16
Reach-1	2.65095	1.5"	1624.00	6.06	9.94	7.06	9.97	0.000255	1.43	1134.42	300.46	0.13
Reach-1	2.65095	1"	426.00	6.06	7.57	6.47	7.58	0.000410	0.98	434.52	291.04	0.14
Reach-1	2.650		Bridge									
Reach-1	2.649	100-year	42800.00	6.00	22.71	14.76	23.71	0.000913	8.06	5312.48	348.31	0.36
Reach-1	2.649	50-year	32500.00	6.00	20.82	13.34	21.57	0.000778	6.97	4660.64	342.61	0.33
Reach-1	2.649	10-year	5900.00	6.00	13.59	8.35	13.69	0.000235	2.61	2262.48	320.77	0.17
Reach-1	2.649	2-year	3450.00	6.00	11.60	7.64	11.67	0.000207	2.09	1650.14	302.81	0.16
Reach-1	2.649	1.5"	1624.00	6.00	9.92	7.00	9.96	0.000147	1.42	1145.39	297.77	0.13
Reach-1	2.649	1"	426.00	6.00	7.56	6.41	7.57	0.000213	0.95	448.84	290.67	0.13

HEC-RAS Plan: 5'Tall_2"Deck River: RIVER-1 Reach: Reach-1 (Continued)

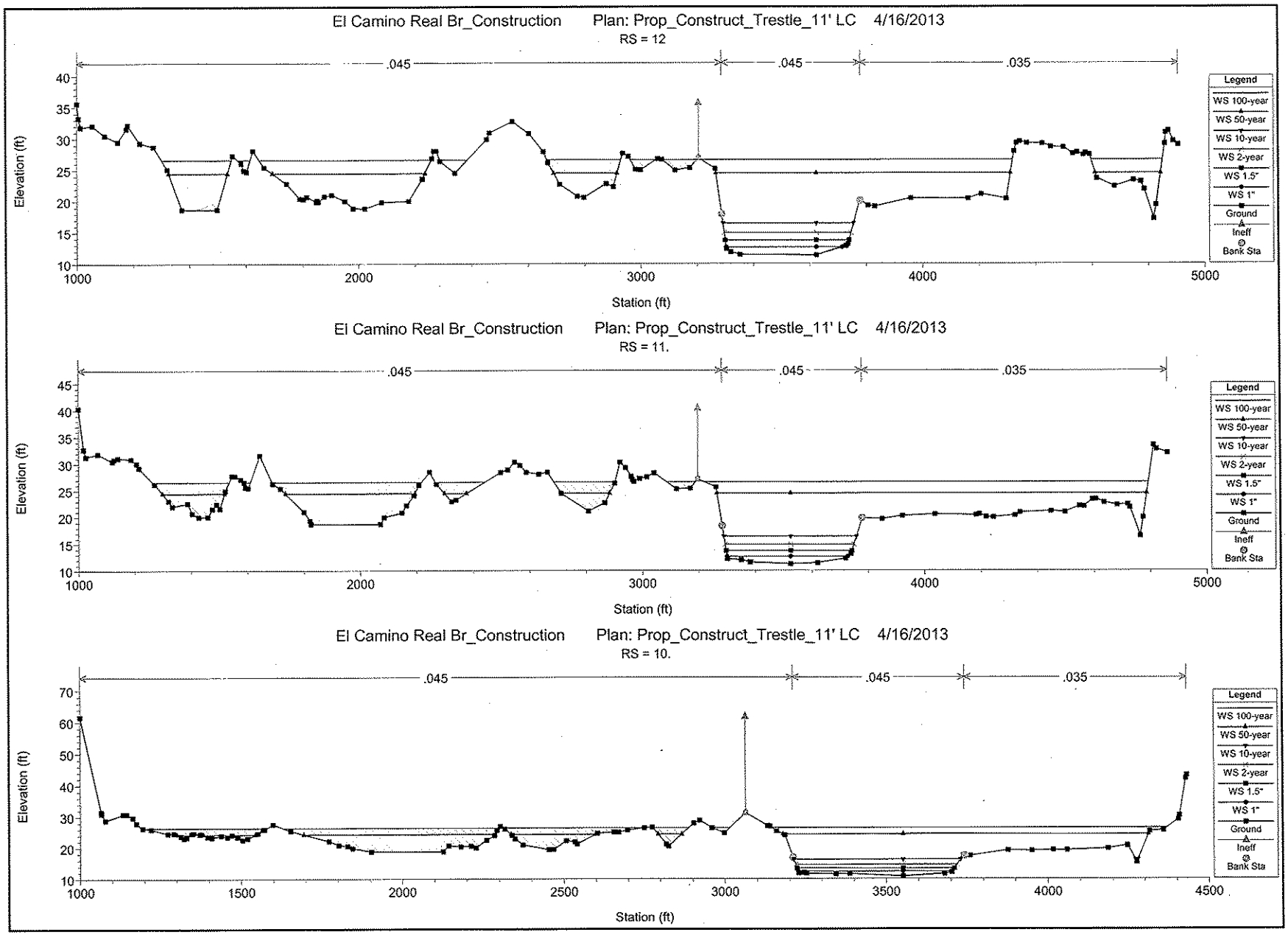
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.637		Bridge									
Reach-1	2.625	100-year	42800.00	5.90	22.14	15.14	23.39	0.001184	8.94	4784.85	322.77	0.41
Reach-1	2.625	50-year	32500.00	5.90	20.35	13.68	21.28	0.001000	7.72	4210.47	318.11	0.37
Reach-1	2.625	10-year	5900.00	5.90	13.27	8.44	13.40	0.000314	2.92	2021.94	299.69	0.20
Reach-1	2.625	2-year	3450.00	5.90	11.50	7.70	11.58	0.000253	2.28	1514.77	282.50	0.17
Reach-1	2.625	1.5"	1624.00	5.90	9.89	7.02	9.92	0.000172	1.53	1063.64	277.67	0.14
Reach-1	2.625	1"	426.00	5.90	7.52	6.40	7.54	0.000251	1.03	415.01	270.57	0.15
Reach-1	2.624		Bridge									
Reach-1	2.622	100-year	42800.00	5.65	19.97		21.82	0.003423	10.93	3917.03	342.18	0.57
Reach-1	2.622	50-year	32500.00	5.65	18.51		19.91	0.003028	9.50	3421.35	337.04	0.53
Reach-1	2.622	10-year	5900.00	5.65	12.60		12.83	0.001233	3.84	1534.96	301.78	0.30
Reach-1	2.622	2-year	3450.00	5.65	11.29		11.43	0.001096	3.02	1142.34	295.74	0.27
Reach-1	2.622	1.5"	1624.00	5.65	9.81		9.89	0.000959	2.25	723.33	264.66	0.24
Reach-1	2.622	1"	426.00	5.65	7.39		7.48	0.003782	2.42	175.77	160.62	0.41
Reach-1	2.614	100-year	40100.00	5.00	20.08	15.22	21.53	0.001430	9.65	4155.91	1763.48	0.49
Reach-1	2.614	50-year	32500.00	5.00	18.50	14.14	19.76	0.001466	9.01	3606.58	1370.09	0.49
Reach-1	2.614	10-year	5900.00	5.00	12.59	8.73	12.78	0.000513	3.49	1690.41	305.92	0.26
Reach-1	2.614	2-year	3450.00	5.00	11.28	7.85	11.39	0.000366	2.64	1305.09	278.56	0.22
Reach-1	2.614	1.5"	1624.00	5.00	9.80	6.87	9.85	0.000247	1.79	908.42	259.59	0.17
Reach-1	2.614	1"	426.00	5.00	7.39	5.81	7.41	0.000343	1.28	333.94	202.73	0.18
Reach-1	2.6115		Bridge									
Reach-1	2.609	100-year	40100.00	5.00	19.56		21.14	0.002930	10.10	3972.00	1658.02	0.53
Reach-1	2.609	50-year	32500.00	5.00	18.07		19.44	0.002966	9.39	3461.43	1121.47	0.52
Reach-1	2.609	10-year	5900.00	5.00	12.53		12.73	0.000942	3.53	1673.06	305.66	0.27
Reach-1	2.609	2-year	3450.00	5.00	11.24		11.35	0.000666	2.66	1295.40	278.11	0.22
Reach-1	2.609	1.5"	1624.00	5.00	9.79		9.84	0.000446	1.80	903.55	259.35	0.17
Reach-1	2.609	1"	426.00	5.00	7.37		7.39	0.000628	1.29	329.91	201.13	0.18
Reach-1	2.59	100-year	40100.00	5.00	19.33		20.81	0.002643	10.14	4172.39	2025.16	0.51
Reach-1	2.59	50-year	32500.00	5.00	17.81		19.13	0.002774	9.52	3602.64	1952.25	0.51
Reach-1	2.59	10-year	5900.00	5.00	12.39		12.61	0.001150	3.84	1614.65	629.10	0.29
Reach-1	2.59	2-year	3450.00	5.00	11.12		11.26	0.001048	3.05	1163.81	494.77	0.27

HEC-RAS Plan: 5'Tall_2"Deck River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.59	1.5"	1624.00	5.00	9.69		9.76	0.000942	2.25	722.50	260.66	0.24
Reach-1	2.59	1"	426.00	5.00	7.26		7.31	0.000967	1.73	246.20	134.02	0.22
Reach-1	2.524	100-year	33415.00	4.50	19.66		19.97	0.000522	4.49	7516.40	2469.13	0.23
Reach-1	2.524	50-year	27307.00	4.50	18.04		18.32	0.000565	4.24	6486.13	2444.73	0.23
Reach-1	2.524	10-year	5900.00	4.50	12.28		12.34	0.000369	2.05	2887.96	1430.91	0.17
Reach-1	2.524	2-year	3450.00	4.50	10.98		11.03	0.000354	1.65	2093.03	1208.84	0.16
Reach-1	2.524	1.5"	1624.00	4.50	9.57		9.59	0.000249	1.25	1301.79	499.52	0.14
Reach-1	2.524	1"	426.00	4.50	7.11		7.13	0.000297	0.95	447.66	246.73	0.12
Reach-1	2.439	100-year	34115.00	3.80	19.44		19.73	0.000525	4.43	7983.31	2270.74	0.23
Reach-1	2.439	50-year	27307.00	3.80	17.79		18.05	0.000587	4.24	6720.67	2200.10	0.23
Reach-1	2.439	10-year	5900.00	3.80	12.02		12.12	0.000660	2.64	2361.36	1398.96	0.22
Reach-1	2.439	2-year	3450.00	3.80	10.72		10.80	0.000715	2.26	1542.56	1045.40	0.23
Reach-1	2.439	1.5"	1624.00	3.80	9.37		9.42	0.000636	1.84	882.13	392.08	0.22
Reach-1	2.439	1"	426.00	3.80	6.90		6.93	0.000674	1.45	293.90	159.36	0.19
Reach-1	2.341	100-year	34815.00	3.30	19.28		19.48	0.000353	3.96	9741.34	2383.65	0.20
Reach-1	2.341	50-year	27307.00	3.30	17.59		17.78	0.000399	3.83	8031.78	2376.63	0.21
Reach-1	2.341	10-year	5900.00	3.30	11.72		11.83	0.000492	2.65	2400.65	786.52	0.22
Reach-1	2.341	2-year	3450.00	3.30	10.42		10.50	0.000478	2.26	1544.13	549.66	0.22
Reach-1	2.341	1.5"	1624.00	3.30	9.13		9.18	0.000342	1.77	916.33	468.39	0.22
Reach-1	2.341	1"	426.00	3.30	6.70		6.72	0.000257	1.20	353.79	149.18	0.14
Reach-1	2.231	100-year	42800.00	3.00	19.18		19.30	0.000220	3.19	15687.33	2385.53	0.17
Reach-1	2.231	50-year	32500.00	3.00	17.46		17.58	0.000255	3.08	12516.73	2352.97	0.17
Reach-1	2.231	10-year	5900.00	3.00	11.46		11.54	0.000477	2.22	2703.17	803.13	0.20
Reach-1	2.231	2-year	3450.00	3.00	10.08		10.15	0.000784	2.09	1654.10	716.13	0.24
Reach-1	2.231	1.5"	1624.00	3.00	8.68		8.76	0.002377	2.27	716.36	624.35	0.37
Reach-1	2.231	1"	426.00	3.00	6.34		6.43	0.001278	2.47	172.74	83.01	0.30
Reach-1	2.155	100-year	42800.00	2.50	19.13		19.22	0.000170	2.89	18701.15	2354.14	0.15
Reach-1	2.155	50-year	32500.00	2.50	17.40		17.49	0.000209	2.89	14640.57	2320.43	0.16
Reach-1	2.155	10-year	5900.00	2.50	11.22		11.32	0.000609	2.64	2413.64	813.86	0.23
Reach-1	2.155	2-year	3450.00	2.50	9.74		9.84	0.000750	2.51	1386.69	455.53	0.25
Reach-1	2.155	1.5"	1624.00	2.50	8.12		8.20	0.000937	2.19	742.18	340.73	0.26
Reach-1	2.155	1"	426.00	2.50	6.01		6.07	0.000647	1.86	228.50	100.24	0.22

HEC-RAS Plan: 5'Tall_2"Deck River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2.06	100-year	42800.00	2.00	19.05		19.15	0.000169	3.27	18250.76	2197.55	0.15
Reach-1	2.06	50-year	32500.00	2.00	17.31		17.40	0.000201	3.27	14444.66	2160.70	0.16
Reach-1	2.06	10-year	5900.00	2.00	10.82		11.01	0.000638	3.63	2098.58	1097.10	0.26
Reach-1	2.06	2-year	3450.00	2.00	9.35		9.50	0.000617	3.08	1122.80	281.84	0.24
Reach-1	2.06	1.5"	1624.00	2.00	7.86		7.92	0.000353	2.02	804.61	199.11	0.18
Reach-1	2.06	1"	426.00	2.00	5.91		5.93	0.000138	0.95	446.71	168.26	0.10
Reach-1	1.979	100-year	42800.00	3.00	19.00	13.18	19.08	0.000145	2.90	19913.77	2420.18	0.14
Reach-1	1.979	50-year	32500.00	3.00	17.24	12.57	17.32	0.000176	2.91	15682.74	2387.81	0.15
Reach-1	1.979	10-year	5900.00	3.00	10.50	7.56	10.70	0.000844	3.65	1887.90	871.94	0.28
Reach-1	1.979	2-year	3450.00	3.00	9.01	6.65	9.16	0.001001	3.18	1103.64	346.88	0.29
Reach-1	1.979	1.5"	1624.00	3.00	7.59	5.69	7.68	0.001002	2.44	666.55	271.80	0.27
Reach-1	1.979	1"	426.00	3.00	5.75	4.55	5.80	0.001001	1.69	251.84	177.53	0.25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Station (ft)
Legend
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WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
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Elevation (ft)
Station (ft)
Legend
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WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
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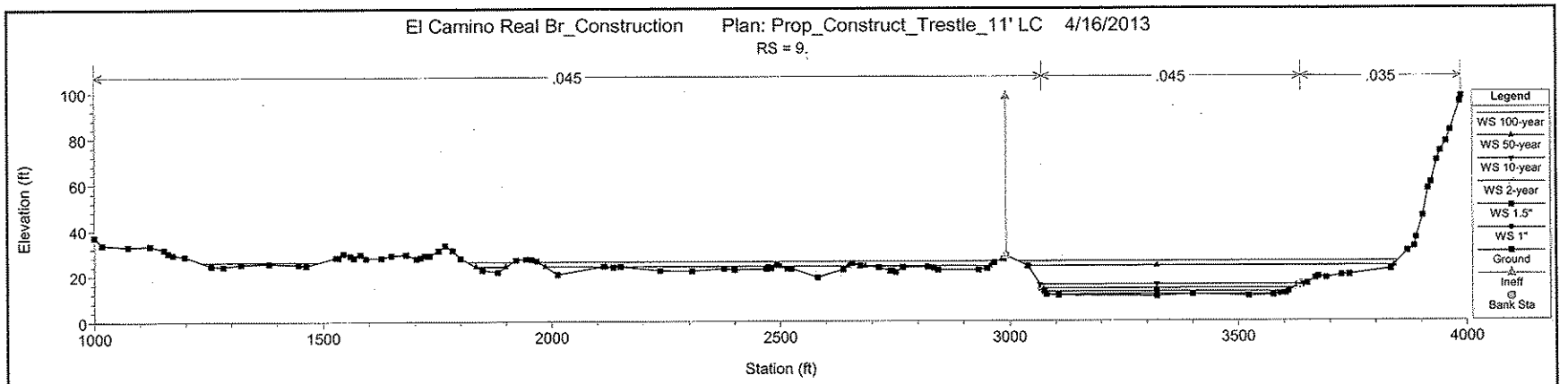
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WS 1"
Ground
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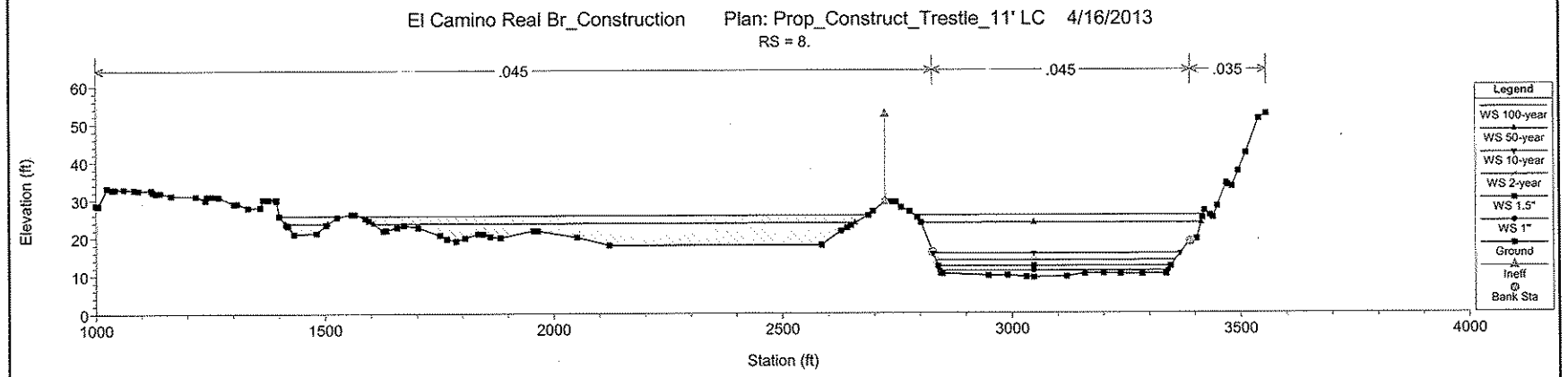
Bank Sta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Station (ft)
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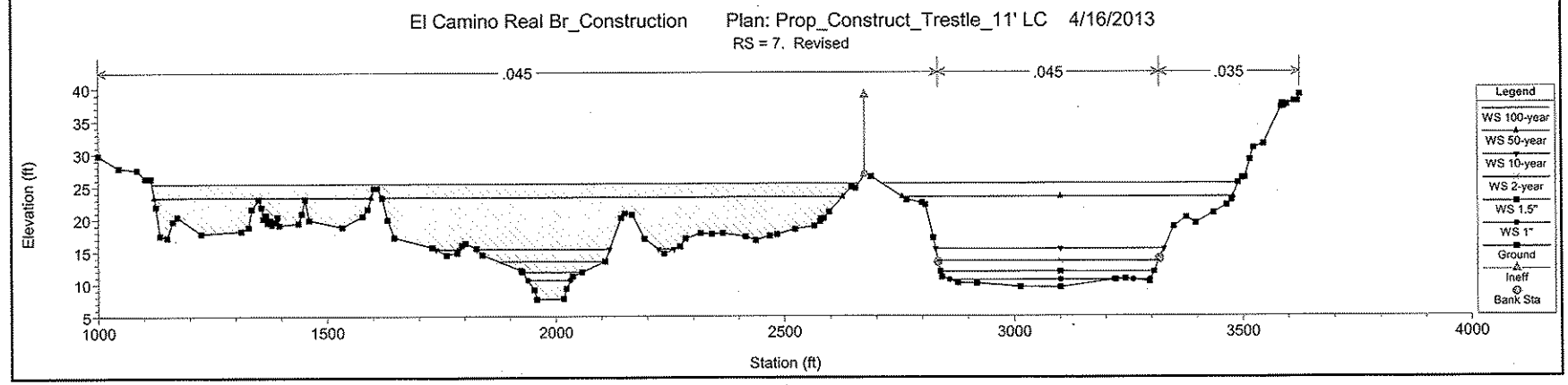
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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Elevation (ft)
Station (ft)
Legend
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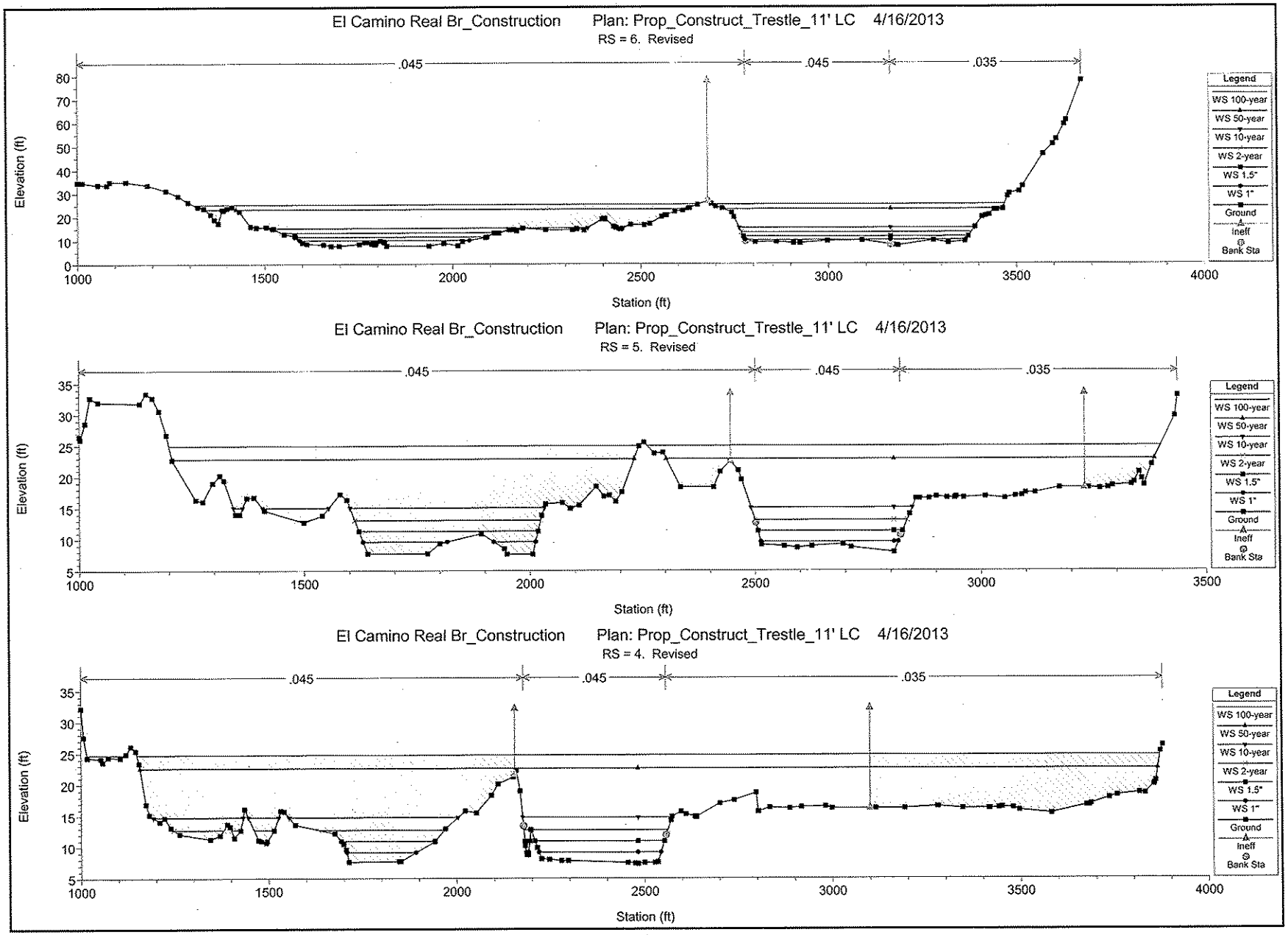
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 5. Revised
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.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
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Elevation (ft)
Station (ft)
Legend
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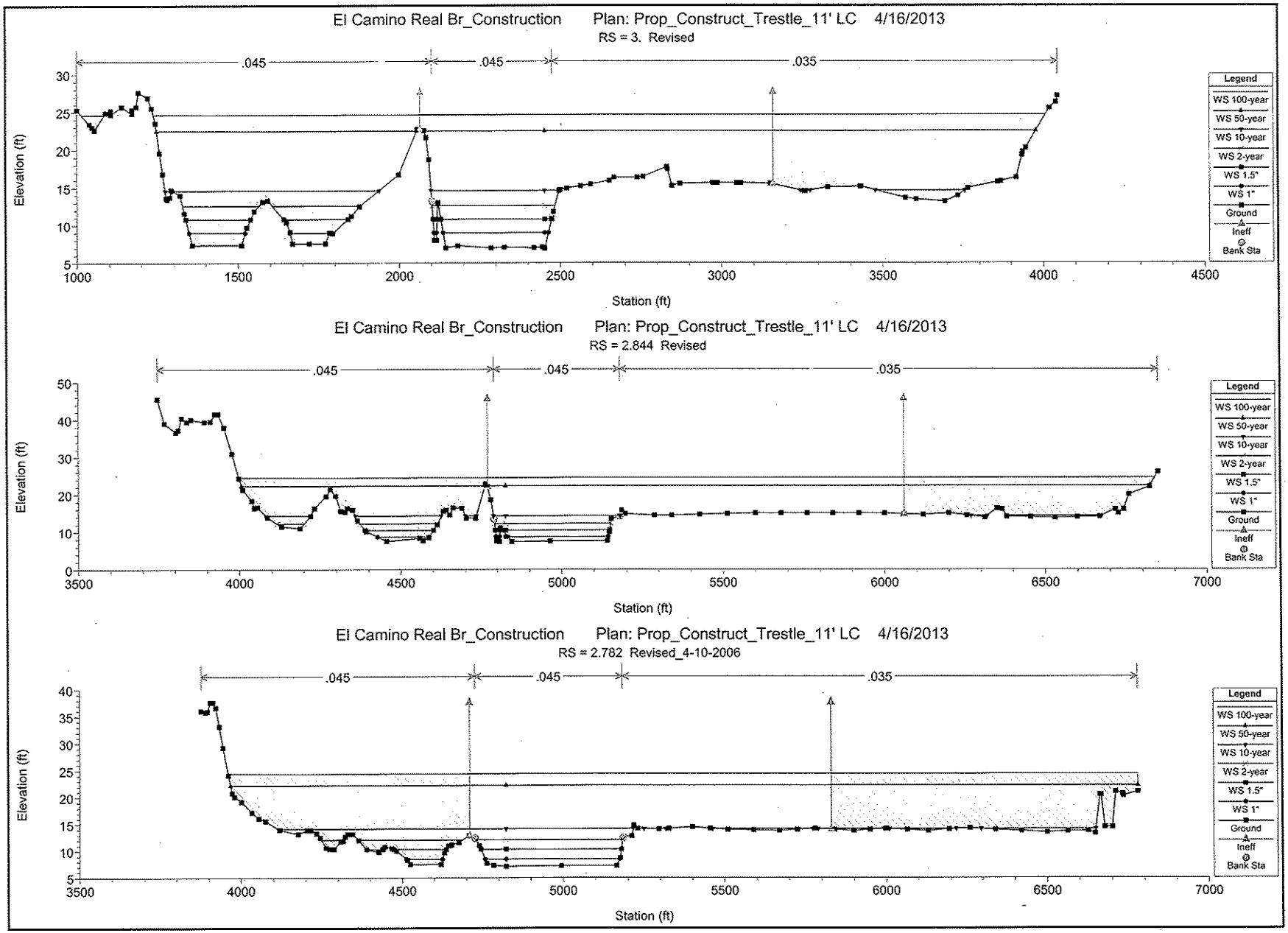
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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Station (ft)
Legend
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WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
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Station (ft)
Legend
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WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
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Station (ft)
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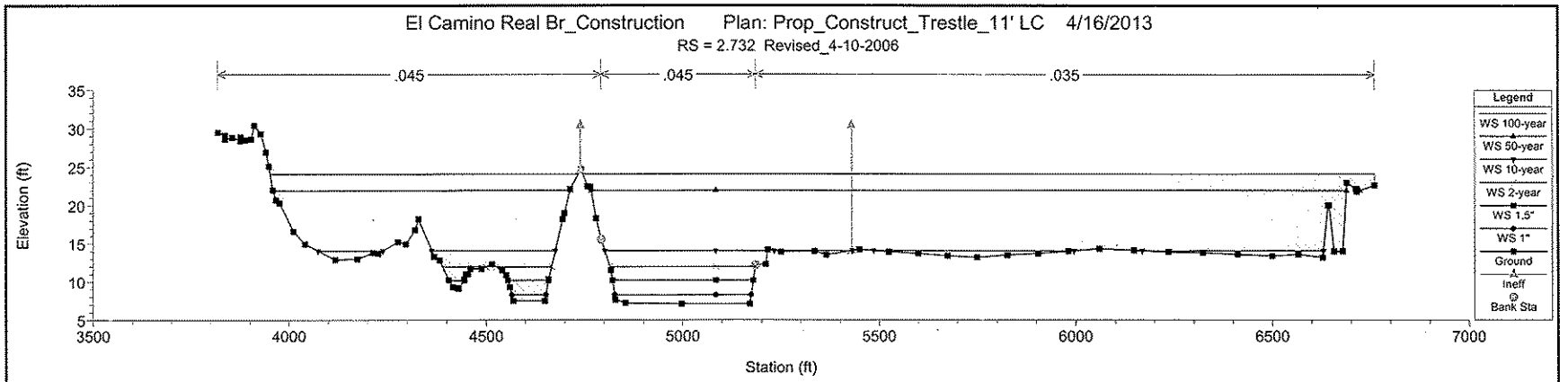
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta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Station (ft)
Legend
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WS 50-year
WS 10-year
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WS 1.5"
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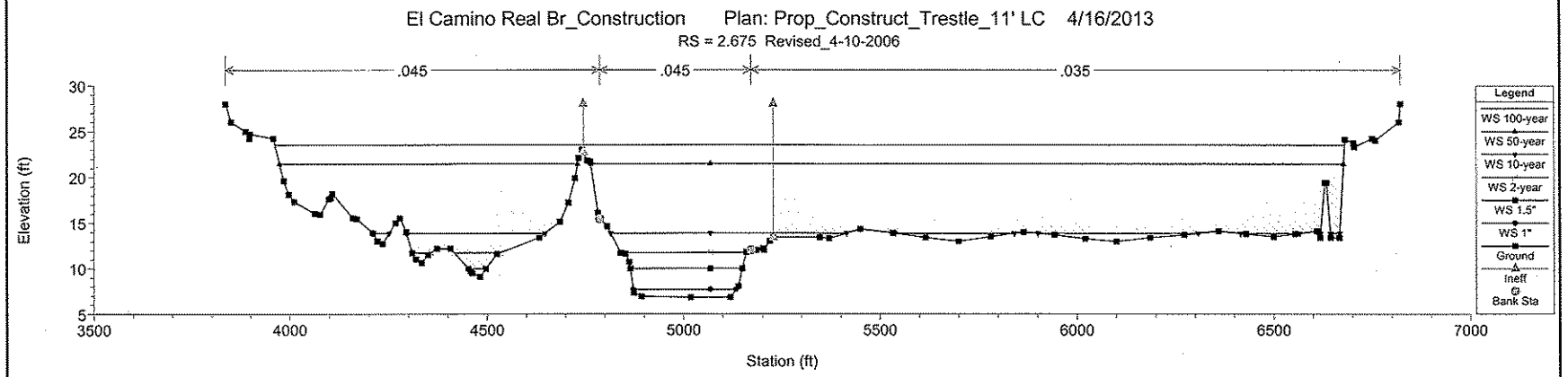
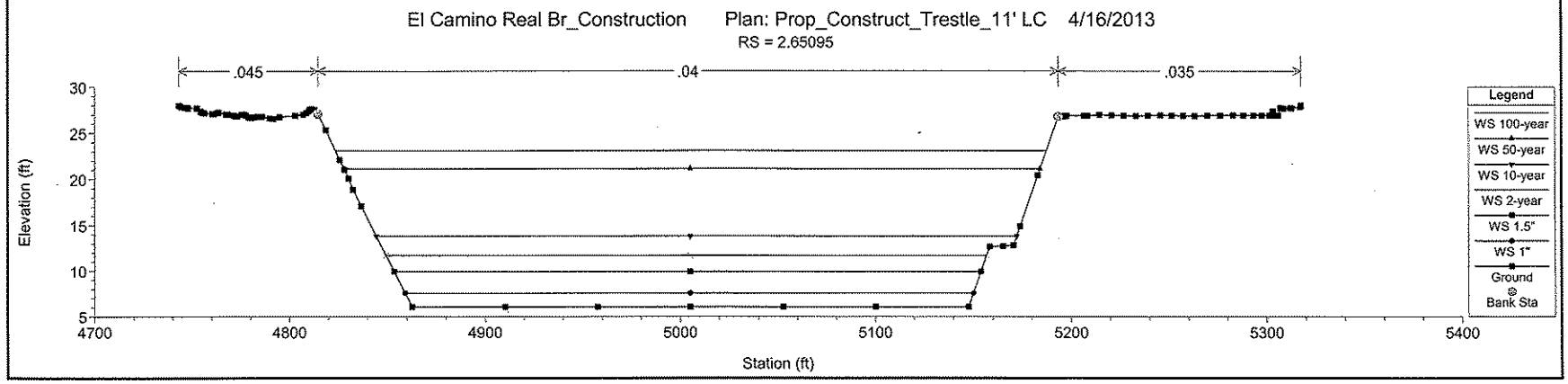
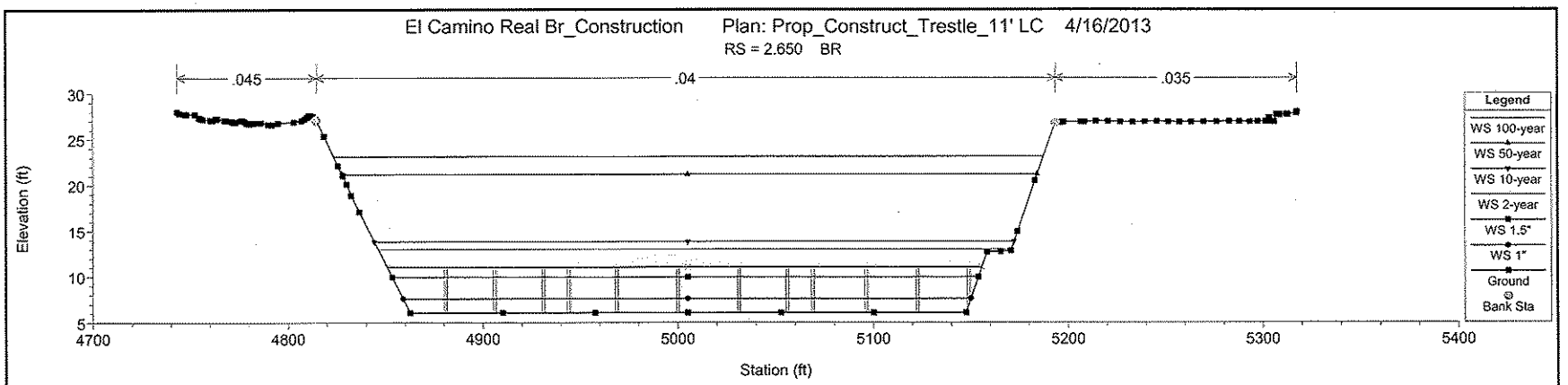
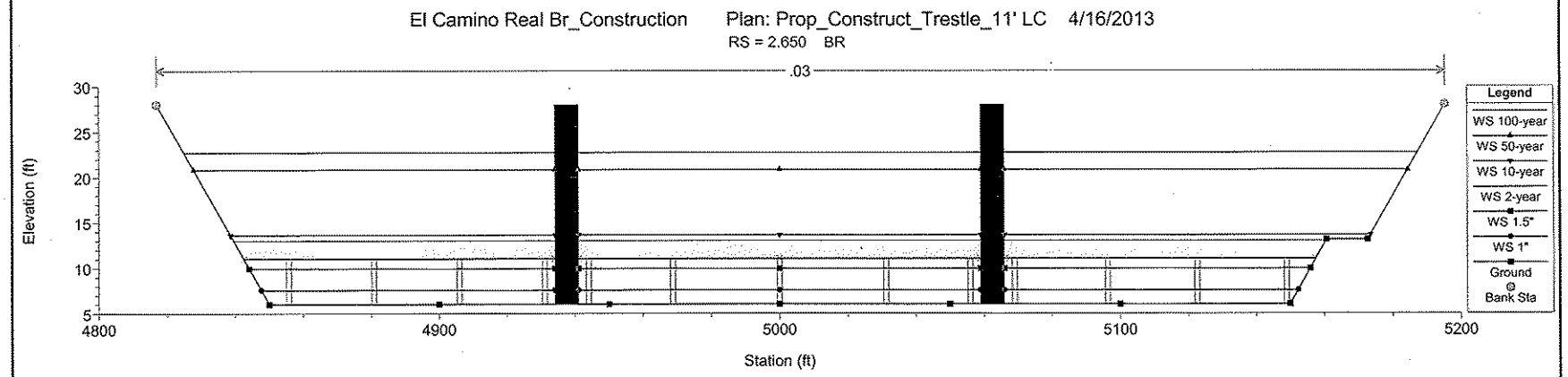
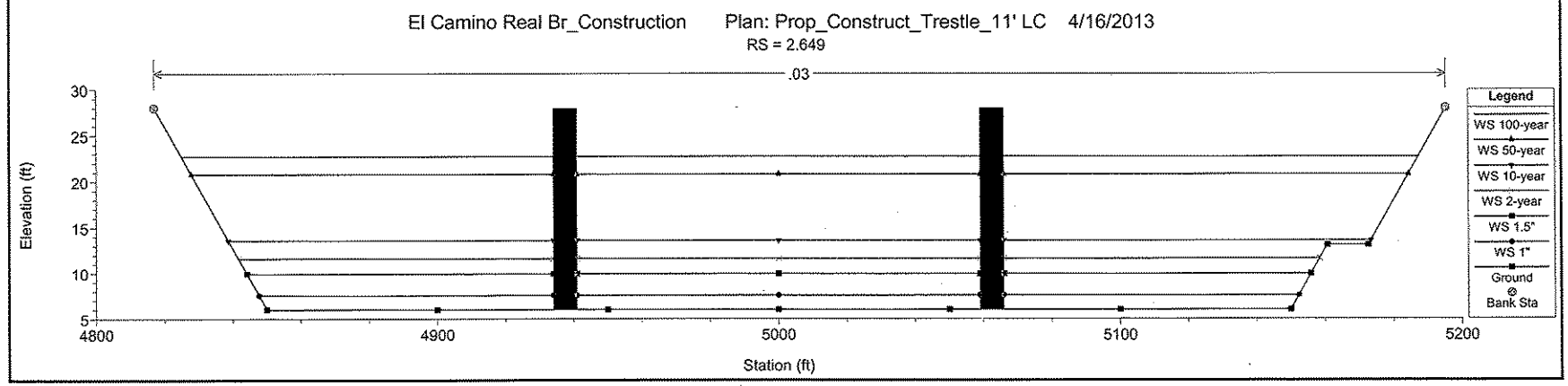
Ground
Ineff
Bank Sta

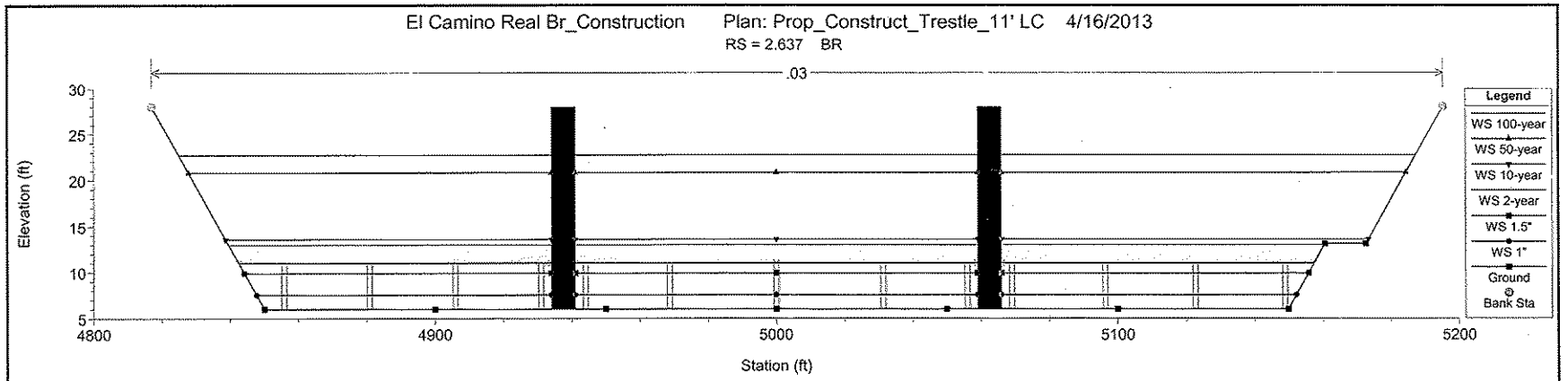

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.675 Revised_4-10-2006
.045
.045
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

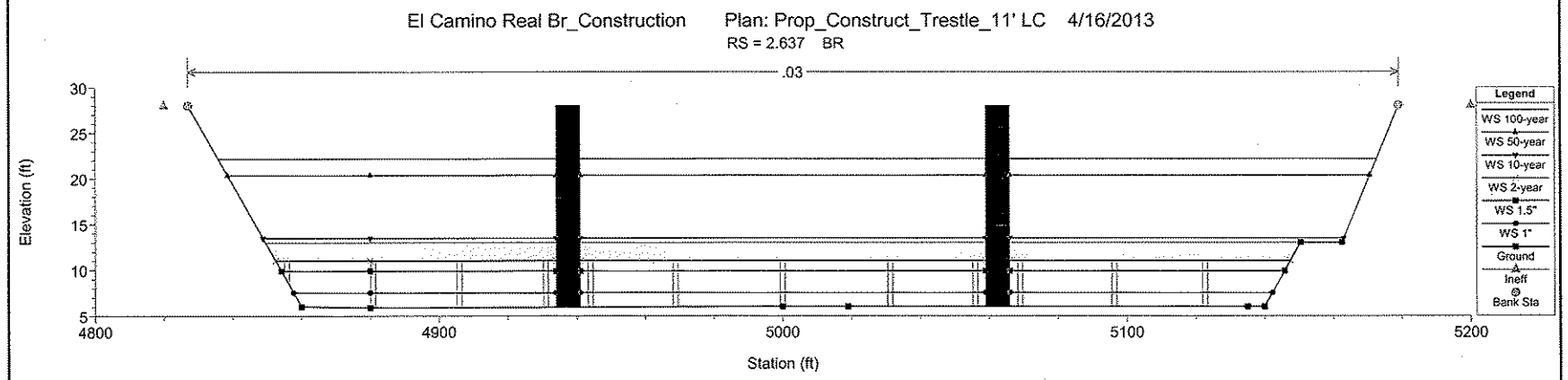

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.65095
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

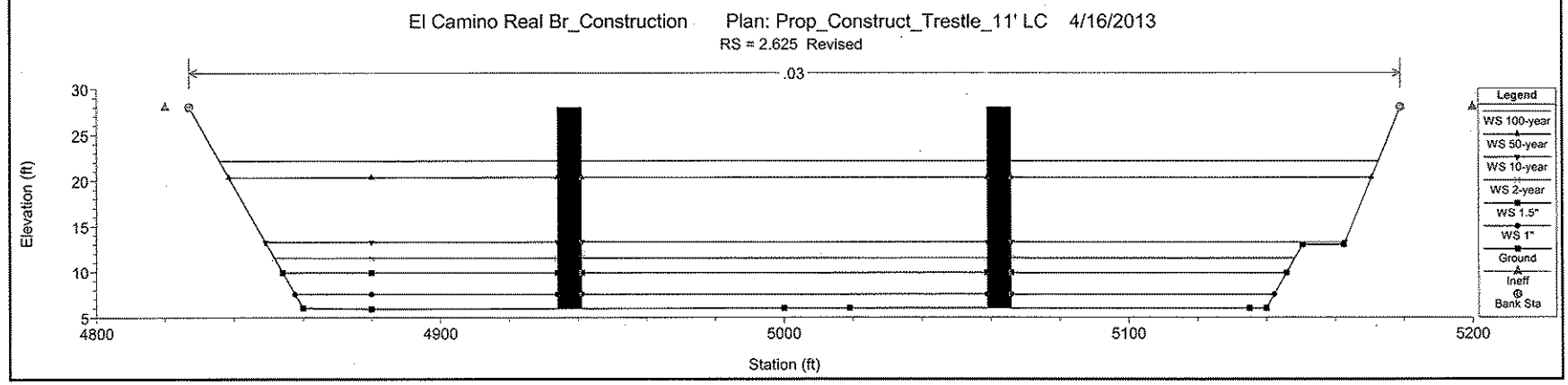

El Camino Real Br_Construction
Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.650 BR
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

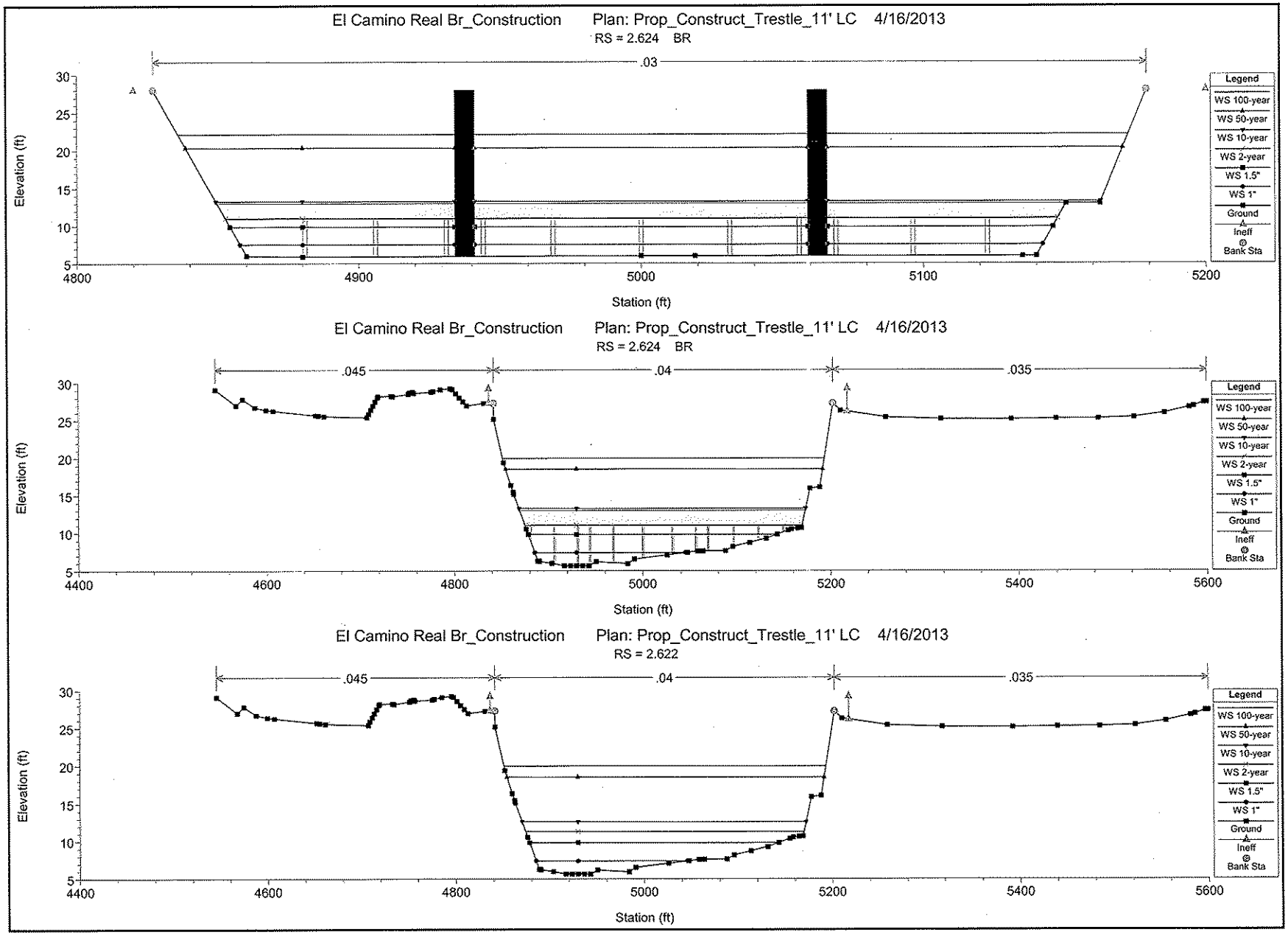

El Camino Real Br_Construction
Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.650 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

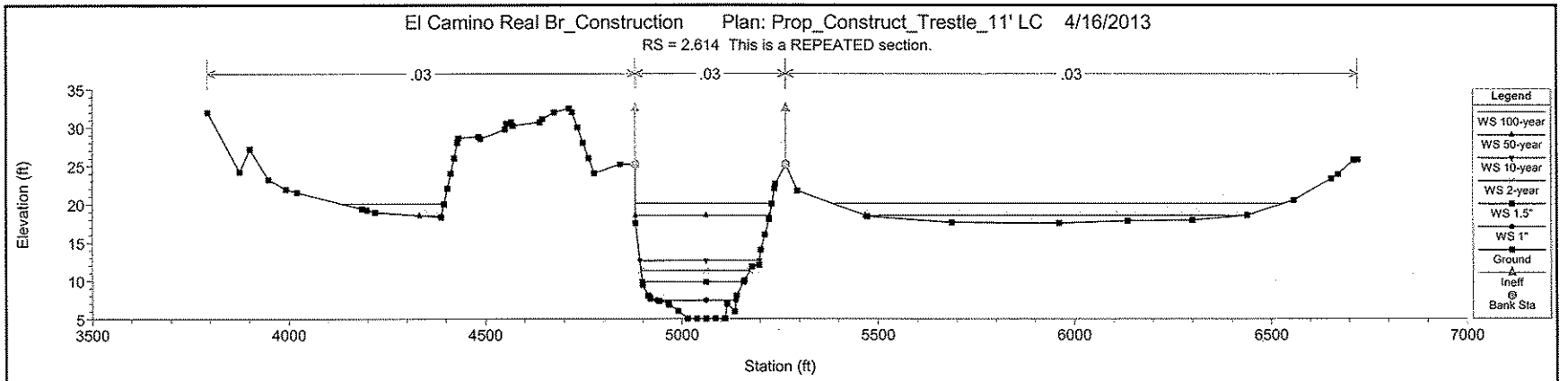

El Camino Real Br_Construction
Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.649
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

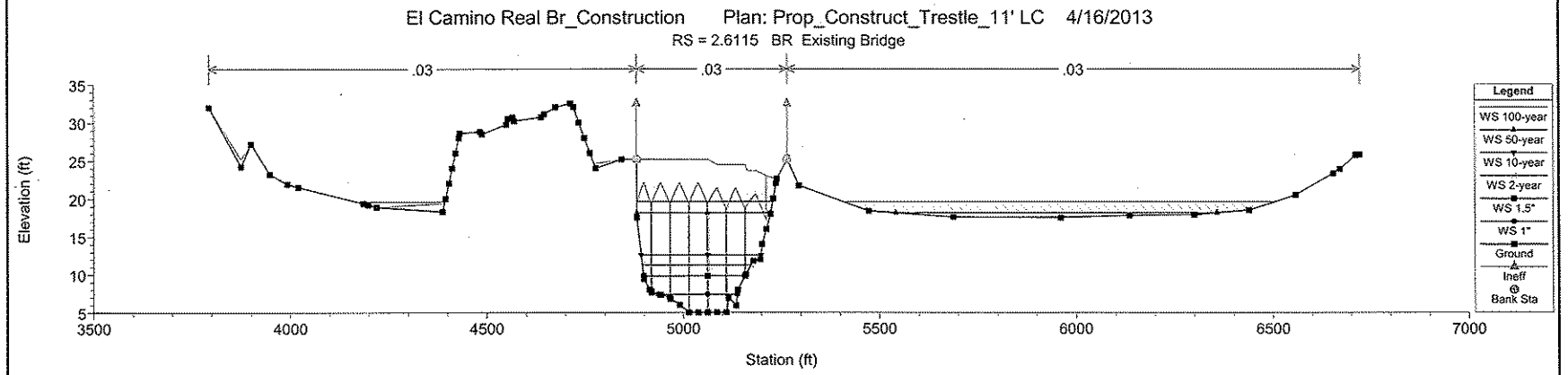

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.637 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

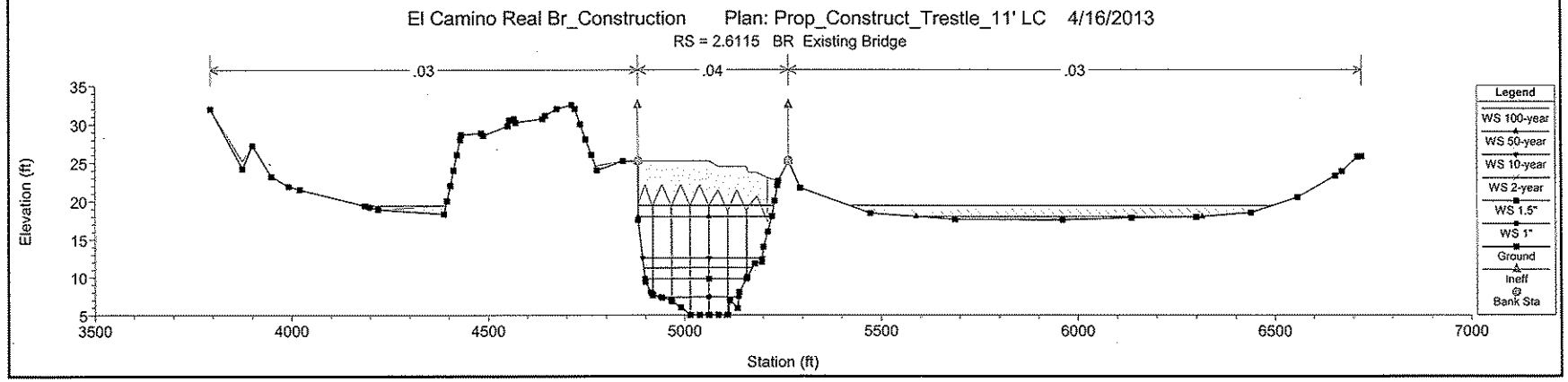

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.637 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

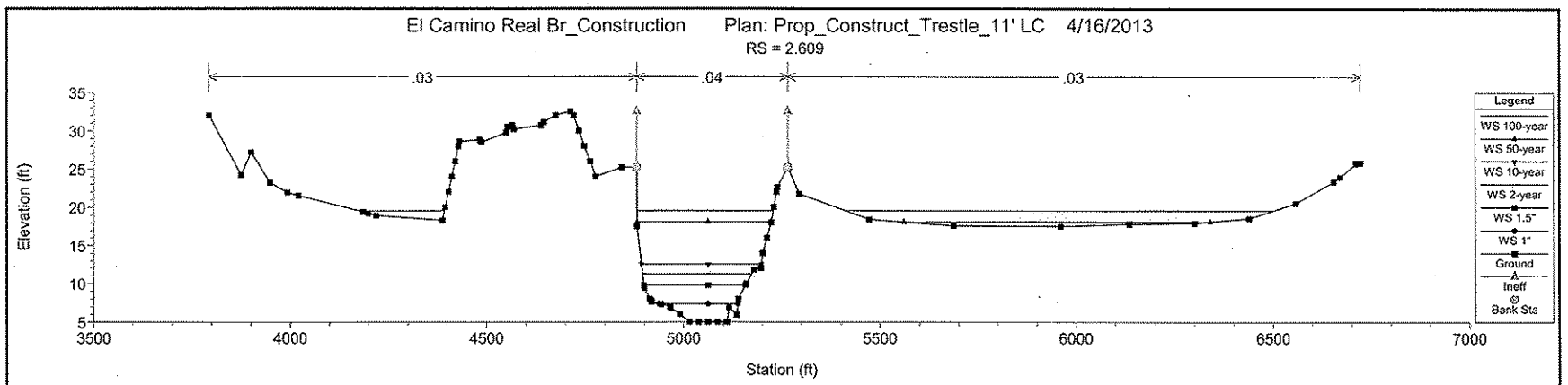

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.625 Revised
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

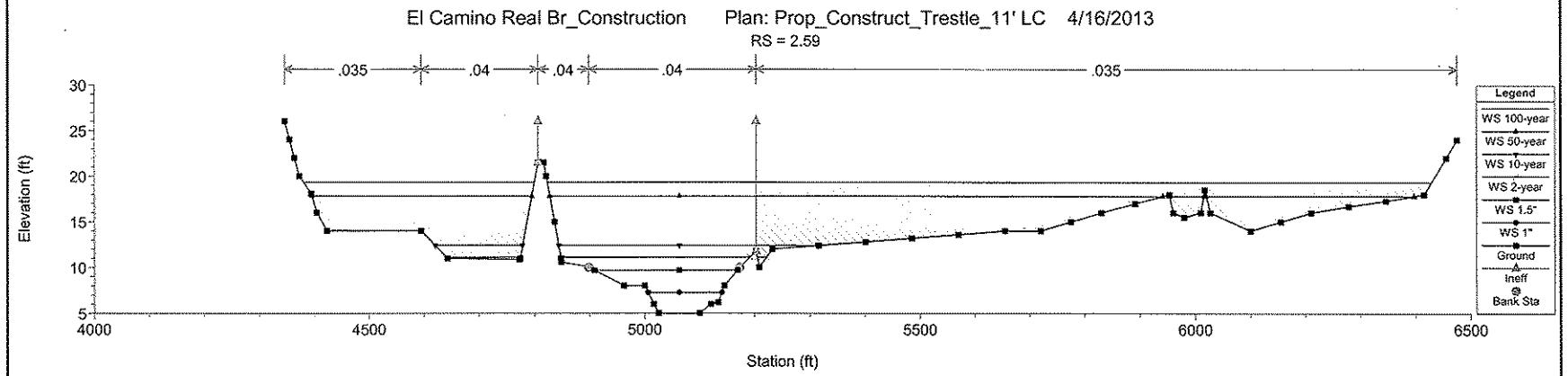

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.624 BR
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.624 BR
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.622
.045
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

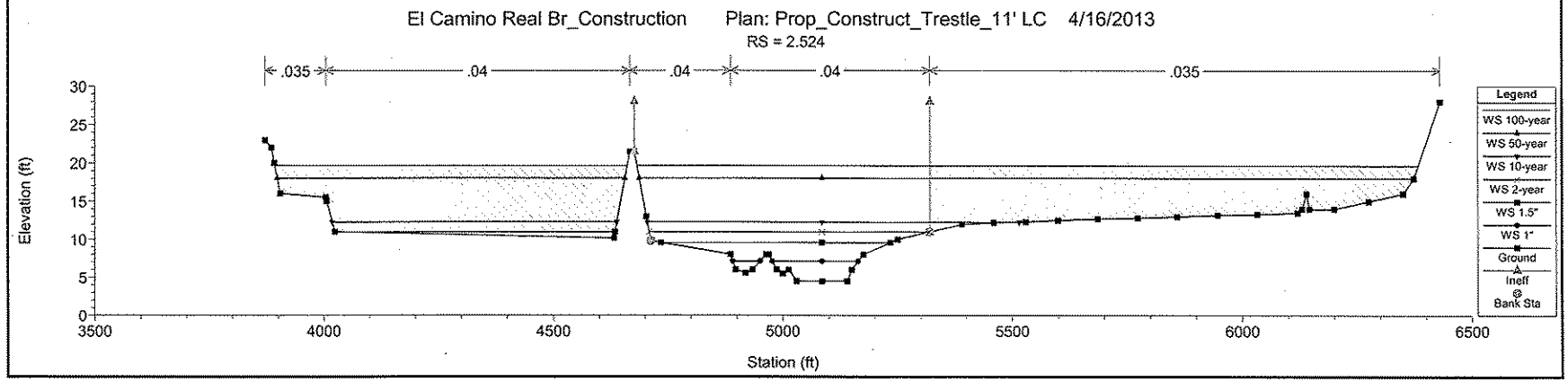

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.614 This is a REPEATED section.
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

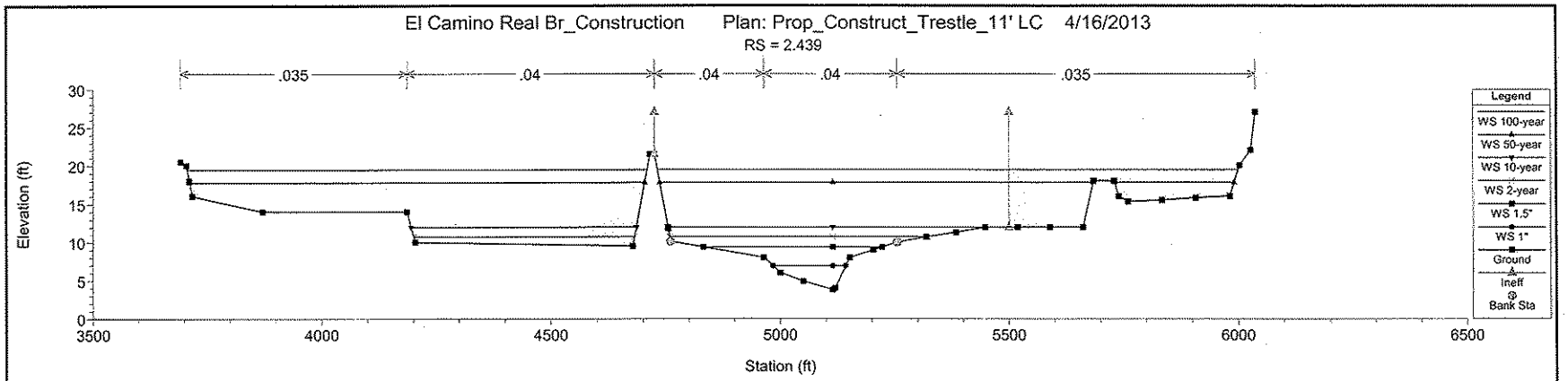

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.6115 BR Existing Bridge
.03
.03
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

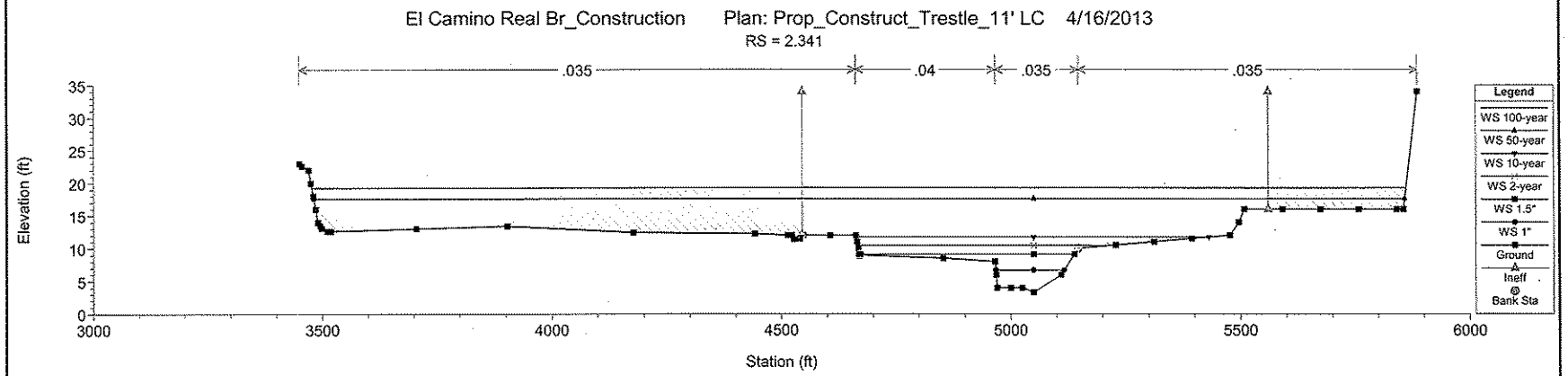

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.6115 BR Existing Bridge
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

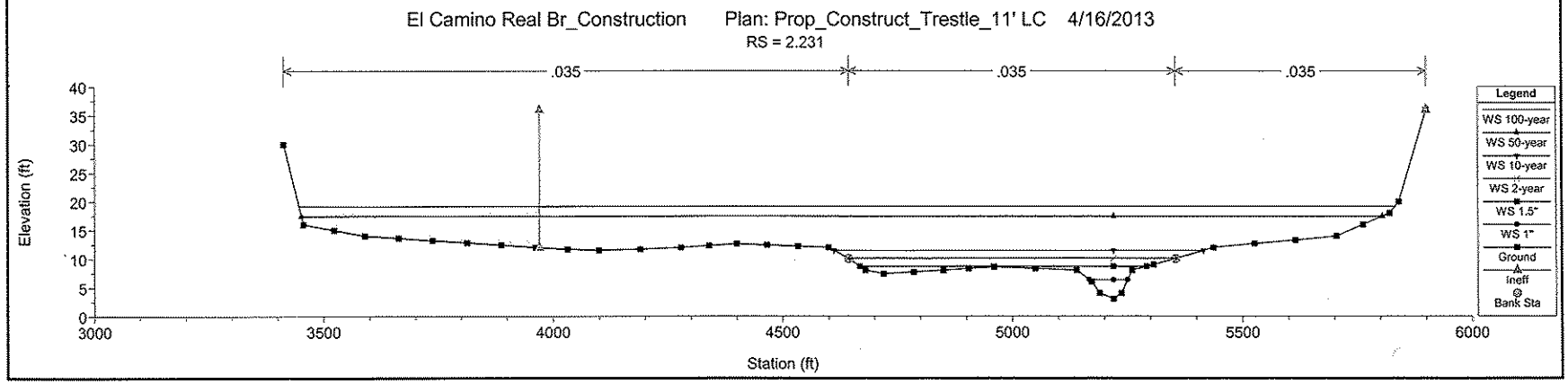

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.609
.03
.04
.03
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta

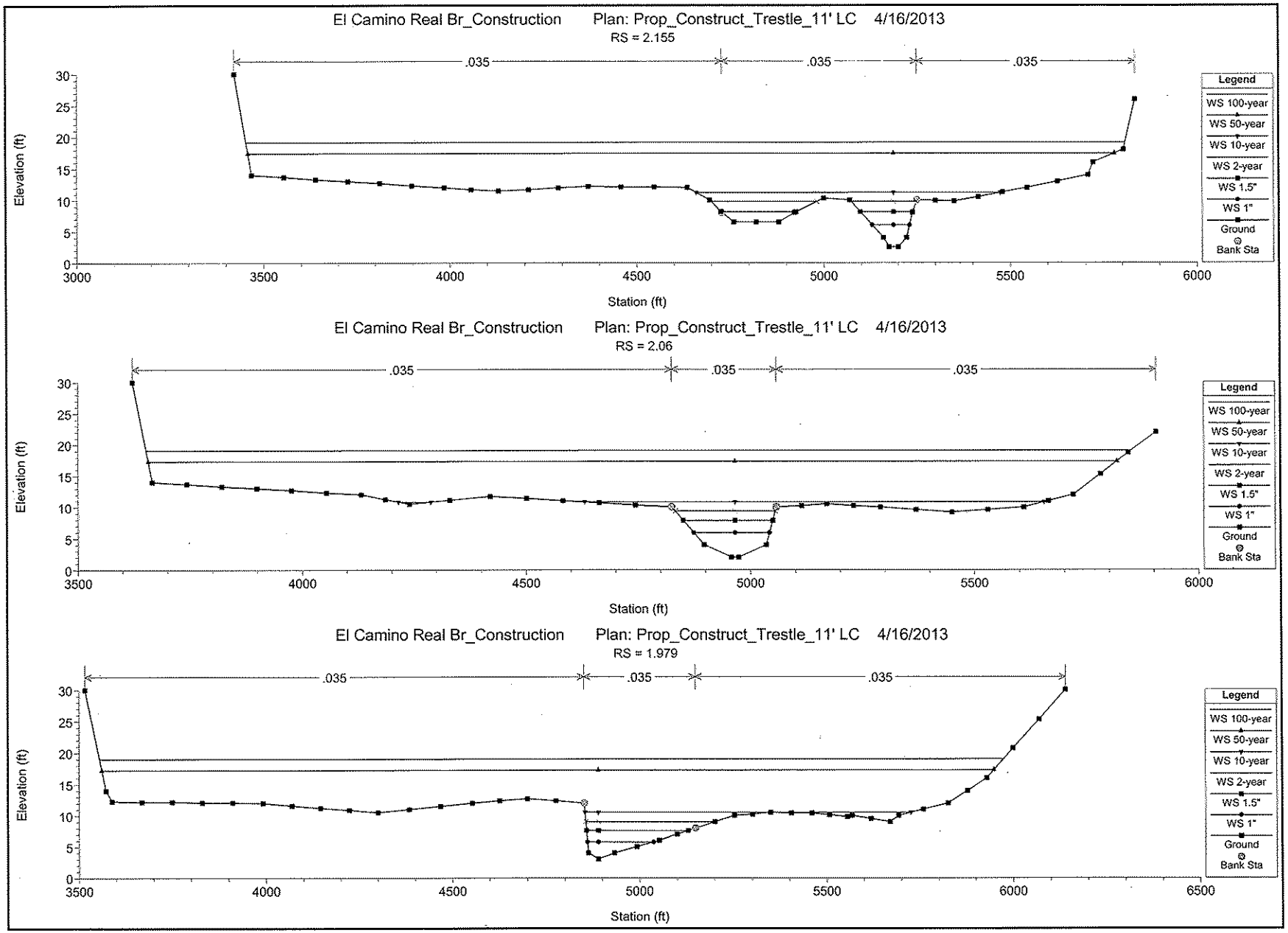

El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.59
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.524
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.439
.035
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.341
.035
.04
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.231
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Ineff
Bank Sta


El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.155
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 2.06
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta
El Camino Real Br_Construction Plan: Prop_Construct_Trestle_11' LC 4/16/2013
RS = 1.979
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-year
WS 50-year
WS 10-year
WS 2-year
WS 1.5"
WS 1"
Ground
Bank Sta

```
HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: El Camino Real Br_Construction
Project File : ECRBr_Construction.prj
Run Date and Time: 4/16/2013 3:39:46 PM

Project in English units

Project Description:
EL CAMINO REAL BRDIGE ON SAN DIEGUITO RIVER
Temporary Construction
Phase

The PROPOSED CONDITION ElCamino.p09 plan file was saved and
renamed for the future analyses with the existing bridge added to the
geometry
file.

PLAN DATA

Plan Title: Prop_Construct_Trestle_11' LC
Plan File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.p36

Geometry Title: Prop_Construct_Trestle_LC-11'

Geometry File : W:\14752-
C\Hydro\Hydraulics\HecRas\ECRBr_Construction.g33

Flow Title : Prop+Exis_Construction_Berm
Flow File : W:\14752-
C\Hydro\Hydraulics\HecRas\ECRBr_Construction.f08

Plan Description:
Existing and proposed bridge with trestle LC at 9' elevation, 1.5' piles

Plan Summary Information:

Number of:	Cross Sections =	28	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	4	Lateral Structures =	0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Prop+Exis_Construction_Berm
Flow File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.f08

Flow Data (cfs)

River	Reach	RS	100-year	50-year	10-year	2-year	1.5"	1"
RIVER-1	Reach-1	12	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.844	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.732	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.675	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.625	42800	32500	5900	3450	1624	426
RIVER-1	Reach-1	2.614	40100	32500	5900	3450	1624	426

```
  RIVER-1          Reach-1          2.524                33415
27307             5900             3450             1624                426
  RIVER-1          Reach-1          2.439                34115
27307             5900             3450             1624                426
  RIVER-1          Reach-1          2.341                34815
27307             5900             3450             1624                426
  RIVER-1          Reach-1          2.231                42800
32500             5900             3450             1624                426
  RIVER-1          Reach-1          2.155                42800
32500             5900             3450             1624                426


Boundary Conditions

  River            Reach            Profile                        Upstream
Downstream

  RIVER-1          Reach-1          100-year
Known WS = 19
  RIVER-1          Reach-1          50-year
Known WS = 17.24
  RIVER-1          Reach-1          10-year
Known WS = 10.5
  RIVER-1          Reach-1          2-year
Normal S = 0.001
  RIVER-1          Reach-1          1.5"
Normal S = 0.001
  RIVER-1          Reach-1          1"
Normal S = 0.001



GEOMETRY DATA

Geometry Title: Prop_Construct_Trestle_LC-11'
Geometry File : W:\14752-C\Hydro\Hydraulics\HecRas\ECRBr_Construction.g33

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 12

INPUT
Description:
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000    35.6 1005.86   33.27 1013.08   31.83 1055.01    32.1 1099.25
30.47
 1144.99    29.5    1176   31.58 1180.55   32.16 1224.52   29.29 1272.69
28.7
```



```
 1321.29    25.1 1372.68   18.68 1498.17   18.68 1553.31   27.25 1584.04
26.05
 1592.99    24.9 1603.16    24.7 1625.67   28.06 1665.26    25.4 1744.29
22.84
 1791.24    20.4 1803.95   20.35 1815.94   20.71 1850.07   19.88 1852.08
20.1
 1856.82    19.9 1878.37   20.77 1904.54   21.04 1951.26   20.01 1980.89
18.85
 2021.94    18.8 2082.22   19.82 2177.87   19.99  2226.8   23.59 2260.35
26.81
 2266.62      28 2276.55   28.01 2289.11   26.36 2341.63   24.48 2453.87
29.83
 2463.88    30.9 2545.28   32.67 2603.12   30.76    2654   27.88 2670.13
26.1
 2711.85    22.7 2774.21   20.74 2797.93   20.55 2877.43   22.79 2902.47
22.3
 2935.73    27.6 2956.39   27.08 2981.85   25.02 3000.22   24.95 3060.28
26.72
 3075.48    26.6 3122.59   24.89 3174.65   25.29 3205.29    26.8  3264.7
25.15
 3287.43    17.9 3303.45   12.36 3319.08   11.84 3351.69   11.41 3622.04
11.32
 3727.53    12.8 3734.46    13.1 3776.26   20.11  3778.5   20.05 3805.79
19.28
 3830.09    19.1 3958.65   20.42 4161.16   20.39 4207.79   21.08 4296.23
20.35
 4323.61    27.9 4332.48   29.22 4343.85   29.47 4369.91   29.17 4423.85
29.14
 4453.69    28.6 4498.75   28.52 4531.82   27.51 4546.42   27.73 4568.52
27.35
 4576.79    27.6 4591.03   27.38 4616.36   23.58 4679.05   22.34 4746.64
23.31
 4773.16    23.1 4785.29   21.85 4818.03   17.15 4827.16   19.36 4857.86
29.1
 4861.74    30.9 4871.15   31.21 4888.42   29.54 4905.42   28.94

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 3287.43    .045  3778.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
      3287.43  3778.5            49.32      48   73.57              .1
.3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000 3205.29                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 11.
```

```
INPUT
Description:
Station Elevation Data     num=       99
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
    1000     40.3  1017.77    32.69  1025.98    31.31  1068.34    31.84  1120.18
30.46
 1125.95     30.8  1139.82    31.06  1186.39    30.89   1205.9    30.03  1215.36
29.19
  1270.4     26.2  1319.99    23.06  1333.18    22.01  1387.97    22.58  1403.23
20.7
 1427.05       20  1458.92    20.06   1475.5    21.56  1490.04    22.43  1501.97
21.59
 1521.74     24.9  1544.11    27.77  1555.98    27.71  1576.39    27.13  1588.08
26.52
 1592.53     25.6  1602.16    25.44  1644.13    31.55  1689.45    26.26  1716.32
25.39
 1799.98       21  1821.54    19.32  1824.81    18.71  2071.33    18.71  2084.45
19.97
 2148.41     20.8  2163.75    22.18  2190.78    24.07  2208.44    26.01  2245.42
28.48
 2269.66     26.2  2324.04    22.89  2339.18    23.23  2497.01    28.39  2521.97
28.85
 2546.84     30.3  2565.05    29.68  2587.75    28.39  2631.81    28.04  2662.57
28.41
 2710.89     24.4  2807.45    21.06  2866.09    22.63     2901    26.32  2920.28
30.24
 2940.22     29.2  2959.82    27.62  2964.07       27  2969.64    26.61  2989.81
27.21
 3015.83     27.5  3041.11    28.24   3120.4    25.24  3169.54    25.37  3196.64
27.06
 3260.42     25.6   3282.4    18.34  3300.55    12.14  3349.52    11.94  3381.12
11.52
 3524.57     11.2   3619.7    11.39  3718.86    12.21   3738.3    13.08  3778.55
19.79
 3849.99     19.6  3921.31     20.2  4036.71     20.5  4181.79    20.35     4194
20.53
 4217.99       20  4243.34    19.95  4319.69    20.32  4337.47    20.86  4446.99
21.08
 4496.05     20.9  4547.69    22.06  4563.82    21.98  4593.72    23.28  4605.59
23.35
 4634.58     22.7  4681.06    22.26  4718.72    22.41  4726.07    21.78  4762.55
16.45
 4772.93     19.9  4811.26    33.42  4821.04    32.65  4860.55    31.96

Manning's n Values         num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
    1000     .045   3282.4     .045  3778.55     .035

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
        3282.4  3778.55            347.68      339   548.49              .1
.3
Ineffective Flow      num=        1
```



```
   Sta L    Sta R     Elev  Permanent
    1000  3196.64                 T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 10.

INPUT
Description:
Station Elevation Data     num=       99
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
    1000     61.6   1065.1    31.55  1066.72    30.96  1078.56    28.81  1133.55
30.82
 1144.36     30.8  1163.16    29.72  1174.61     27.9  1194.28    26.28  1220.63
25.97
 1272.47     24.6  1290.82    24.66  1313.56    23.75  1322.01    23.03  1330.79
23.38
 1346.64     24.6  1352.33    24.76  1372.19    24.37  1377.21    24.54  1396.08
23.58
    1409     23.3  1437.64    23.91  1457.07     23.5  1471.34    24.16  1487.88
23.48
 1489.88     23.6  1504.34     22.5  1520.03    23.02  1551.94    24.67  1568.23
25.86
 1572.66       26  1598.72    27.62  1653.76    25.37  1772.86    22.14  1802.96
20.84
 1830.99     20.5  1846.37    19.78  1904.05    18.71  2126.59    18.71  2143.98
20.6
 2181.47     20.3  2213.13    20.54  2228.29    20.02  2260.47    22.45  2285.56
23.91
 2292.62     25.6     2303     26.9  2317.41    25.97  2339.99    23.98  2349.03
22.8
 2373.01     20.9  2453.68    19.32  2467.97    19.43  2507.32     22.2  2533.93
21.88
 2540.85     21.2  2603.98    24.58   2655.3    24.99  2669.58    24.91  2697.53
25.59
    2749     26.4  2774.29    26.56  2817.77    21.14  2825.25    20.46  2903.54
27.83
 2922.14     28.7  2959.73    26.34  2998.12    24.68  3063.82    31.09   3131.8
27
 3139.33     26.8  3159.32     25.3  3185.34    23.98  3210.78    16.78  3228.28
11.78
 3244.48     11.9  3252.18    11.68  3344.18    11.39  3386.35    11.54  3552.31
10.72
 3679.96     11.5  3702.75    12.08  3737.94    17.39  3742.94    17.35  3759.57
17.33
 3876.38     19.1  3950.62    18.95  4016.25     19.2  4059.21    19.11  4185.85
19.68
 4245.42     20.7  4246.74    20.53  4274.78    15.27  4315.06    25.27  4357.64
25.53
 4403.81       29  4407.41    30.26  4426.73    42.03  4430.62    43.13
```

```
Manning's n Values          num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 3210.78    .045 3742.94    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       3210.78 3742.94            585.6     450  556.91             .1
.3
Ineffective Flow      num=        1
   Sta L   Sta R    Elev  Permanent
    1000 3063.82               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 9.

INPUT
Description:
Station Elevation Data     num=       99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000      37  1016.9    33.7 1073.58   32.94  1121.8   33.23 1152.75
31.65
 1161.67    30.1 1171.71   29.36 1198.09   28.64 1256.09   24.45 1282.45
24.17
 1321.64    25.1 1382.49   25.44  1446.9   25.01 1463.43   24.47 1528.47
28.12
 1533.87    28.1  1544.3   29.93 1559.42   28.86  1567.3   27.86 1581.06
29.5
 1593.41    27.7 1627.08   27.96 1648.62   28.99  1680.4    29.4 1703.36
27.5
 1712.61      28 1721.47   28.98 1732.48    28.9 1751.89   31.06 1766.04
33.19
 1782.94    31.2 1800.28   27.57 1848.38   22.39 1882.05   21.62 1921.82
26.96
 1943.46    27.3 1956.53   27.14 1966.87   26.49 2013.05   20.39 2114.35
24.06
 2135.36    23.6    2151    23.9 2237.13   22.08 2307.12   21.91 2377.04
22.97
 2399.54    22.4 2468.87   22.81 2473.19   23.63 2480.05   23.05 2491.91
24.59
 2515.92    22.9 2524.23   22.84 2581.98   19.02 2637.55   22.51 2657.34
25.17
 2674.82    24.2 2715.26   23.38 2740.33   21.83 2743.51      22 2751.97
21.28
 2767.57    23.4 2821.64   23.57 2834.98   23.08 2844.63   22.26 2932.59
22.26
 2951.05    22.9 2966.41   25.46 2986.32   27.06  2992.2   28.44 3039.79
23.8
 3070.69    14.2 3080.08   11.42 3106.55   11.02 3321.87   10.64 3400.49
11.49
```



```
 3522.98    10.7 3576.78   11.11 3603.66   11.87 3631.39   15.44 3637.71
15.64
 3650.43    16.1 3668.33   18.59 3674.22   19.28 3691.74   18.65 3725.46
19.86
 3742.81      20 3832.93   22.46 3869.75   30.39 3884.99   32.22    3889
36.15
 3903.88    45.7 3915.36   57.56 3922.06   60.21 3934.59   69.86  3942.4
73.97
 3955.33    78.1 3964.35   83.07 3985.23   95.58 3988.22   97.89

Manning's n Values          num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 3070.69    .045 3637.71    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       3070.69 3637.71           1127.52     452  287.85             .1
.3
Ineffective Flow      num=        1
   Sta L   Sta R    Elev  Permanent
    1000  2992.2                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 8.

INPUT
Description:
Station Elevation Data     num=       99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000    28.6 1005.45   28.45 1024.27   33.23 1035.35   32.74 1041.71
32.87
 1061.19    32.9 1083.84   32.75 1092.86   32.56 1121.25   32.64  1124.3
32.11
 1131.29    31.8 1140.59   31.88 1164.62   31.19 1219.06   30.98  1239.9
29.91
 1242.97    30.9  1255.6   30.95  1268.5   30.77 1302.14   28.93 1308.95
29.04
 1332.76    27.9 1359.49   28.05  1365.6   30.06 1378.37   30.03 1393.75
30.12
 1394.57    29.8 1400.54   25.66 1416.32   23.32 1419.41   23.16 1420.28
23.05
 1433.25    20.9 1482.05   21.18 1502.76   23.35 1526.92   25.37 1557.55
26.22
  1561.6    26.2 1564.42   26.18 1588.13   25.13 1595.86   24.52  1627.6
21.8
 1633.43    21.9 1657.37   22.66 1671.61   23.28 1703.38   22.62 1750.91
20.6
 1766.08    19.6 1786.31   18.96 1806.22   19.85 1834.37   20.97 1846.46
20.93
```

```
 1861.46    20.2 1883.93   19.91 1955.91   21.79 1958.38   21.71  1965.3
21.71
  2051.2      20 2121.94   17.86 2585.61   17.86 2628.16   21.64 2641.35
22.45
 2649.73    23.1 2687.98   25.74 2697.64   26.82 2724.27   29.32 2737.82
29.24
 2748.03    29.2 2759.02   27.76 2777.42    26.7 2794.59   25.17 2802.41
23.78
 2827.53    15.9 2845.35    10.4 2848.93   10.33 2949.01    9.78 2990.53
9.84
 3031.41     9.4 3047.38    9.32 3118.85    9.51 3158.36   10.28 3200.01
10.36
 3237.46    10.2 3284.67   10.19 3336.84   10.23 3346.59   12.25 3386.84
18.59
 3390.01    18.7 3403.66   19.41 3416.52   24.97 3420.62   26.92 3433.41
25.66
 3439.42    25.1 3448.56   28.08  3468.3   34.15 3471.51   33.72  3481.4
33.27
 3494.77    37.3 3511.58   42.12 3539.78   51.12 3556.19   52.41

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045 2827.53    .045 3390.01    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       2827.53 3390.01           806.85     444  387.93             .1
.3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000 2724.27               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 7.

INPUT
Description: Revised
Station Elevation Data    num=     107
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000    29.8    1045    27.9    1085    27.6    1103    26.3    1115
26.3
    1126      22    1135    17.5    1151    17.2    1163    19.7    1173
20.4
    1225    17.8    1313    18.2    1329    18.8    1336    21.6    1351
23.1
    1357    21.9    1361    20.1    1367    20.7    1371    19.5    1376
19.9
    1380    19.2    1389    19.6    1392    20.4    1396    19.1    1438
19.4
```



```
    1445    20.9    1452    23.1    1461    19.9    1533    18.8    1577
20.5
    1588    21.6    1602    24.8    1609    24.8    1620    23.3    1632
19.9
    1646    17.2    1729    15.7    1761    14.5    1784    14.8    1794
16
    1802    16.3    1826    15.5    1839    14.5    1924    12.1    1953
9.1
    1958     7.6    2017     7.7    2023     9.3    2037    11.2    2108
13.5
    2143    20.2    2151    20.9    2167    20.7    2194      17    2237
14.7
    2272    15.8    2284      17    2317    17.8    2341    17.7    2365
17.8
    2415    17.3    2437    16.7    2468    17.4    2484    17.6    2523
18.4
    2565    18.9    2578    19.6    2580      20    2586    20.1    2598
21.1
    2647    24.9    2655    24.7    2675    26.8    2689    26.5    2767
22.9
    2800    22.5    2807    22.2    2824    17.1    2835    13.3    2843
11
    2878    10.1    2919      10    3013     9.5    3101     9.4    3222
10.6
    3243    10.7    3296    10.3    3318    13.8    3349    18.8    3377
20.2
    3397    19.3    3436    20.9    3465    22.1    3476    22.8    3490
25.5
    3499    26.2    3505    26.3    3516      29    3524    30.8    3546
31.4
    3585      37    3587    37.5    3590    37.1    3597    37.4    3613
37.9
    3620    37.9    3625    38.9

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045    2835    .045    3318    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          2835    3318            692.7     497  459.02             .1
.3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    1000 2674.77               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 6.

INPUT
Description: Revised
```

Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	34.8	1013	34.7	1055	33.7	1055	33.9	1078	33.7
1086	35	1129	35.1	1187	33.7	1237	31.2	1269	28.9
1296	26.3	1322	24.3	1338	23.7	1356	21.1	1366	18.9
1376	17.3	1387	23.1	1391	22.8	1400	23.7	1413	24.3
1433	22.4	1463	15.9	1478	15.5	1504	15.7	1523	15
1552	12.7	1580	12	1600	9.1	1612	8.6	1656	8.3
1676	7.7	1698	7.7	1751	8.5	1765	9.3	1771	9.3
1784	8.6	1787	8.8	1791	8.3	1794	8.4	1796	8.9
1807	9.8	1816	9.6	1818	9.2	1824	7.7	1937	7.7
1976	8.8	2014	7.8	2026	9.6	2088	11.3	2111	13.2
2122	13.2	2150	14.5	2161	14.6	2170	14.1	2186	15.2
2247	14.5	2318	14.5	2329	14.9	2349	14.3	2397	19
2402	19.3	2403	19.3	2405	19	2427	15.9	2433	15.4
2444	14.8	2447	14.8	2473	16.6	2509	16.5	2524	17
2556	20	2565	20.6	2569	20.7	2591	22.2	2612	22.6
2631	23.7	2652	25.1	2679	26.7	2689	25.5	2700	24.4
2718	23.6	2743	21.7	2749	19.8	2780	9.7	2806	9.2
2862	9.3	2907	8.8	2925	8.8	2998	9.7	3089	10
3165	8.1	3173	7.9	3185	7.7	3279	9.9	3319	8.8
3363	9.5	3390	15.5	3409	19.8	3418	20.3	3428	20.7
3441	22.8	3449	22.9	3464	23.2	3477	28.5	3482	29.7
3508	30.7	3517	32.9	3572	46.4	3598	50.5	3607	52.7
3628	59.1	3633	60.8	3673	77.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	2780	.045	3165	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

2780	3165	642.39	511	528.63	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1000	2678.79		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 5.

INPUT
Description: Revised
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	26.5	1002	26	1013	28.6	1024	32.7	1042	32
1135	31.8	1149	33.4	1163	32.7	1178	30.6	1194	26.7
1207	22.7	1259	16.3	1275	16	1297	19	1313	20.2
1322	19.4	1348	14	1357	14	1373	16.6	1389	16.7
1412	14.6	1499	12.7	1540	13.8	1579	17.2	1594	16.3
1640	7.7	1773	7.7	1800	9.3	1892	10.9	1943	8.5
1949	7.6	2006	7.6	2026	13.8	2035	15.6	2072	15.8
2089	14.9	2109	15.4	2147	18.4	2164	16.8	2176	17
2190	16	2204	17.5	2242	24.9	2253	25.5	2276	23.7
2295	23.9	2334	18.3	2408	18.3	2423	20.8	2445	22.5
2463	21	2470	19.5	2502	12.6	2514	9.1	2564	8.9
2593	8.6	2625	8.9	2694	9.2	2712	8.7	2807	7.9
2822	10.6	2842	14	2856	16.5	2864	16.5	2885	16.5
2901	16.8	2925	16.6	2942	16.6	2945	16.8	2962	16.6
3010	16.8	3053	16.5	3076	16.9	3091	17	3099	17.4
3120	17.4	3174	18.2	3238	18.2	3263	18.1	3281	18.2
3291	18.5	3333	18.7	3339	19.1	3350	20.7	3356	19.6
3361	18.6	3378	21.9	3430	29.7	3436	33		

```
Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045    2502    .045    2822    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          2502    2822           578.02     495  791.59             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000 2446.02                T
    3230    3436                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 4.

INPUT
Description: Revised
Station Elevation Data     num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000    32.2    1007    27.6    1017    24.3    1053    24.2    1058
23.6
    1073    24.4    1105    24.3    1120    24.9    1133    26.1    1146
25.4
    1155    23.4    1173    16.9    1182    15.2    1210    14.1    1223
14.7
    1240    13.1    1263    12.1    1345    11.3    1371    11.9    1391
13.7
    1398    13.3    1409    11.5    1426    12.7    1437    16.1    1474
11.1
    1494    10.7    1515    12.7    1533    15.8    1542    15.7    1571
13.6
    1676    12.2    1699    10.5    1706     9.6    1713     7.6    1847
7.7
    1851     7.7    1942    10.9    1970      13    2023    15.8    2053
15.5
    2093    18.3    2111    20.1    2152    21.2    2159    22.3    2169
19
    2178    13.4    2182    10.2    2186     8.8    2190     8.7    2197
12.8
    2214     9.9    2225     8.1    2246       8    2278     7.8    2296
7.8
    2454     7.5    2474     7.4    2482     7.3    2499     7.5    2527
7.5
    2535     7.6    2557    11.9    2570    14.3    2573    14.9    2597
15.7
    2610    15.3    2634    14.9    2638    14.8    2639    14.9    2701
17
```



```
    2739    17.5    2798    18.7    2803    15.7    2804    15.7    2834
16.3
    2887    16.2    2918    16.4    2982    16.5    2999    16.2    3115
16.2
    3192    16.2    3279    16.5    3281    16.5    3346    16.2    3416
16.2
    3418    16.2    3442    16.3    3451    16.4    3480    16.3    3497
15.9
    3582    15.4    3675    16.7    3682    16.7    3687    16.9    3735
17.9
    3756    18.3    3815    18.7    3830    18.6    3854      20    3856
20.2
    3859    20.6    3871    25.3    3877    26.3

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045    2178    .045    2557    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          2178    2557           537.07     495  500.63             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    2155                T
    3100    3877                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 3.

INPUT
Description: Revised
The X1 and GR information below is all generated from new
                sections cut from
the topo received from Jas...saved as
                fairbanks.dtm.  The X1 Id's
currently indicate the station along
                the stream alignment, with the zero
station of the stream at the
                upstream end.  For this Hec-Clomr analysis,
the X1 and GR
                information listed below is for all sections upstream of
                the
Howard Chang CX 2.8444.  CX geometry begins with Sta. 1000 at
                the left end
                                                          Date:  11-08-02
Station Elevation Data     num=      95
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    1000    25.3    1039    23.4    1047      23    1055    22.6    1089
24.9
```

```
    1105     25.2     1105     24.7     1139     25.7     1171     24.8     1171
25.3
    1184     25.7     1191     27.6     1220     26.9     1232     25.5     1244
23.5
    1256     19.6     1266     16.8     1277     13.6     1280     13.4     1288
13.7
    1293     14.7     1320       14     1333     11.6     1358      7.4     1511
7.4
    1527      9.7     1550     11.9     1577     13.1     1592     13.3     1650
10.4
    1661      9.1     1669      7.6     1720      7.6     1770      7.6     1783
9
    1792      8.9     1851     11.2     1876     12.5     1998     16.7     2056
22.7
    2077     22.5     2083     21.6     2092     18.7     2101     13.2     2109
8
    2115        8     2119     12.9     2120       13     2144        7     2182
7.3
    2285        7     2326      7.1     2418        7     2444      7.1     2452
6.9
    2474     10.9     2479     11.8     2496     14.6     2500     14.7     2520
14.9
    2563     15.2     2594     15.4     2652     15.9     2666     16.3     2738
16.3
    2756     16.4     2830     17.7     2832     17.4     2846     15.2     2871
15.5
    2973     15.6     2987     15.6     3048     15.6     3060     15.6     3151
15.5
    3256     14.5     3260     14.5     3330       15     3430     15.1     3431
15.1
    3432     15.1     3570     13.6     3604     13.4     3693     13.1     3734
13.9
    3765     14.9     3858     15.7     3868     15.8     3916     16.3     3934
19.3
    3936     19.7     3946     20.2     4019     25.5     4039     26.3     4044
27.1

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .045    2101    .045    2474    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          2101    2474              715     765     795             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    1000    2065                T
    3160    4044                T

CROSS SECTION


RIVER: RIVER-1
```



```
REACH: Reach-1            RS: 2.844

INPUT
Description: Revised
Station Elevation Data     num=      88
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
    3745     45.5    3767       39    3803     36.6    3810     37.2    3821
40.4
    3837     39.4    3850       40    3892     39.4    3910     39.5    3924
41.5
    3934     41.5    3952     37.9    3977     30.9    3998     24.3    4010
21.3
    4038     18.3    4046     16.4    4056     16.6    4086     13.9    4130
11.5
    4187       11    4220     14.2    4232     16.3    4268     19.5    4281
21.4
    4298     19.6    4313     15.6    4316     15.5    4327     15.3    4334
16.3
    4350     15.9    4365       13    4392     10.1    4456      7.5    4559
8.3
    4569      7.7    4587      8.5    4613     11.9    4632     15.5    4641
15.8
    4652     14.5    4663     16.4    4690     16.3    4704     13.7    4733
13.6
    4764     22.8    4770     22.1    4780     18.5    4790     13.4    4798
7.6
    4807      7.4    4810     11.1    4845      7.4    4964      7.5    5141
7.6
    5147      9.9    5153     13.4    5180       14    5185     15.7    5196
14.8
    5287     14.4    5340     14.4    5427     14.6    5513     14.8    5600
15
    5680       15    5760       15    5840       15    5920       15    6000
15
    6060     14.7    6120     14.5    6200       15    6256     14.4    6312
13.8
    6350     16.2    6366       16    6380       14    6455     13.9    6530
13.7
    6599     13.9    6668       14    6716       16    6725       15    6742
16
    6758       20    6822       22    6848       26

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    3745    .045    4790    .045    5180    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4790    5180              325     325     325             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3745    4770                T
```

```
    6060    6848                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 2.782

INPUT
Description: Revised_4-10-2006
Station Elevation Data     num=       91
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
    3877       36    3892     35.8    3897     35.9    3906     37.6    3914
37.6
    3923     36.6    3934     33.1    3945     29.2    3961     24.1    3973
20.8
    3980     20.1    4002     19.2    4034     17.2    4055     16.1    4076
15.6
    4120       14    4177     13.2    4204     13.9    4216     13.9    4234
13.3
    4245     12.5    4264     10.6    4275     10.4    4288     10.4    4308
11.8
    4317     11.9    4323     12.7    4331     13.2    4345     13.2    4365
12
    4389     10.3    4426      9.8    4427      9.8    4440     10.4    4446
10.8
    4467     10.5    4482       10    4516      8.3    4525      7.5    4620
7.5
    4631      9.7    4644       11    4650       11    4654     11.2    4676
11.6
    4708     12.9    4727     12.4    4740       11    4763      7.7    4784
7.3
    4823      7.1    4994      7.2    5165      7.2    5176      8.7    5184
12.4
    5187     12.6    5212     12.8    5218     14.8    5230     14.2    5296
14.1
    5326     14.2    5327     14.2    5400     14.5    5455     14.2    5510
14
    5590     13.9    5670     13.8    5725       14    5780     14.2    5840
14
    5900     13.8    5950       14    6000     14.2    6065       14    6130
13.8
    6195     14.1    6260     14.3    6340       14    6420     13.8    6500
13.5
    6563     13.7    6626     13.8    6648     13.3    6663     20.5    6666
20.5
    6678     14.5    6701     14.5    6711     21.1    6733     20.7    6735
20.3
    6780     21.1

Manning's n Values         num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
    3877    .045    4727    .045    5184    .035
```



```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
         4727    5184              265     265     265              .1
.3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
    3877    4710                T
    5830    6780                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1              RS: 2.732

INPUT
Description: Revised_4-10-2006
Station Elevation Data     num=       86
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
    3819     29.5    3837     29.1    3837     28.6    3856     28.8    3877
28.4
    3877     28.9    3889     28.5    3904     28.6    3912     30.4    3929
29.3
    3942     26.9    3949     25.1    3959       22    3967     20.7    3976
20.3
    4012     16.6    4041     14.9    4118     12.9    4174       13    4214
13.8
    4227     13.7    4277     15.2    4297     14.9    4320     16.8    4329
18.2
    4368     13.3    4382     12.8    4405     10.2    4416      9.3    4425
9.2
    4430      9.1    4445     10.3    4449       11    4454       11    4460
11.7
    4488     11.7    4515     12.3    4541     11.5    4551     10.9    4560
9.3
    4569      7.5    4649      7.5    4659     10.3    4695     18.2    4700
19
    4714     22.1    4742     24.7    4758     22.5    4766     22.4    4780
18.3
    4793     15.5    4818     11.5    4829      7.6    4854      7.2    4998
7.1
    5171      7.1    5185     12.2    5211     12.3    5216     14.2    5250
13.9
    5335       14    5365     13.5    5450     14.2    5525     13.9    5600
13.7
    5675     13.4    5750     13.2    5827     13.5    5905     13.7    5982
14
    6060     14.3    6148     14.1    6236     13.9    6324     13.8    6412
13.6
    6500     13.4    6566     13.6    6628     13.2    6642       20    6645
20
```

```
    6657      14    6679      14    6690    22.9    6713    22.2    6715
21.8
    6760    22.6

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    3819    .045    4793    .045    5185    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4793    5185              300     300     300            .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3819    4740                T
    5430    6760                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.675

INPUT
Description: Revised_4-10-2006
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    3836      28    3850      26    3887      25    3897    24.2    3898
24.7
    3958    24.2    3984    19.6    3997    18.1    4011    17.3    4063
16
    4077    15.9    4099    17.6    4104    17.7    4108    18.2    4160
15.5
    4170    15.4    4210    13.9    4222      13    4235    12.7    4268
15
    4279    15.5    4295      14    4310    11.7    4320      11    4334
10.6
    4350    11.5    4373    12.2    4407    12.2    4458     9.7    4462
9.5
    4482     9.1    4525    11.6    4633    13.4    4686    15.1    4707
17.2
    4724    19.9    4733    22.1    4742      23    4755    21.8    4763
21.7
    4782    16.1    4787    15.4    4806    14.6    4840    11.7    4852
11.6
    4862    10.7    4873     7.3    4893     6.9    5018     6.8    5119
6.8
  5139.2       8  5149.2      10  5159.5    11.8  5171.6      12  5185.6
12
  5202.4    12.2    5204      12    5219      13    5228    13.4    5346
13.4
    5370    13.3    5450    14.3    5533    13.9    5616    13.4    5700
13
```



```
    5782    13.5    5865      14    5943    13.7    6021    13.3    6100
13
    6186    13.4    6273    13.7    6360    14.1    6430    13.8    6500
13.5
    6555    13.8    6610    14.1    6618    13.4    6630    19.4    6634
19.4
    6645    13.4    6667    13.4    6681    24.1    6703    23.7    6705
23.3
    6750    24.2    6758      24    6818      26    6822      28

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    3836    .045    4787    .045  5171.6    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4787  5171.6            147.97     123   97.11            .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3836    4745                T
    5228    6822                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.65095

INPUT
Description:
Station Elevation Data    num=      96
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
 4743.24      28 4744.29   27.85 4747.08   27.77 4747.83   27.71  4747.9
27.75
 4752.41   27.71 4754.37   27.37 4755.35   27.26  4756.4    27.2 4760.31
27.1
 4761.36   27.09 4763.02   27.22 4763.39   27.23 4763.69   27.26  4767.6
27.06
 4768.35   27.05 4771.36   26.94 4772.26   26.87 4773.24   26.85 4775.72
27.02
 4776.55   27.06 4777.75   26.95 4778.88   26.77 4779.63   26.72 4780.68
26.69
 4781.89   26.76 4783.62   26.81 4786.17   26.81 4790.01   26.62 4790.31
26.61
 4791.81   26.58 4795.04   26.77 4803.17    26.9 4807.15   27.03 4808.73
27.19
 4810.01   27.39 4810.68   27.56 4811.36   27.62 4812.34   27.53 4812.94
27.53
 4814.37   27.11 4814.74   27.05 4818.68   25.32 4825.73   22.11 4828.22
21.04
 4830.29   20.09 4832.57   18.87 4836.72   17.08 4862.63    6.06 4910.14
6.06
```

```
 4957.64    6.06 5005.15    6.06 5052.66    6.06 5100.16    6.06 5147.67
6.06
 5158.45   12.68 5165.28   12.72 5170.59   12.81 5173.99   14.91 5182.97
20.44
 5193.52    26.8 5194.57    26.8 5195.83   26.81 5195.95    26.8 5197.08
26.87
 5197.76    26.9 5206.63    26.9 5208.44   26.89 5214.45   26.97 5220.69
26.94
 5226.93    26.9 5233.25   26.87 5239.41   26.91 5245.65   26.95 5251.52
26.92
 5257.38   26.89 5263.32   26.87 5269.79    26.9 5276.33   26.92 5282.87
26.95
 5288.13   26.93  5293.4   26.91 5297.53   26.93 5301.67   26.95 5302.27
26.9
 5303.17   27.35 5303.47   27.35  5304.3    26.9 5305.95    26.9 5307.01
27.71
 5308.66   27.68 5308.81   27.65 5312.19   27.71  5312.8    27.7 5317.31
27.85
 5317.61      28

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4743.24    .045 4814.74     .04 5193.52    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       4814.74 5193.52             32.03      30   27.89             .1
.3

BRIDGE


RIVER: RIVER-1
REACH: Reach-1             RS: 2.650

INPUT
Description:
Distance from Upstream XS =      .01
Deck/Roadway Width        =     29.9
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=        2
    Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 4814.74      13      11 5193.52      13      11

Upstream Bridge Cross Section Data
Station Elevation Data     num=       96
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
 4743.24      28 4744.29   27.85 4747.08   27.77 4747.83   27.71  4747.9
27.75
 4752.41   27.71 4754.37   27.37 4755.35   27.26  4756.4    27.2 4760.31
27.1
```



```
 4761.36   27.09 4763.02   27.22 4763.39   27.23 4763.69   27.26  4767.6
27.06
 4768.35   27.05 4771.36   26.94 4772.26   26.87 4773.24   26.85 4775.72
27.02
 4776.55   27.06 4777.75   26.95 4778.88   26.77 4779.63   26.72 4780.68
26.69
 4781.89   26.76 4783.62   26.81 4786.17   26.81 4790.01   26.62 4790.31
26.61
 4791.81   26.58 4795.04   26.77 4803.17    26.9 4807.15   27.03 4808.73
27.19
 4810.01   27.39 4810.68   27.56 4811.36   27.62 4812.34   27.53 4812.94
27.53
 4814.37   27.11 4814.74   27.05 4818.68   25.32 4825.73   22.11 4828.22
21.04
 4830.29   20.09 4832.57   18.87 4836.72   17.08 4862.63    6.06 4910.14
6.06
 4957.64    6.06 5005.15    6.06 5052.66    6.06 5100.16    6.06 5147.67
6.06
 5158.45   12.68 5165.28   12.72 5170.59   12.81 5173.99   14.91 5182.97
20.44
 5193.52    26.8 5194.57    26.8 5195.83   26.81 5195.95    26.8 5197.08
26.87
 5197.76    26.9 5206.63    26.9 5208.44   26.89 5214.45   26.97 5220.69
26.94
 5226.93    26.9 5233.25   26.87 5239.41   26.91 5245.65   26.95 5251.52
26.92
 5257.38   26.89 5263.32   26.87 5269.79    26.9 5276.33   26.92 5282.87
26.95
 5288.13   26.93  5293.4   26.91 5297.53   26.93 5301.67   26.95 5302.27
26.9
 5303.17   27.35 5303.47   27.35  5304.3    26.9 5305.95    26.9 5307.01
27.71
 5308.66   27.68 5308.81   27.65 5312.19   27.71  5312.8    27.7 5317.31
27.85
 5317.61      28

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4743.24    .045 4814.74     .04 5193.52    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       4814.74 5193.52             .1       .3

Downstream  Deck/Roadway Coordinates
    num=        2
    Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4817      13      11  5195.3      13      11

Downstream Bridge Cross Section Data
Station Elevation Data     num=       11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    4817      28    4850       6    4900       6    4950       6    5000
6
```

```
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65
13.1
  5195.3      28

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4817    .045    4817     .03  5195.3    .035

Bank Sta: Left   Right   Coeff Contr.   Expan.
          4817  5195.3              .3       .5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Upstream Embankment side slope                =       0 horiz. to 1.0
vertical
Downstream Embankment side slope              =       0 horiz. to 1.0
vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins           =      13
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  16

Pier Data
Pier Station     Upstream= 4805.75    Downstream=
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       0


Pier Data
Pier Station     Upstream= 4830.75    Downstream= 4830.75
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream= 4880.88    Downstream= 4880.88
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream= 4905.94    Downstream= 4905.94
```



```
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream=    4931    Downstream=    4931
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream=    4944    Downstream=    4944
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream= 4968.75    Downstream= 4968.75
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream=    5000    Downstream=    5000
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream= 5031.25    Downstream= 5031.25
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream=    5056    Downstream=    5056
```

```
Upstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11
Downstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11

Pier Data
Pier Station      Upstream=    5069    Downstream=    5069
Upstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11
Downstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11

Pier Data
Pier Station      Upstream=  5096.3    Downstream=  5096.3
Upstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11
Downstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11

Pier Data
Pier Station      Upstream= 5122.63    Downstream= 5122.63
Upstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11
Downstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11

Pier Data
Pier Station      Upstream= 5148.94    Downstream= 5148.94
Upstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11
Downstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11

Pier Data
Pier Station      Upstream= 5175.25    Downstream= 5175.25
Upstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11
Downstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11

Pier Data
Pier Station      Upstream=            Downstream= 4855.81
```



```
Upstream      num=        0

Downstream      num=        2
    Width    Elev     Width    Elev
     1.5     5.9      1.5      11

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
Selected Low Flow Methods = Energy

High Flow Method
      Pressure and Weir flow
          Submerged Inlet Cd          =
          Submerged Inlet + Outlet Cd =      .8
          Max Low Cord                =

Additional Bridge Parameters
      Add Friction component to Momentum
      Do not add Weight component to Momentum
      Class B flow critical depth computations use critical depth
          inside the bridge at the upstream end
      Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.649

INPUT
Description:
Station Elevation Data     num=      11
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
    4817       28    4850        6    4900        6    4950        6    5000
6
    5050        6    5100        6    5150        6 5160.65     13.1 5172.65
13.1
  5195.3       28

Manning's n Values         num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
    4817     .045    4817      .03  5195.3     .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4817  5195.3              93.8    93.8    93.8              .3
.5
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28
```

```
BRIDGE


RIVER: RIVER-1
REACH: Reach-1            RS: 2.637

INPUT
Description:
Distance from Upstream XS =      .01
Deck/Roadway Width        =    93.78
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4817      13      11  5195.3      13      11

Upstream Bridge Cross Section Data
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    4817      28    4850       6    4900       6    4950       6    5000
6
    5050       6    5100       6    5150       6 5160.65    13.1 5172.65
13.1
  5195.3      28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4817    .045    4817     .03  5195.3    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4817  5195.3              .3       .5
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4827      13      11 5202.56      13      11

Downstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    4827      28    4860       6    4880     5.9    5000       6    5019
6
    5135       6    5140       6  5150.5      13  5162.5      13    5179
28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4827    .045    4827     .03    5179    .035
```



```
Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820               T
    5200    5179               T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Upstream Embankment side slope              =       0 horiz. to 1.0
vertical
Downstream Embankment side slope            =       0 horiz. to 1.0
vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =      13
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  16

Pier Data
Pier Station     Upstream= 4830.75    Downstream= 4830.75
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 4855.81    Downstream= 4855.81
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 4880.88    Downstream= 4880.88
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 4905.94    Downstream= 4905.94
Upstream     num=       2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
```

```
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream=    4931    Downstream=    4931
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream=    4944    Downstream=    4944
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 4968.75    Downstream= 4968.75
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream=    5000    Downstream=    5000
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 5031.25    Downstream= 5031.25
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream=    5056    Downstream=    5056
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
```



```
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream=    5069    Downstream=    5069
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream=  5096.3    Downstream=  5096.3
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 5122.63    Downstream= 5122.63
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 5148.94    Downstream= 5148.94
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 5175.25    Downstream= 5175.25
Upstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream=            Downstream= 4805.75
Upstream      num=        0

Downstream      num=        2
```

```
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =       .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.625

INPUT
Description: Revised
Station Elevation Data    num=      10
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
    4827      28    4860       6    4880     5.9    5000       6    5019
6
    5135       6    5140       6  5150.5      13  5162.5      13    5179
28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4827    .045    4827     .03    5179    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4827    5179             25.1      30   35.99             .3
.5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820               T
    5200    5179               T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28
```



```
BRIDGE


RIVER: RIVER-1
REACH: Reach-1            RS: 2.624

INPUT
Description:
Distance from Upstream XS =     .01
Deck/Roadway Width        =   29.98
Weir Coefficient          =       3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    4827      13      11    5179      13      11

Upstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
    4827      28    4860       6    4880     5.9    5000       6    5019
6
    5135       6    5140       6  5150.5      13  5162.5      13    5179
28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4827    .045    4827     .03    5179    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4827    5179            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4827    4820               T
    5200    5179               T
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    4934    4941      28    5059    5066      28

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
 4841.79      13      11 5202.56      13      11

Downstream Bridge Cross Section Data
Station Elevation Data    num=      83
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
 4545.46   29.09 4567.69   26.96 4574.69   27.78 4587.66   26.69 4599.67
26.34
 4607.41   26.23 4652.36   25.66 4655.82    25.6  4661.7   25.52 4707.41
25.36
 4709.37   25.82 4711.71   26.37    4714   26.91 4716.35   27.46 4718.66
28
```

```
 4719.31   28.16 4733.29   28.22 4734.68   28.14 4751.62   28.47 4752.71
28.68
  4755.9   28.74 4757.02    28.6 4775.62   28.74 4777.64   28.84 4785.59
29.09
 4795.81   29.23 4797.99   29.09 4801.69   28.54 4805.45      28 4809.38
27.46
 4813.24   26.91  4831.3   27.24 4841.79   27.24 4841.85   25.12  4852.1
19.38
 4859.82   16.34 4862.36   15.42 4863.03   15.13 4876.22   10.51 4888.28
6.28
  4889.4    6.27 4890.08    6.21 4903.26    5.96 4916.45    5.65 4916.78
5.65
 4923.15    5.65 4929.52    5.65 4929.85    5.65 4936.23    5.65  4942.6
5.65
 4942.93    5.65 4950.49    6.18 4983.93    5.93 4990.99    6.51 5025.78
7.07
 5047.13    7.41 5058.04    7.58 5063.63    7.59 5087.45    7.63 5095.18
8.18
 5113.33    8.72 5131.14    9.27 5142.91    9.81  5154.5   10.36  5158.2
10.52
 5164.36   10.62  5168.7   10.69 5177.82   15.93 5188.24   16.09 5202.56
27.24
 5210.63   26.28 5259.01   25.38 5317.52   25.17 5392.03   25.14 5439.67
25.22
 5484.38   25.25  5522.3   25.41 5554.66   25.96 5580.95   26.72 5585.55
26.88
 5596.39   27.37 5596.56    27.4 5599.28    27.4

Manning's n Values         num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
 4545.46    .045 4841.79     .04 5202.56    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
       4841.79 5202.56             .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
 4545.464836.617               T
 5217.84 5599.28               T

Upstream Embankment side slope              =       0 horiz. to 1.0
vertical
Downstream Embankment side slope            =       0 horiz. to 1.0
vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =      13
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  14

Pier Data
Pier Station     Upstream= 4830.75    Downstream= 4830.75
Upstream     num=        2
```



```
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream= 4880.88    Downstream= 4880.88
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5       5     1.5      11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5       5     1.5      11

Pier Data
Pier Station     Upstream= 4905.94    Downstream= 4905.94
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream=    4931    Downstream=    4931
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream=    4944    Downstream=    4944
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream= 4968.75    Downstream= 4968.75
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11
Downstream      num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5      11

Pier Data
Pier Station     Upstream=    5000    Downstream=    5000
Upstream     num=        2
```

```
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 5031.25    Downstream= 5031.25
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5      5      1.5     11
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5      5      1.5     11

Pier Data
Pier Station     Upstream=    5056    Downstream=    5056
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5      5      1.5     11
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5      5      1.5     11

Pier Data
Pier Station     Upstream=    5069    Downstream=    5069
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream=  5096.3    Downstream=  5096.3
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 5122.63    Downstream= 5122.63
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 5148.94    Downstream= 5148.94
Upstream     num=        2
```



```
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Pier Data
Pier Station     Upstream= 5175.25    Downstream= 5175.25
Upstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11
Downstream     num=        2
    Width   Elev    Width   Elev
     1.5     5.9     1.5     11

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.622

INPUT
Description:
Station Elevation Data     num=      83
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
 4545.46    29.09 4567.69    26.96 4574.69    27.78 4587.66    26.69 4599.67
26.34
 4607.41    26.23 4652.36    25.66 4655.82     25.6  4661.7    25.52 4707.41
25.36
 4709.37    25.82 4711.71    26.37    4714    26.91 4716.35    27.46 4718.66
28
 4719.31    28.16 4733.29    28.22 4734.68    28.14 4751.62    28.47 4752.71
28.68
```

```
  4755.9   28.74 4757.02    28.6 4775.62   28.74 4777.64   28.84 4785.59
29.09
 4795.81   29.23 4797.99   29.09 4801.69   28.54 4805.45      28 4809.38
27.46
 4813.24   26.91  4831.3   27.24 4841.79   27.24 4841.85   25.12  4852.1
19.38
 4859.82   16.34 4862.36   15.42 4863.03   15.13 4876.22   10.51 4888.28
6.28
  4889.4    6.27 4890.08    6.21 4903.26    5.96 4916.45    5.65 4916.78
5.65
 4923.15    5.65 4929.52    5.65 4929.85    5.65 4936.23    5.65  4942.6
5.65
 4942.93    5.65 4950.49    6.18 4983.93    5.93 4990.99    6.51 5025.78
7.07
 5047.13    7.41 5058.04    7.58 5063.63    7.59 5087.45    7.63 5095.18
8.18
 5113.33    8.72 5131.14    9.27 5142.91    9.81  5154.5   10.36  5158.2
10.52
 5164.36   10.62  5168.7   10.69 5177.82   15.93 5188.24   16.09 5202.56
27.24
 5210.63   26.28 5259.01   25.38 5317.52   25.17 5392.03   25.14 5439.67
25.22
 5484.38   25.25  5522.3   25.41 5554.66   25.96 5580.95   26.72 5585.55
26.88
 5596.39   27.37 5596.56    27.4 5599.28    27.4

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4545.46    .045 4841.79     .04 5202.56    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       4841.79 5202.56              29.1    42.2   58.21            .3
.5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 4545.464836.617               T
 5217.84 5599.28               T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 2.614

INPUT
Description: This is a REPEATED section.
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
  3793.5      32  3875.1    24.2  3900.8    27.2  3948.4    23.2  3992.5
21.9
  4020.9    21.5  4185.9    19.4  4198.6    19.2  4220.2    18.9    4388
18.3
```



```
  4395.2      20  4403.8      22  4412.2      24  4420.8      26  4429.3
28
  4431.7    28.6    4483    28.8  4488.1    28.5  4550.3   29.74  4554.3
30.5
    4566    30.7  4570.1    30.2  4638.4    30.7  4645.8    31.1    4675
32
  4712.5    32.5  4720.5      32  4734.1      30  4747.9      28  4762.3
26
  4776.5      24  4842.8    25.2  4881.3    25.2  4881.4    17.5  4899.6
9.4
  4913.3       8  4917.8     7.8    4919     7.6  4942.4     7.3  4965.8
7
    4967     6.8  4990.4       6  5013.8       5    5015       5  5038.4
5
  5061.8       5    5063       5  5086.4       5  5109.8       5    5111
5
  5115.5     6.9  5135.4     5.9  5139.6       8  5160.3      10  5179.5
11.8
    5197      12  5201.6      14  5212.4      16    5223      18    5230
20
  5236.9      22  5239.1    22.6  5265.5    25.2  5295.1    21.7  5472.7
18.4
  5687.5    17.6    5961    17.5  6135.9    17.8    6300    17.9  6439.2
18.5
    6558    20.5  6654.5    23.3  6671.4    23.9  6711.2    25.7  6711.8
25.8
  6721.8    25.8

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  3793.5    .03  4881.3     .03  5265.5     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        4881.3  5265.5               27      27      27              .3
.5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  3793.5    4881               T
  5265.5  6721.8               T

BRIDGE


RIVER: RIVER-1
REACH: Reach-1             RS: 2.6115

INPUT
Description: Existing Bridge
Distance from Upstream XS =       .1
Deck/Roadway Width        =     26.8
Weir Coefficient          =      2.8
Upstream  Deck/Roadway Coordinates
    num=      65
```

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Upstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28
4431.7	28.6	4483	28.8	4488.1	28.5	4550.3	29.74	4554.3	30.5
4566	30.7	4570.1	30.2	4638.4	30.7	4645.8	31.1	4675	32
4712.5	32.5	4720.5	32	4734.1	30	4747.9	28	4762.3	26
4776.5	24	4842.8	25.2	4881.3	25.2	4881.4	17.5	4899.6	9.4
4913.3	8	4917.8	7.8	4919	7.6	4942.4	7.3	4965.8	7
4967	6.8	4990.4	6	5013.8	5	5015	5	5038.4	5
5061.8	5	5063	5	5086.4	5	5109.8	5	5111	5
5115.5	6.9	5135.4	5.9	5139.6	8	5160.3	10	5179.5	11.8
5197	12	5201.6	14	5212.4	16	5223	18	5230	20
5236.9	22	5239.1	22.6	5265.5	25.2	5295.1	21.7	5472.7	18.4

5687.5	17.6	5961	17.5	6135.9	17.8	6300	17.9	6439.2	18.5
6558	20.5	6654.5	23.3	6671.4	23.9	6711.2	25.7	6711.8	25.8
6721.8	25.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3793.5	.03	4881.3	.03	5265.5	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
4881.3	5265.5	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3793.5	4881		T
5265.5	6721.8		T

Downstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
3793.5	32	32	3875.1	25.2	24.2	3900.8	27.2	27.2
3948.4	23.2	23.2	3992.5	21.9	21.9	4020.9	21.5	21.5
4185.9	19.4	19.4	4198.6	19.2	19.2	4220.2	18.9	18.9
4424.6	19.5	19.5	4613.1	22.1	22.1	4752.2	24.4	24.4
4842.8	25.2	25.2	4881.3	25.2	25.2	4881.4	25.2	19.5
4899.6	25.2	22.1	4913.3	25.2	19.9	4917.8	25.2	19.4
4917.9	25.2	19.4	4918.9	25.2	19.4	4919	25.2	19.4
4942.4	25.2	22.1	4965.8	25.2	19.4	4965.9	25.2	19.4
4966.9	25.2	19.4	4967	25.2	19.4	4990.4	25.2	22.1
5013.8	25.2	19.4	5013.9	25.2	19.4	5014.9	25.2	19.4
5015	25.2	19.4	5038.4	25.2	22.1	5061.8	25.2	19.4
5061.9	25.2	19.4	5062.9	25.2	19.4	5063	25.2	19.4
5086.4	24.5	21.4	5109.8	24.5	18.7	5109.9	24.5	18.7
5110.9	24.5	18.7	5111	24.5	18.7	5134.4	24.5	21.4
5157.8	24.5	18.7	5157.9	24.5	18.7	5158.9	24.5	18.7
5159	24.5	18.7	5163.4	23.7	19.2	5185.6	23.7	20.6
5212	23	17.2	5212.1	23	17.2	5212.2	23	23
5247.2	22.5	22.5	5295.1	21.7	21.7	5472.7	18.4	18.4
5687.5	17.6	17.6	5961	17.7	17.7	6135.9	17.8	17.8
6300	17.9	17.9	6439.2	18.5	18.5	6558	20.5	20.5
6654.5	23.3	23.3	6671.4	23.9	23.9	6711.2	25.7	25.7
6711.8	25.8	25.8	6721.8	25.8	25.8			

Downstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3793.5	32	3875.1	24.2	3900.8	27.2	3948.4	23.2	3992.5	21.9
4020.9	21.5	4185.9	19.4	4198.6	19.2	4220.2	18.9	4388	18.3
4395.2	20	4403.8	22	4412.2	24	4420.8	26	4429.3	28

```
  4431.7    28.6    4483    28.8  4488.1    28.5  4550.3   29.74  4554.3
30.5
    4566    30.7  4570.1    30.2  4638.4    30.7  4645.8    31.1    4675
32
  4712.5    32.5  4720.5      32  4734.1      30  4747.9      28  4762.3
26
  4776.5      24  4842.8    25.2  4881.3    25.2  4881.4    17.5  4899.6
9.4
  4913.3       8  4917.8     7.8    4919     7.6  4942.4     7.3  4965.8
7
    4967     6.8  4990.4       6  5013.8       5    5015       5  5038.4
5
  5061.8       5    5063       5  5086.4       5  5109.8       5    5111
5
  5115.5     6.9  5135.4     5.9  5139.6       8  5160.3      10  5179.5
11.8
    5197      12  5201.6      14  5212.4      16    5223      18    5230
20
  5236.9      22  5239.1    22.6  5265.5    25.2  5295.1    21.7  5472.7
18.4
  5687.5    17.6    5961    17.5  6135.9    17.8    6300    17.9  6439.2
18.5
    6558    20.5  6654.5    23.3  6671.4    23.9  6711.2    25.7  6711.8
25.8
  6721.8    25.8

Manning's n Values        num=       3
    Sta   n Val     Sta   n Val     Sta   n Val
  3793.5     .03  4881.3     .04  5265.5     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
        4881.3  5265.5            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  3793.5    4881               T
  5265.5  6721.8               T

Upstream Embankment side slope              =       0 horiz. to 1.0
vertical
Downstream Embankment side slope            =       0 horiz. to 1.0
vertical
Maximum allowable submergence for weir flow =      .95
Elevation at which weir flow begins         =     17.6
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  7

Pier Data
Pier Station     Upstream=  4918.4    Downstream=  4918.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
```



```
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  4918.4    Downstream=  4918.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  4966.4    Downstream=  4966.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  5014.4    Downstream=  5014.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  5062.4    Downstream=  5062.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  5110.4    Downstream=  5110.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
Downstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22

Pier Data
Pier Station     Upstream=  5158.4    Downstream=  5158.4
Upstream     num=       2
    Width   Elev    Width   Elev
        3       5       3     22
```

```
Downstream      num=        2
    Width   Elev    Width   Elev
        3       5       3      22

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =       .8
           Max Low Cord                =

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.609

INPUT
Description:
Station Elevation Data     num=      76
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
  3793.5       32  3875.1     24.2  3900.8     27.2  3948.4     23.2  3992.5
21.9
  4020.9     21.5  4185.9     19.4  4198.6     19.2  4220.2     18.9    4388
18.3
  4395.2       20  4403.8       22  4412.2       24  4420.8       26  4429.3
28
  4431.7     28.6    4483     28.8  4488.1     28.5  4550.3    29.74  4554.3
30.5
    4566     30.7  4570.1     30.2  4638.4     30.7  4645.8     31.1    4675
32
  4712.5     32.5  4720.5       32  4734.1       30  4747.9       28  4762.3
26
  4776.5       24  4842.8     25.2  4881.3     25.2  4881.4     17.5  4899.6
9.4
  4913.3        8  4917.8      7.8    4919      7.6  4942.4      7.3  4965.8
7
    4967      6.8  4990.4        6  5013.8        5    5015        5  5038.4
5
  5061.8        5    5063        5  5086.4        5  5109.8        5    5111
5
```



```
  5115.5      6.9  5135.4      5.9  5139.6        8  5160.3       10  5179.5
11.8
    5197       12  5201.6       14  5212.4       16    5223       18    5230
20
  5236.9       22  5239.1     22.6  5265.5     25.2  5295.1     21.7  5472.7
18.4
  5687.5     17.6    5961     17.5  6135.9     17.8    6300     17.9  6439.2
18.5
    6558     20.5  6654.5     23.3  6671.4     23.9  6711.2     25.7  6711.8
25.8
  6721.8     25.8

Manning's n Values         num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
  3793.5      .03  4881.3      .04  5265.5      .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        4881.3  5265.5              100     100      90              .3
.5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
  3793.5    4881                T
  5265.5  6721.8                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.59

INPUT
Description:
Station Elevation Data     num=      54
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
  4345.5       26  4354.4       24  4363.1       22  4372.1       20  4393.8
18.1
  4404.3       16  4422.7       14  4594.7       14  4642.3       11    4773
10.89
  4774.2       11  4806.4     21.5  4816.4     21.5    4821       20    4836
15
    4848       11  4848.3    10.57  4897.7     10.1    4898       10    4962
8
    5000        8    5016        6    5025        5    5100        5    5120
6
  5133.3      6.2  5144.5        8  5173.2       10  5202.4     11.8    5208
10
    5232       12    5316     12.4    5401     12.8    5485     13.2    5570
13.6
    5655       14    5720       14    5775       15    5830       16    5891
17
    5953       18    5960       16    5980     15.5    6010       16    6017
18.5
```

```
    6027      16    6100      14    6155      15    6210      16    6278
16.7
    6346    17.3    6415      18    6455      22    6475      24

Manning's n Values          num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta
n Val
  4345.5    .035  4594.7     .04  4806.4     .04    4898     .04  5202.4
.035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4898  5173.2               345     345     340             .2
.4
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  4345.5  4806.4                T
  5202.4    6475                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.524

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    3871      23    3885      22    3891      20    3904      16    4004
15.5
    4006      15    4024      11    4632   10.17    4634      11    4666
21.5
    4676    21.5    4702      13    4712     9.8    4886       8    4897
6
    4919     5.6    4934       6    4964       8    4969       8    4987
6
    5000     5.5    5013       6    5030     4.5    5085     4.5    5140
4.5
    5150       6    5175       8    5250      10    5320      11    5390
12
    5460    12.2    5530    12.3    5600    12.5    5686    12.7    5773
12.8
    5859      13    5946    13.2    6033    13.3    6120    13.5    6130
14
    6140      16    6146      14    6200      14    6275      15    6350
16
    6373      18    6430      28

Manning's n Values          num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta
n Val
```



```
    3871    .035    4004     .04    4666     .04    4886     .04    5320
.035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4712    5320               450     450     450             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3871    4676                T
    5320    6430                T

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1            RS: 2.439

INPUT
Description:
Station Elevation Data    num=      37
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    3692    20.5    3705      20    3711      18    3718      16    3871
14
    4186      14    4204      10    4678     9.5    4715    21.5    4725
21.5
    4754      12    4755    11.8    4760    10.1    4964       8    5000
6
    5050     4.9    5115     3.8    5120       4    5152       8    5204
9
    5256      10    5320    10.7    5384    11.3    5448      12    5519
12
    5590      12    5662      12    5685      18    5730      18    5740
16
    5760    15.3    5834    15.5    5908    15.8    5982      16    6003
20
    6027      22    6037      27

Manning's n Values          num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta
n Val
    3692    .035    4186     .04    4725     .04    4964     .04    5256
.035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4760    5256               520     520     520             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3692    4725                T
    5500    6037                T
```

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.341

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3449.9	23	3455	22.6	3470	22	3475	20	3480	18
3485	16	3490	14	3495	13.52	3498	13.1	3511	12.6
3518	12.6	3705	13	3903	13.4	4177	12.4	4442	12.2
4514	12	4522	12	4527	11.35	4540	11.45	4545	12
4548	12	4606	12	4662	12	4665	11	4668	10
4671	9	4853	8.5	4966	8	4968	6	4970	4
5000	4	5025	4	5050	3.3	5110	6	5147	10
5229	10.5	5312	11	5394	11.5	5477	12	5496	14
5508	16	5591	16	5674	16	5757	16	5840	16
5855	16	5885	34						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3449.9	.035	4662	.04	4966	.035	5147	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4671 5147 550 580 600 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3449.9	4545		T
5560	5885		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.231

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3413	30	3456	16	3523	15	3590	14	3664	13.6
3738	13.2	3813	12.8	3887	12.4	3962	12	4031	11.7
4100	11.5	4189	11.7	4278	12	4339	12.3	4400	12.6
4466	12.4	4533	12.2	4600	12	4644	10	4680	8
4720	7.4	4785	7.7	4850	8	4905	8.3	4960	8.6
5050	8.3	5140	8	5173	6	5190	4	5220	3
5237	4	5260	8	5307	9	5355	10	5437	12
5526	12.7	5615	13.3	5704	14	5762	16	5820	18
5840	20	5900	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3413	.035	4644	.035	5355	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4644 5355 300 400 430 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3413	3970		T
5900	5900		T

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1 RS: 2.155

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3422	30	3468	14	3554	13.7	3640	13.3	3726	13
3812	12.7	3898	12.3	3985	12	4057	11.7	4130	11.5
4210	11.7	4290	12	4370	12.2	4458	12.1	4547	12.1
4636	12	4696	10	4728	8	4760	6.5	4820	6.5
4880	6.5	4922	8	5000	10.3	5070	10	5160	4

```
    5175      2.5     5200      2.5     5222       4     5238       8     5250
10
    5300      9.9     5350      9.8     5415    10.5     5480    11.3     5545
12
    5626       13     5708       14     5722       16     5803       18     5834
26

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    3422    .035    4728    .035    5250    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4728    5250             330     500     450             .1
.3

CROSS SECTION


RIVER: RIVER-1
REACH: Reach-1             RS: 2.06

INPUT
Description:
Station Elevation Data     num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    3622      30    3666      14    3743    13.7    3821    13.3    3899
13
    3976    12.7    4054    12.3    4132      12    4186    11.2    4240
10.5
    4330    11.1    4420    11.7    4501    11.4    4582      11    4663
10.7
    4744    10.3    4825      10    4897       4    4958       2    4974
2
    5035       4    5058      10    5114    10.2    5170    10.5    5230
10.2
    5290      10    5370     9.6    5450     9.2    5530     9.6    5610
10
    5665      11    5720      12    5781    15.3    5843    18.7    5905
22

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    3622    .035    4825    .035    5058    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4825    5058             480     430     330             .1
.3

CROSS SECTION
```



```
RIVER: RIVER-1
REACH: Reach-1             RS: 1.979

INPUT
Description:
Station Elevation Data     num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
    3516      30    3572      14    3588    12.3    3668    12.2    3749
12.2
    3830    12.1    3911    12.1    3992      12    4069    11.6    4146
11.2
    4223    10.9    4300    10.5    4384      11    4468    11.5    4553
12
    4626    12.4    4700    12.7    4776    12.4    4852      12    4863
4
    4890       3    4933       4    4993       5    5053       6    5101
7
    5150       8    5202       9    5254      10    5302    10.2    5350
10.5
    5405    10.4    5460    10.4    5507    10.1    5555     9.8    5568
10
    5619     9.5    5670       9    5693      10    5759      11    5826
12
    5878      14    5930      16    6000    20.7    6070    25.3    6140
30

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    3516    .035    4852    .035    5150    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          4852    5150             400     400     400             .1
.3


SUMMARY OF MANNING'S N VALUES

River:RIVER-1

      Reach          River Sta.       n1        n2        n3        n4
n5

 Reach-1              12              .045      .045      .035
 Reach-1              11.             .045      .045      .035
 Reach-1              10.             .045      .045      .035
 Reach-1              9.              .045      .045      .035
 Reach-1              8.              .045      .045      .035
 Reach-1              7.              .045      .045      .035
 Reach-1              6.              .045      .045      .035
 Reach-1              5.              .045      .045      .035
 Reach-1              4.              .045      .045      .035
```

Reach-1	3.		.045	.045	.035
Reach-1	2.844		.045	.045	.035
Reach-1	2.782		.045	.045	.035
Reach-1	2.732		.045	.045	.035
Reach-1	2.675		.045	.045	.035
Reach-1	2.65095		.045	.04	.035
Reach-1	2.650	Bridge			
Reach-1	2.649		.045	.03	.035
Reach-1	2.637	Bridge			
Reach-1	2.625		.045	.03	.035
Reach-1	2.624	Bridge			
Reach-1	2.622		.045	.04	.035
Reach-1	2.614		.03	.03	.03
Reach-1	2.6115	Bridge			
Reach-1	2.609		.03	.04	.03
Reach-1	2.59		.035	.04	.04
.04	.035				
Reach-1	2.524		.035	.04	.04
.04	.035				
Reach-1	2.439		.035	.04	.04
.04	.035				
Reach-1	2.341		.035	.04	.035
.035					
Reach-1	2.231		.035	.035	.035
Reach-1	2.155		.035	.035	.035
Reach-1	2.06		.035	.035	.035
Reach-1	1.979		.035	.035	.035

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	12	49.32	48	73.57
Reach-1	11.	347.68	339	548.49
Reach-1	10.	585.6	450	556.91
Reach-1	9.	1127.52	452	287.85
Reach-1	8.	806.85	444	387.93
Reach-1	7.	692.7	497	459.02
Reach-1	6.	642.39	511	528.63
Reach-1	5.	578.02	495	791.59
Reach-1	4.	537.07	495	500.63
Reach-1	3.	715	765	795
Reach-1	2.844	325	325	325
Reach-1	2.782	265	265	265
Reach-1	2.732	300	300	300
Reach-1	2.675	147.97	123	97.11
Reach-1	2.65095	32.03	30	27.89
Reach-1	2.650	Bridge		
Reach-1	2.649	93.8	93.8	93.8

Reach-1	2.637	Bridge		
Reach-1	2.625	25.1	30	35.99
Reach-1	2.624	Bridge		
Reach-1	2.622	29.1	42.2	58.21
Reach-1	2.614	27	27	27
Reach-1	2.6115	Bridge		
Reach-1	2.609	100	100	90
Reach-1	2.59	345	345	340
Reach-1	2.524	450	450	450
Reach-1	2.439	520	520	520
Reach-1	2.341	550	580	600
Reach-1	2.231	300	400	430
Reach-1	2.155	330	500	450
Reach-1	2.06	480	430	330
Reach-1	1.979	400	400	400

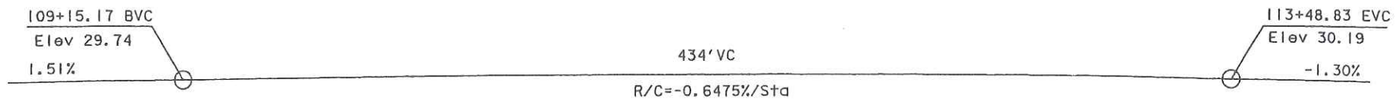
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	12	.1	.3
Reach-1	11.	.1	.3
Reach-1	10.	.1	.3
Reach-1	9.	.1	.3
Reach-1	8.	.1	.3
Reach-1	7.	.1	.3
Reach-1	6.	.1	.3
Reach-1	5.	.1	.3
Reach-1	4.	.1	.3
Reach-1	3.	.1	.3
Reach-1	2.844	.1	.3
Reach-1	2.782	.1	.3
Reach-1	2.732	.1	.3
Reach-1	2.675	.1	.3
Reach-1	2.65095	.1	.3
Reach-1	2.650	Bridge	
Reach-1	2.649	.3	.5
Reach-1	2.637	Bridge	
Reach-1	2.625	.3	.5
Reach-1	2.624	Bridge	
Reach-1	2.622	.3	.5
Reach-1	2.614	.3	.5
Reach-1	2.6115	Bridge	
Reach-1	2.609	.3	.5
Reach-1	2.59	.2	.4
Reach-1	2.524	.1	.3
Reach-1	2.439	.1	.3
Reach-1	2.341	.1	.3
Reach-1	2.231	.1	.3

Reach-I	2.155	.1	.3
Reach-1	2.06	.1	.3
Reach-1	1.979	.1	.3

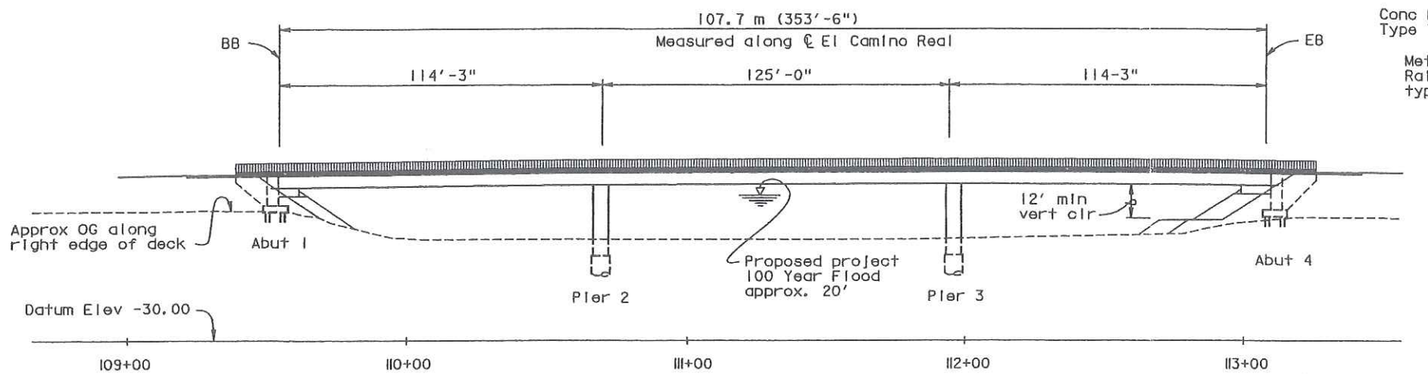
ATTACHMENT 7

Preliminary Eastern Alignment Plan for Proposed El Camino Real Bridge



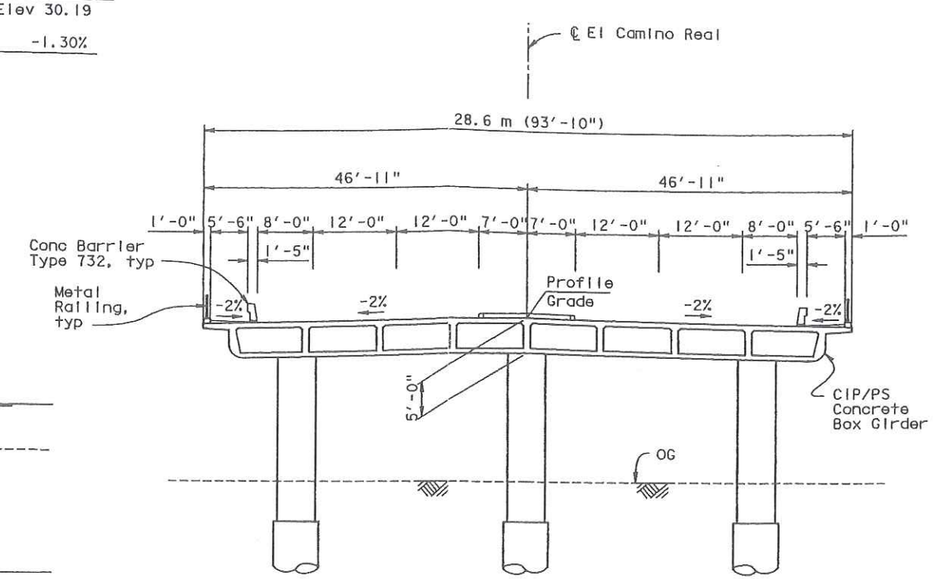
PROFILE GRADE

No Scale



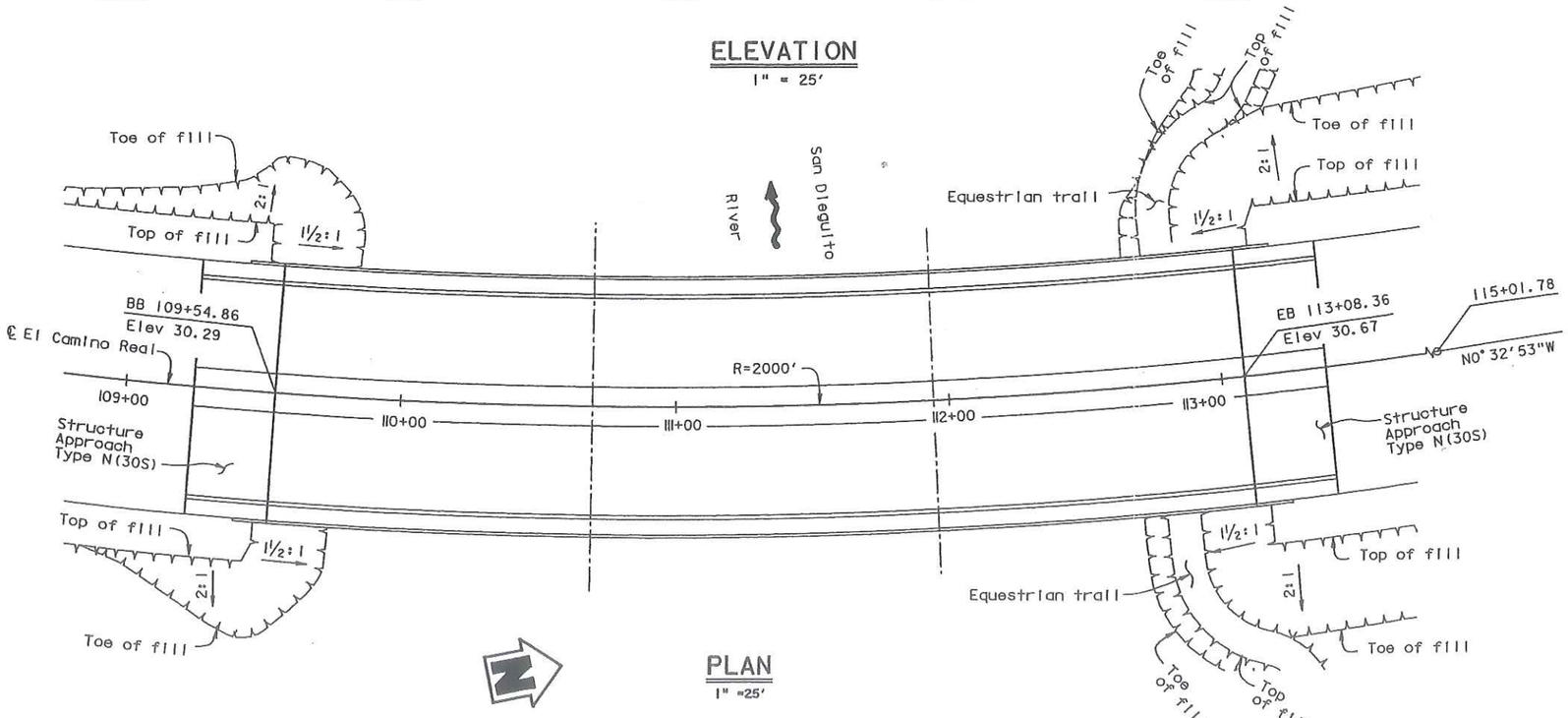
ELEVATION

1" = 25'



TYPICAL SECTION

1" = 10'



PLAN

1" =25'

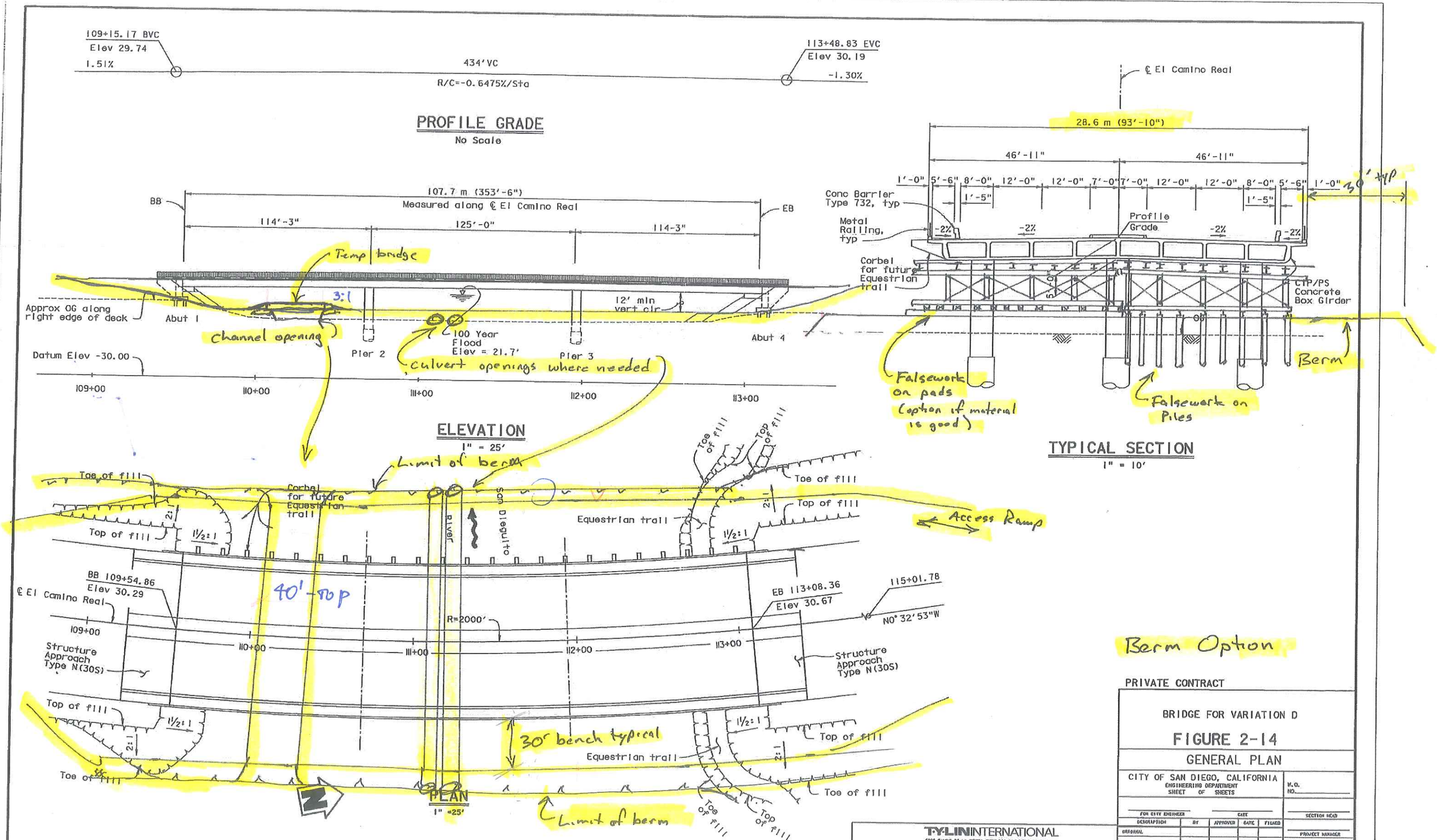
EL CAMINO REAL
ROAD /BRIDGE WIDENING

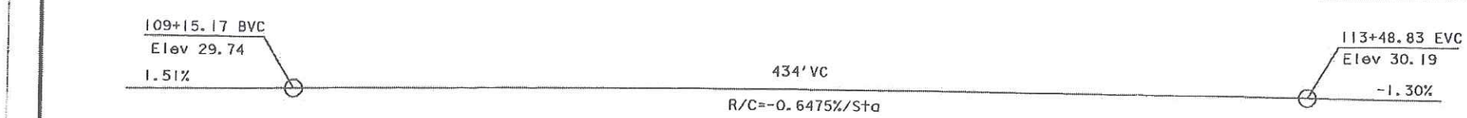
GENERAL PLAN

BRIDGE FOR EASTERN ALIGNMENT

JOB NO. 14752
DATE: APRIL 2006

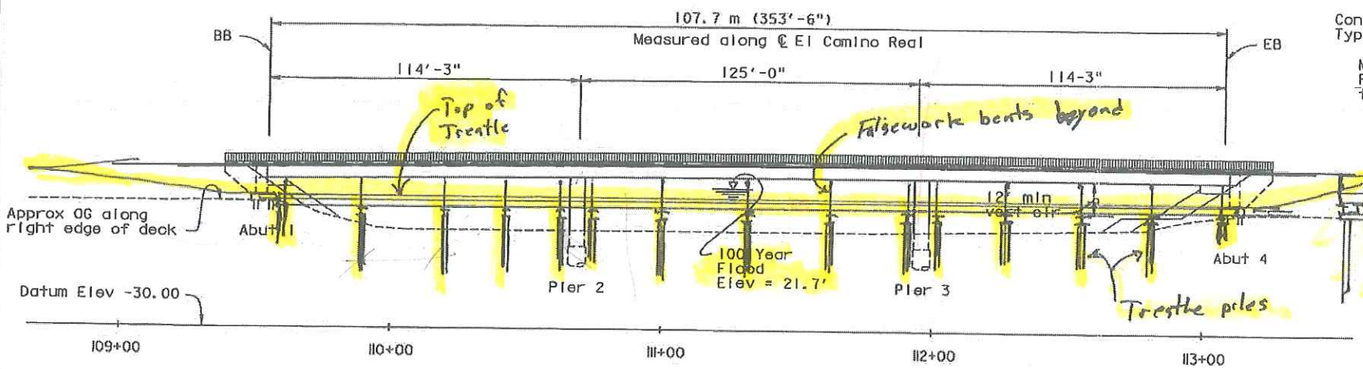
Figure
2-19


109+15.17 BVC
Elev 29.74
1.51%
434' VC
R/C=-0.6475%/Sta
113+48.83 EVC
Elev 30.19
-1.30%
PROFILE GRADE
No Scale
107.7 m (353'-6")
Measured along ℄ El Camino Real
BB
EB
114'-3"
125'-0"
114-3"
Temp bridge
3:1
Approx OG along right edge of deck
Abut 1
Channel opening
Pier 2
100 Year Flood Elev = 21.7'
Culvert openings where needed
Pier 3
12' min vert clr
Abut 4
Datum Elev -30.00
109+00
110+00
111+00
112+00
113+00
ELEVATION
1" = 25'
Limit of berm
Toe of fill
Top of fill
Corbel for future Equestrian trail
2:1
1½:1
River
San Dieguito
Equestrian trail
Access Ramp
BB 109+54.86
Elev 30.29
℄ El Camino Real
40' top
R=2000'
EB 113+08.36
Elev 30.67
115+01.78
N0° 32' 53"W
Structure Approach Type N(30S)
30' bench typical
PLAN
1" =25'
Limit of berm
℄ El Camino Real
28.6 m (93'-10")
46'-11"
46'-11"
1'-0" 5'-6" 8'-0" 12'-0" 12'-0" 7'-0" 7'-0" 12'-0" 12'-0" 8'-0" 5'-6" 1'-0"
1'-5"
30' typ
Conc Barrier Type 732, typ
Metal Railing, typ
-2%
Profile Grade
Corbel for future Equestrian trail
CIP/PS Concrete Box Girder
Berm
Falsework on pads (option if material is good)
Falsework on Piles
TYPICAL SECTION
1" = 10'
Berm Option
PRIVATE CONTRACT
BRIDGE FOR VARIATION D
FIGURE 2-14
GENERAL PLAN
CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET OF SHEETS
M.O. NO.
FOR CITY ENGINEER
DATE
DESCRIPTION BY APPROVED DATE FILMED
ORIGINAL
SECTION HEAD
PROJECT MANAGER
DESIGN ENGINEER
LAMBERT COORDINATES
CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED
TY·LIN INTERNATIONAL
ENGINEER OF WORK
PROJECT ENGINEER
DATE
Filename: d:\projects\980\081\dgn\ECL_alt_d_GP.dgn
Date:01/14/2005 Time:02:20:22 PM User:#USER#



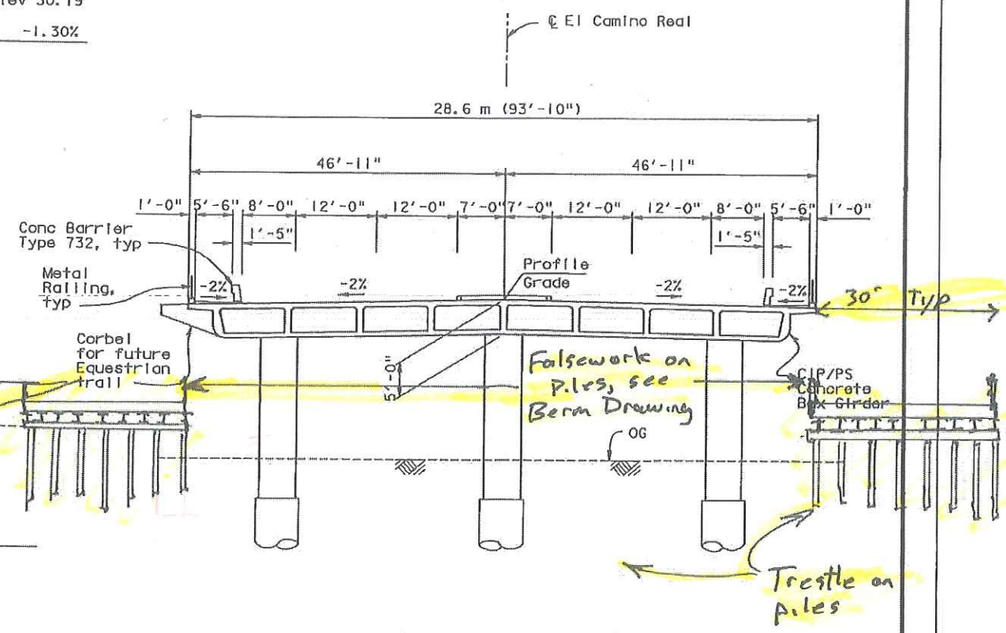
PROFILE GRADE

No Scale



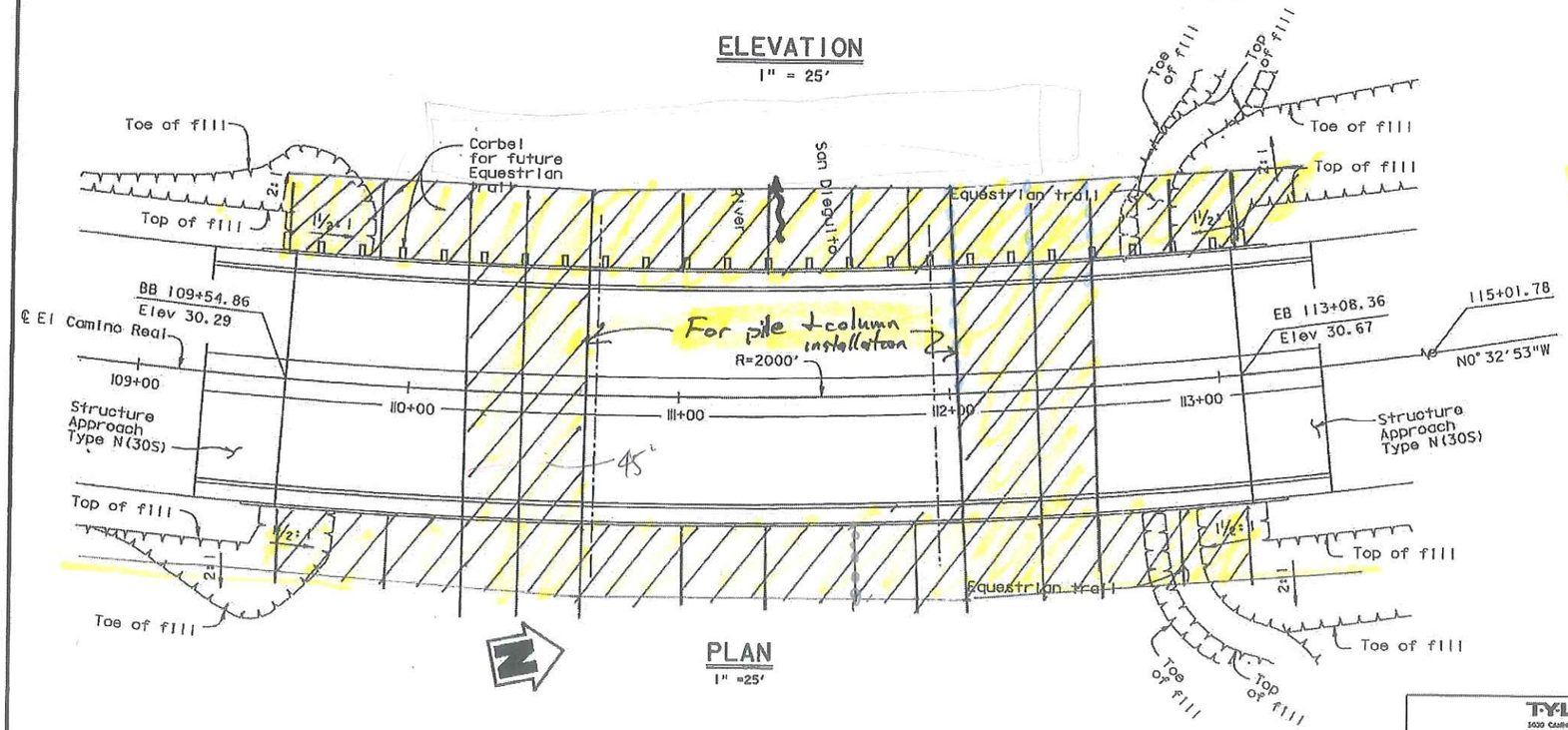
ELEVATION

1" = 25'



TYPICAL SECTION

1" = 10'



PLAN

1" =25'

▨ - Trestle area

Trestle Option

PRIVATE CONTRACT

BRIDGE FOR VARIATION D

FIGURE 2-14

GENERAL PLAN

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET OF SHEETS

W.O. NO.

FOR CITY ENGINEER — DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				

SECTION HEAD
PROJECT MANAGER
DESIGN ENGINEER
LAMBERT COORDINATES

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

TYLIN INTERNATIONAL
3020 CAMINO DE LA SIESTA, SUITE 204, SAN DIEGO, CA 92108
(619) 692-0220 www.tylin.com

ENGINEER OF WORK

PROJECT ENGINEER — REG — EXP — DATE

Filename: q:\projects\980\981\dgn\ECR_all_d_GP.dgn
Date:01/14/2005 Time:02:20:22 PM User:$USER49

MAP POCKET 1

CD of HEC-1,
HEC-RAS Models
And
PDF Version of the Report