PRELIMINARY
DRAINAGE REPORT
THE TRAILS AT CARMEL MOUNTAIN RANCH

City of San Diego, CA
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VTM PTS #652519

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1. INTRODUCTION

This preliminary drainage report has been prepared in support of a Vesting Tentative Map Entitlement submittal for the Trails at Carmel Mountain Ranch Project (the Project), which is located in the City of San Diego, California. The purpose of this report is to determine the hydrologic impact, if any, to the existing storm drain facilities or natural drainage, and to provide peak 100-year discharge values for the project.

The drainage analysis presented herein reflects a Vesting Tentative Map level-of-effort, which includes peak 100-year storm event hydrologic analyses using preliminary grades. Hydraulic analyses for inlets, pipe sizes, inverts, and HGL's will be provided during final engineering. Therefore, the purpose of this report submittal is to acquire from the City of San Diego: 1) concept approval of the proposed storm drain layout, 2) approval of the methodology used in the evaluation of the project storm drain system hydrology, and 3) identification of critical path drainage issues that need to be addressed during final engineering.

The Trails at Carmel Mountain Ranch Project is a proposed residential community located in the City of San Diego. The site is approximately 164.5 acres in size and is located east of Interstate 15, west of Pomerado Road, and between Carmel Mountain Road and Ted Williams Parkway. The Property was formerly operated as a golf course and is currently owned by PACS Enterprises, LLC. The Proposed Project includes approximately 101.2 acres of open space (including natural open space, landscaped slopes, and parkland), and a total of approximately 1200 residential units. The vicinity map is shown in Figure 1.

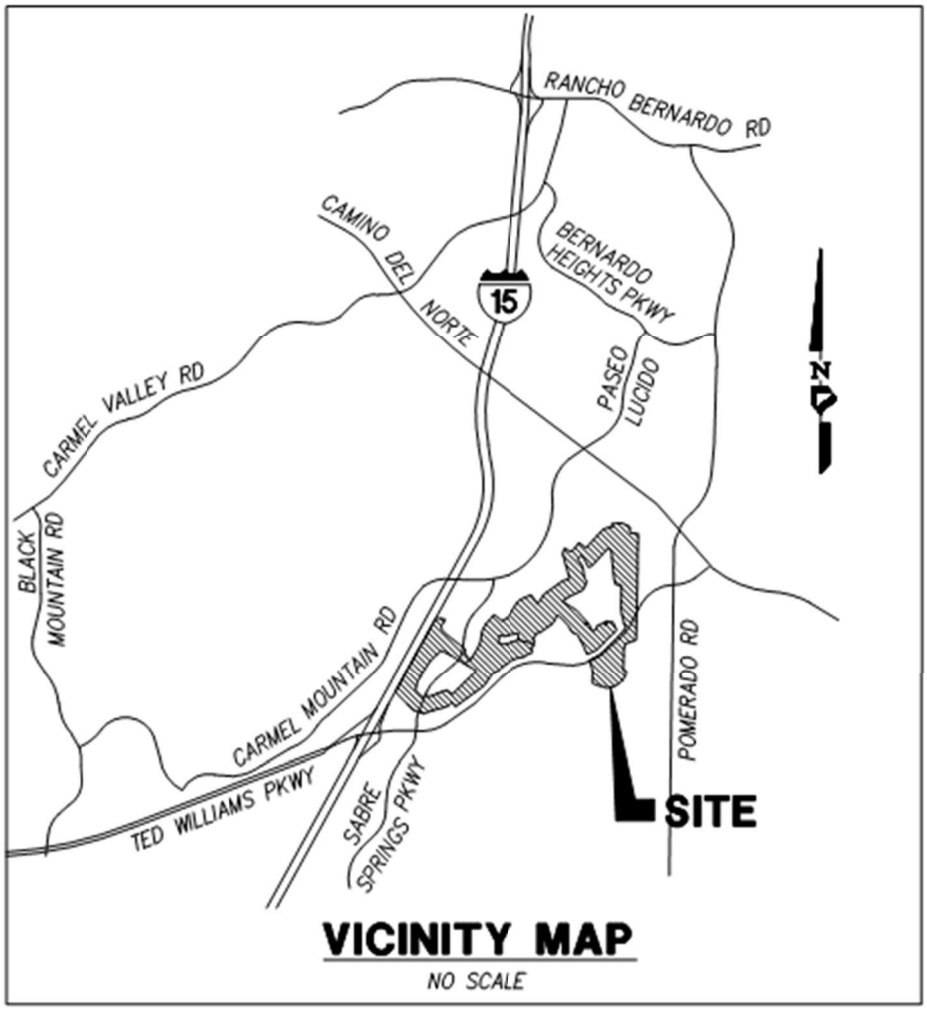

Figure 1: Project Vicinity Map

Redevelopment of the site will involve demolition of the existing golf course and regrading of the site to a usable condition compatible with future land uses. The project will not require a 401 Certification or an Army Corps of Engineers 404 permit. A blend of market rate homes, multi-family homes, and affordable housing is to be constructed including all associated landscaping, hardscaping, and utilities.

From a regional drainage perspective, the project's storm drain system will discharge into Los Penasquitos Creek. There is one FEMA special flood hazard area near the project site, see Appendix 1 for the full FEMA Firm.

Treatment of onsite storm water prior to discharging into the downstream systems will be facilitated by several biofiltration basins. For a detailed discussion of the project's stormwater quality BMPs and hydromodification management approach, refer to the Preliminary Stormwater Quality Management Plan (SWQMP) report. For the Southern California Coastal Water Research Project (SCCWRP) channel screening report for the project, refer to the SCCWRP report prepared by Chang Consultants and submitted under a separate cover. The SCCWRP report documents the channel erosivity analysis, which was used to document the low flow threshold to be used for design of the proposed hydromodification management facilities. The final post-construction BMP design will be provided during final engineering.

2. EXISTING AND PROPOSED DRAINAGE PATTERNS

2.1 Existing Drainage Patterns

The existing site is currently the location of the Carmel Mountain Ranch Golf Course and clubhouse. Generally the site drains to two different locations; the western half of the site drains west and is conveyed to outfalls in Chicarita Creek, and the eastern half of the site drains east and is conveyed to an outfall near Ted Williams Parkway on existing golf course hole 14. This water is then conveyed through natural canyons near Poway Fire Station 3 until it drains into Los Penasquitos Creek. Los Penasquitos Creek runs from east to west, and the runoff from Chicarita Creek eventually commingles with Los Penasquitos Creek at Cypress Canyon.

Because the majority of the area surrounding the project site is already developed, there is minimal run-on into the project site.

There are several existing private storm drain systems within the project site and two major public systems in the adjacent streets: a 72-inch CIP concrete storm drain per Drawing 22088-12-D on Shoal Creek Drive and a 72-inch RCP storm drain per Drawing 22745-23-D on Carmel Ridge Road. There are two additional storm drain system outlets near the project. A 48" RCP outlets into Chicarita Creek near Rancho Carmel Drive and a 54" RCP outlets into existing golf course hole 12 near Ted Williams Parkway.

Onsite, under existing conditions, the drainage from most holes generally sheetflows into a type F catch basin at the downhill side of the hole. A private storm drain attached to the type F CB then conveys water to one of the public storm drain systems listed above.

See Exhibit A in Appendix 6 for an existing conditions drainage map. Note that for some of the systems, the downstream limits of the onsite drainage areas were set to approximate the downstream limits of the proposed drainage areas, in order to compare similar areas in pre-project and post-project flows.

2.2 Proposed Drainage Patterns and Storm Drain Improvements

Redevelopment will disturb approximately 74 acres of the project site. Proposed development will not significantly alter ultimate discharge points of onsite and offsite runoff. There is minimal offsite runon onto the project site, and proposed onsite drainage patterns will mimic existing drainage patterns. Some local re-direction of runoff occurs onsite, however most flows converge in the storm drain systems that head to Chicarita Creek or Los Penasquitos Creek.

The west side of the project site (existing course holes 1, 2, 5, 6, 8, and 9) will continue to discharge to Chicarita Creek through either a 48" or 72" RCP. The east side of the site (existing holes 10, 11, 16, 17, and 18) will drain through a 72" RCP into natural canyons before converging with Los Penasquitos Creek. The proposed drainage improvements include private storm drains collecting rooftop and surface drainage and public storm drains in public roads that connect private pipes with the public storm drain system. Refer to Exhibit B in Appendix 6 for the proposed condition drainage map.

3. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS

3.1 Hydrology Criteria

Table 1 summarizes the key hydrology assumptions and criteria used for the hydrologic modeling.

Table 1: Hydrology Criteria

Existing and Proposed Hydrology:	100-year storm frequency
Soil Type:	Hydrologic Soil Group D per Drainage Design Manual requirements
Runoff coefficients:	Based on land use in sub-drainage area, from C=0.45 to 0.95. See Rational Method output.
Rainfall intensity:	Based on the City of San Diego Intensity Frequency Duration Curves presented in the 2017 City of San Diego Drainage Design Manual.

3.2 Hydrology Methodology

Hydrology calculations were completed for existing and proposed conditions accounting for all areas draining to the onsite storm drain systems. Drainage areas were defined from existing and proposed topographic maps of the area. A hydrologic analysis was completed utilizing the Rational Method, outlined in the 2017 City of San Diego Drainage Design Manual. The goal of the Rational Method analysis was to determine the peak 100-year flow rates for the storm drain pipes by developing a node link model of the contributing drainage area and applying the intensity-duration-frequency (IDF) curve to the areas. See Appendix 1 for the City of San Diego IDF curve.

The Civil-D computer program was used to obtain peak flow rates for the offsite and onsite drainage areas under existing and proposed conditions. The Civil-D Modified Rational Method Hydrology Program is a computer-aided design program where the user develops a node link model of the watershed. Developing independent node link models for each interior watershed and linking these sub-models together at confluence points creates the node link model. The intensity-duration-frequency relationships are applied to each of the drainage areas in the model to get the peak flow rates at each point of interest.

The project drainage areas were split into multiple systems representing different outfall areas of concern. Generally, each existing course hole is a separate system. For the proposed condition, Systems 1000 and 2000 represent existing course holes 1 and 2, respectively. System 1000 drains to BMP 1, which is conveyed offsite by an 18" RCP per Drawing 22838-5-D, while System 2000

drains to BMP 2, which is conveyed offsite by an 18" RCP per Drawing 22088-3-D. System 5000 represents the area on existing hole 5 to the east of Chicarita Creek and outside of the environmental buffer. This area drains to BMP 5 and is conveyed offsite via a 48" RCP per Drawing 22917-5-D. System 6000 represents existing hole 6 and some run-on area from existing hole 7. This system drains to BMP 6 and is conveyed offsite via a 36" RCP per Drawing 22917-5-D. Both Systems 5000 and 6000 are conveyed to the Chicarita Creek point of compliance "A" (POC A) via the 48" RCP. System 8000 consists of the area that is existing condition course hole 8 and some hillside run-on. This area drains to BMP 8 and is conveyed offsite by a 48" RCP via Drawing 22939-3-D. System 9000 consists of a portion of existing hole 9 and the existing clubhouse parking lot. This system drains to BMP 9. System 9500 consists of the detained flow from BMP 9 and hillside bypass area from the remaining portion of existing hole 9. Systems 1000, 2000, 8000, and 9000 are all conveyed to the Chicarita Creek POC B within a 72" RCP via Drawing 22088-3-D.

System 11000 consists of existing course holes 10 and 11. This area drains to BMP 11 and is conveyed offsite by an 18" RCP pipe per Drawing 24565-2-D. The detained flow from BMP 11 is conveyed to the open space area POC E on existing hole 12. System 16000 consists of the existing course hole 16. This area drains to BMP 16 and is conveyed offsite and to the open space area POC C by a 72" RCP via Drawing 22745-21-D. System 17000 consists of the existing hole 17 and drains to BMP 17. System 18 consists of existing course hole 18 and the existing course clubhouse. This area drains to BMP 18. System 18500 consists of the detained flow from BMPs 17 and 18, and hillside bypass area on existing hole 18. This system is conveyed offsite by an 18" RCP via Drawing 26514-11-D. It eventually heads to natural canyon POC D. Flow from the 72" RCP at POC C is also conveyed through open space area to POC D.

Four systems are being planned as potential public city parks, and are pending City approval before a site plan is created. Because of this, a Civil D model for existing and proposed conditions for each system has been created based on the preliminary park footprints and assuming a proposed runoff coefficient of 0.45. Because the parks do not yet have site plans, the imperviousness of each park is currently unknown. Therefore, it is assumed that the stormwater quality approach for each park will be deferred until site plans are developed. The parks are anticipated to be almost exclusively pervious, with very little impervious area. There, this submittal includes no BMPs or

subsequent BMP calculations for water quality and hydromodification for these systems. System 7000 consists of existing course hole 7. This area drains to Chicarita Creek via POC B. System 13000 consists of a small portion of existing course hole 13, and flows to POC F. Systems 15000 (existing course hole 15) and 17500 (a portion of existing course hole 17) both drain to POC C which outlets into natural canyons on the east side of the site. Basin and/or BMP design for these systems will accompany a future submittal once each system land use is determined. However, as with all systems, flows for proposed conditions will be less than or equal to existing condition flows.

For comparison purposes, existing condition drainage systems are named similarly to the post-project drainage systems. For example, System 800 for existing conditions corresponds to System 8000 for proposed conditions. City of San Diego Drainage Design Manual runoff coefficients, based on land use, were assigned for each drainage sub-basin within CivilD. Additionally, site plans are still in development and therefore proposed conditions "C" values are estimated based on proposed land uses.

3.3 Hydrology Results

The results of the Rational Method hydrology modeling are provided in Appendices 2 and 3 and the results are summarized in this section. Redevelopment of the project site increased the 100-year runoff from the site, but peak flows after detention are less than either backbone storm drain system capacity or existing condition peak flow at the project outfall, whichever condition governs.

For all outfalls, proposed condition unmitigated peak flows are greater than existing condition peak flows. The existing condition 100-year peak flow of Outfall A near the southwest corner of the site is 15.7 cfs, whereas the proposed condition 100-year peak flow is 23.6 cfs. For outfall B (which represents flow from Systems 1000, 2000, 8000, and 9500), the unmitigated 100-year post-project flow rates are increased from 57.7 cfs to 101.9 cfs. Outfall E that represents flow from System 11000 increases 100-year post-project flow rates from 21.7 cfs to 39.6 cfs. Finally, Outfalls C and D (which represents flow in Systems 16000 and 18500, respectively) increase 100-year post-project flow rates from 8.3 cfs to 18.0 cfs and from 19.8 cfs to 31.0 cfs, respectively. However, preliminary detention modeling was performed for a couple of representative basins, and peak flows after detention are significantly less than the existing flows and backbone flows. During

final engineering, calculations will be prepared for all basins to show the final detained flow rates out of the detention basins. The combination of basins will be sufficient to ensure the graded total peak 100-year flow rate for the proposed condition is less than the maximum allowable peak flow rate. Therefore, there will be no adverse impact from a peak flow perspective.

For the results of the analysis, see Exhibit A for the existing conditions hydrology map and Exhibit B for the proposed conditions hydrology map in Appendix 6. Refer to the appendices for the hydrology calculations. Table 2 summarizes the hydrology results and compares existing and proposed conditions.

Table 2: Summary of Hydrology Results

	PRELIMINARY TRAILS AT CARMEL MOUNTAIN RANCH HYDROLOGY SUMMARY										
	EXISTING CONDITION				BACKBONE COMPARISON		PROPOSED CONDITION				
OUTFALL OF INTEREST	SYSTEM	AREA (ac)	TC (min)	Q100 (cfs)	BackboneQ [1] Q100 (cfs)	Qallowable If no backbone Q, Qallowable=Qexisting (cfs)	SYSTEM	AREA (ac)	TC (min)	Q100 (cfs)	w/ Detention Q100 [4] (cfs)
	100	8.6	14.5	11.5	10.6		1000	8.5	6.9	24.9	7.0
	200	8.6	14.1	11.6	9.7		2000	8.6	13.0	19.0	4.0
	700	4.1	9.4	6.4	-	6.4	7000	5.3	17.6	6.5	
	750	1.2	10.7	1.8	34.1						
	800	10.8	12.9	15.0	111.3		8000	10.8	8.0	29.1	10.9
	900	10.1	12.9	16.8	4.8		9000	7.0	6.6	23.0	
To POC B	950	0.8	6.4	2.8	-	2.8	9500 [2]	9.8	32.8	5.9	5.9
Outfall	***TOTAL***	***44.2***		***65.9***	***170.5***	***9.2***	***TOTAL***	***43.0***		***85.4***	**<65.9**
	500	2.6	11.9	3.7	2.9		5000	2.6	6.4	8.5	1.0
	600	6.4	8.2	10.5	10.1		6000	7.2	14.7	15.1	4.6
To POC A	650	0.9	8.0	1.5	1.1						
Outfall	***TOTAL***	***9.9***		***15.7***	***14.1***	-	***TOTAL***	***9.8***		***23.6***	**<15.7**
To POC E	1100	14.9	12.6	21.7	15.8		11000	14.9	9.4	39.6	2.0
Outfall	***TOTAL***	***14.9***		***21.7***	***15.8***	-	***TOTAL***	***14.9***		***39.6***	**<21.7**
To POC E	1300	1.3	7.1	2.2	-	2.2	13000	1.3	7.1	2.2	
Outfall	***TOTAL***	***1.3***		***2.2***	-	***2.2***	***TOTAL***	***1.3***		***2.2***	**<2.2**
	1500	3.3	9.8	5.1	-	5.1	15000	3.3	9.8	5.1	
To POC C	1600	5.8	13.5	8.3	-	8.3	16000	5.7	7.5	18.0	2.9
Outfall	***TOTAL***	***9.1***		***13.4***	-	***13.4***	***TOTAL***	***9.0***		***23.1***	**<13.4**
							17000	5.6	9.4	15.9	
	1800	12.6	11.6	18.2	18.1		18000	4.7	7.2	15.1	
To POC D	1850	1.0	8.3	1.6	-	1.6	18500 [3]	14.9	6.0	9.8	9.8
Outfall	**TOTAL**	**13.6**		**19.8**	**18.1**	**1.6**	**TOTAL**	**14.9**		**31.0**	**<19.8**
	GRAND TOTAL	**93.0**		**138.7**	**218.5**	**26.4**	**GRAND TOTAL**	**92.9**		**204.9**	**<138.7**

Notes:

1) Backbone flowrates are based on As-Built Drawings (see Appendix 4)

2) System 9500 represents the combined routing result of Systems 9000 and hillside bypass area

3) System 18500 represents the combined routing result of Systems 17000 and 18000

4) Q100 values are shown as "<x.x" to indicate detained flow rates. During final engineering, detention calculations will be prepared to show the final detained flow rates out of the the detention basins. The combination of basins will be sufficient to ensure the grand total Q100 for the proposed condition is less than the maximum allowable Q100. The preliminary

3.4 Detention Basins

There are 10 detention basins proposed for the project site for water quality treatment and hydromodification management. From the Rational Method results for each of the systems draining to a basin, the proposed condition peak inflow hydrographs were generated with Rick Engineering Rational Method Hydrograph Generator. This program develops a synthetic hydrograph per the 2003 County Hydrology Manual using the results of the Rational Method output.

The inflow hydrograph for each system was then entered into Haestad Method's PondPack software and the detention routing was performed with the design of the detention basin and the proposed outlet structure. The 100-year hydrograph was routed through the basin to demonstrate that the post-development peak flow rate will comply with the detention requirements and that the detention facility will not overtop during the 100-year peak event. The time of concentration coinciding with the basin outflow peak was established by adding the inflow hydrograph time of concentration plus the lag time of the detained flow within the basin. This combined time of concentration accounts for the time of concentration to get to the basin and the detention time within the basin. The riser for each basin was designed to ensure that riser size, rim elevation, and orifice placement will work in conjunction to properly mitigate the increased flow rate.

Preliminary detention modeling has been completed for representative basins Basin 9 and Basin 11. A complete set of detention models will be included during final engineering. The preliminary hydrograph routing calculations and detention models are included in Appendix 5. With detention, the proposed 100-year flow rates at the project outfalls are less than the existing 100-year flow rates. During the City's review process, it was requested that a table be included that shows the proposed volume of the basins along with the minimum necessary volume for the drainage area conveyed to the basin. Table 3 on the next page shows the results for all DMAs/Basins. The table shows that the minimum detention volume of each basin is less than the proposed volume of the basin for each DMA, showing that the detention area is sufficient to detain peak Q100 flows. This table shows TM level-of-effort for the preliminary engineering submittal, during final engineering full detention calculations and results will be included in the report.

Table 3: Required DMA Detention Volume versus Proposed Basin Volume

Trails at Carmel Mountain Ranch Detention Volume Comparison					
DMA	Basin	Proposed Basin Volume (CF)	Post-Project Detention Volume Estimate (CF)	Pre-Project Runoff Volume Estimate (CF)	Minimum Detention Volume Needed From Basin (CF)
1	1	1.108	1.615	0.956	0.659
2	2	1.111	1.527	0.968	0.559
5	5	0.660	0.527	0.293	0.234
6	6	0.662	1.278	0.810	0.468
8	8	1.082	1.971	1.215	0.756
9	9	0.966	1.453	0.788	0.665
11	11	2.927	2.868	1.676	1.192
16	16	0.654	1.183	0.641	0.542
17	17	0.816	1.162	0.630	0.532
18	18	0.565	0.975	0.529	0.447

3.5 Water Quality Calculations

The water quality calculations are included, under separate cover, in the Storm Water Quality Management Plan (SWQMP) prepared by PDC. The biofiltration basins will be combined hydromodification/biofiltration/detention basins.

3.6 Hydromodification Analysis

The biofiltration basins also address hydromodification requirements, since both biofiltration basins and hydromodification basins produce similar alterations to the flow regime for the smaller, more frequent storm events. Flow duration control is the most common form of hydromodification management. The majority of all onsite water will be treated with biofiltration/hydromodification basins, which will detain the smaller, more frequent events and therefore will mitigate the post-development onsite flows. Refer to the Hydromodification report prepared by PDC for detailed calculations.

4. CONCLUSION

This drainage report supports the VTM for the proposed Trails at Carmel Mountain Ranch development. This report was prepared to ensure that project development would not adversely affect existing drainage patterns. Hydrology calculations indicate that redevelopment will result in an overall increase in flows from the site, but the total flow rates after detention is less than or equal to existing flow. Small onsite re-direction of flows does not alter general drainage patterns

as onsite storm drain systems ultimately discharge to the same location downstream of the project. As such, the project redevelopment should not have an adverse effect on local or global drainage patterns. The drainage system will be designed appropriately to accommodate the peak-flow conditions for the site. Detention calculations and pipe hydraulic calculations will be included during final engineering.

APPENDIX 1

Supporting Documentation

(IDF Curve, Runoff Coefficients, FEMA Firmette)

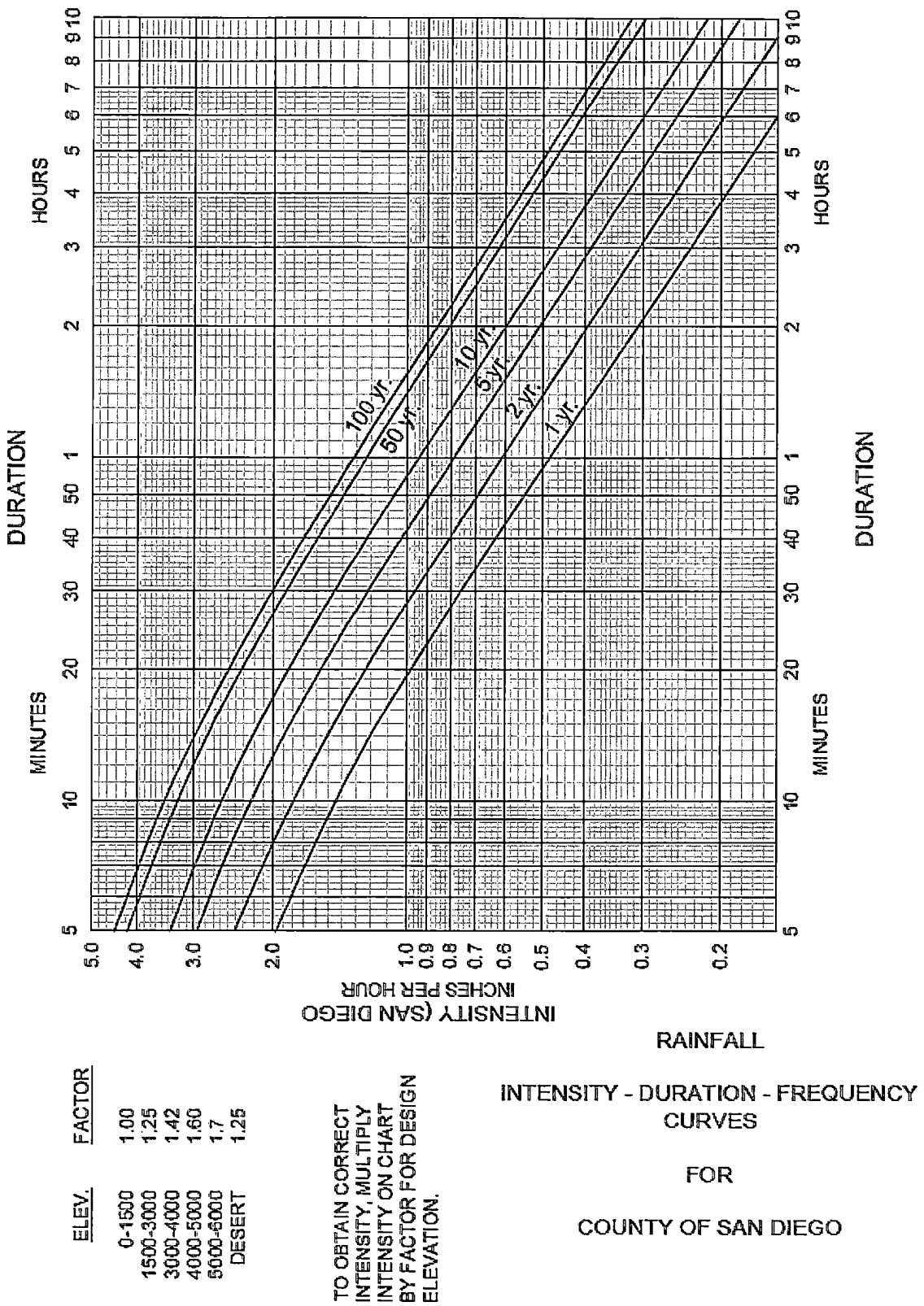

Figure A-1. Intensity-Duration-Frequency Design Chart

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

33°2'6.68"N

117°5'38.04"W

USGS The National Map: Orthoimagery. Data refreshed April, 2019.

32°58'0.86"N

117°2'34.52"W

FLOOD HAZARD INFORMATION

E FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

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SCALE

N

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: No elevation features on this FIRM
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map please see the Flood Insurance Study(FIS) Report for your community at https://msc.fema.gov

1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1352 OF 2300

Panel Contains:

COMMUNITY	NUMBER	PANEL
CITY OF SAN DIEGO CALIFORNIA	060295	1352
CITY OF POWAY CALIFORNIA	060702	1352

MAP NUMBER
06073C1352G
EFFECTIVE DATE
05/16/2012

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
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- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

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- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represe an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/6/2019 at 1:45:19 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX 2

Existing Conditions 100-year Rational Method Computer Output

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/23/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 100 - EXISTING CONDITION
100-YEAR STORM EVENT

--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =  106.000(Ft.)
Highest elevation =  801.000(Ft.)
Lowest elevation =  798.000(Ft.)
Elevation difference =    3.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     8.52 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 106.000^.5)/( 2.830^(1/3)]=   8.52
Rainfall intensity (I) =      3.577(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.290(CFS)
Total initial stream area =        0.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   798.000(Ft.)
Downstream point elevation =   733.000(Ft.)
Channel length thru subarea  =  1190.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      7.090(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      7.090(CFS)
Depth of flow =   0.225(Ft.), Average velocity =   3.308(Ft/s)
Channel flow top width =   14.016(Ft.)
Flow Velocity =    3.31(Ft/s)
Travel time  =    5.99 min.
Time of concentration =   14.51 min.
Critical depth =      0.277(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.942(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     11.188(CFS) for    8.450(Ac.)
Total runoff =     11.477(CFS)  Total area =        8.63(Ac.)
End of computations, total study area =          8.630 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 10/07/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 200 - EXISTING CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)   =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =  100.000(Ft.)
Highest elevation =  711.000(Ft.)
Lowest elevation =  706.500(Ft.)
Elevation difference =    4.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     7.09 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 100.000^.5)/( 4.500^(1/3)]=   7.09
Rainfall intensity (I) =      3.829(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.293(CFS)
Total initial stream area =        0.170(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
```



```
Upstream point elevation =   706.500(Ft.)
Downstream point elevation =   610.000(Ft.)
Channel length thru subarea  =  1500.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      7.589(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      7.589(CFS)
Depth of flow =   0.224(Ft.), Average velocity =   3.577(Ft/s)
Channel flow top width =   13.955(Ft.)
Flow Velocity =    3.58(Ft/s)
Travel time  =    6.99 min.
Time of concentration =   14.08 min.
Critical depth =      0.287(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      2.976(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     11.345(CFS) for    8.470(Ac.)
Total runoff =     11.638(CFS)  Total area =        8.64(Ac.)
End of computations, total study area =          8.640 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/19/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 500 - EXISTING CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      500.000 to Point/Station      501.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =  135.000(Ft.)
Highest elevation =  564.000(Ft.)
Lowest elevation =  561.000(Ft.)
Elevation difference =    3.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    10.42 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 135.000^.5)/( 2.222^(1/3)]=  10.42
Rainfall intensity (I) =      3.325(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.344(CFS)
Total initial stream area =        0.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   561.000(Ft.)
Downstream point elevation =   540.000(Ft.)
Channel length thru subarea  =   250.000(Ft.)
Channel base width       =     5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      2.132(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =     2.000(Ft.)
Flow(q) thru subarea =      2.132(CFS)
Depth of flow =   0.109(Ft.), Average velocity =   2.738(Ft/s)
Channel flow top width =     9.343(Ft.)
Flow Velocity =    2.74(Ft/s)
Travel time  =    1.52 min.
Time of concentration =   11.94 min.
Critical depth =      0.146(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.164(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      3.403(CFS) for    2.390(Ac.)
Total runoff =      3.747(CFS)  Total area =        2.62(Ac.)
End of computations, total study area =          2.620 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/25/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 600 - EXISTING CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      600.000 to Point/Station      601.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   83.000(Ft.)
Highest elevation =  641.000(Ft.)
Lowest elevation =  612.000(Ft.)
Elevation difference =   29.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.26 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  83.000^.5)/(  34.940^(1/3)]=   3.26
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.237(CFS)
Total initial stream area =        0.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** IMPROVED CHANNEL TRAVEL TIME ****
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```
------------------------------------------------------------------------------
Upstream point elevation =   612.000(Ft.)
Downstream point elevation =   566.000(Ft.)
Channel length thru subarea  =   615.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      4.859(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      4.859(CFS)
Depth of flow =   0.172(Ft.), Average velocity =   3.338(Ft/s)
Channel flow top width =   11.893(Ft.)
Flow Velocity =    3.34(Ft/s)
Travel time  =    3.07 min.
Time of concentration =    8.07 min.
Critical depth =      0.229(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.648(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      7.682(CFS) for    4.680(Ac.)
Total runoff =      7.919(CFS)  Total area =        4.80(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      602.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration =    8.07 min.
Rainfall intensity =      3.648(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.707(CFS) for    1.040(Ac.)
Total runoff =      9.626(CFS)  Total area =        5.84(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      603.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   566.000(Ft.)
Downstream point/station elevation =   550.000(Ft.)
Pipe length  =   116.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     9.626(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     9.626(CFS)
Normal flow depth in pipe =    8.41(In.)
Flow top width inside pipe =   10.99(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.36(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =     8.19 min.
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      603.000
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration =     8.19 min.
Rainfall intensity =      3.628(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.865(CFS) for    0.530(Ac.)
Total runoff =     10.492(CFS)  Total area =        6.37(Ac.)
End of computations, total study area =          6.370 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/25/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 650 - EXISTING CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      650.000 to Point/Station      651.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   86.000(Ft.)
Highest elevation =  595.000(Ft.)
Lowest elevation =  576.000(Ft.)
Elevation difference =   19.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.87 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  86.000^.5)/(  22.093^(1/3)]=   3.87
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.435(CFS)
Total initial stream area =        0.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      651.000 to Point/Station      652.000
**** IMPROVED CHANNEL TRAVEL TIME ****
```



```
--------------------------------------------------------------------------
Upstream point elevation =   576.000(Ft.)
Downstream point elevation =   563.000(Ft.)
Channel length thru subarea  =   320.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      1.076(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      1.076(CFS)
Depth of flow =   0.091(Ft.), Average velocity =   1.728(Ft/s)
Channel flow top width =    8.651(Ft.)
Flow Velocity =    1.73(Ft/s)
Travel time  =    3.09 min.
Time of concentration =    8.09 min.
Critical depth =      0.099(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.645(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.066(CFS) for    0.650(Ac.)
Total runoff =      1.501(CFS)  Total area =        0.87(Ac.)
End of computations, total study area =          0.870 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study         Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 700 - EXISTING CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      700.000 to Point/Station      701.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   64.000(Ft.)
Highest elevation =  682.500(Ft.)
Lowest elevation =  675.000(Ft.)
Elevation difference =    7.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.12 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  64.000^.5)/(  11.719^(1/3)]=   4.12
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.454(CFS)
Total initial stream area =       0.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      702.000
**** IMPROVED CHANNEL TRAVEL TIME ****
```



```
--------------------------------------------------------------------------
Upstream point elevation =   675.000(Ft.)
Downstream point elevation =   640.000(Ft.)
Channel length thru subarea  =   705.000(Ft.)
Channel base width       =     5.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      4.227(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =     2.000(Ft.)
Flow(q) thru subarea =      4.227(CFS)
Depth of flow =   0.172(Ft.), Average velocity =   2.647(Ft/s)
Channel flow top width =   13.590(Ft.)
Flow Velocity =    2.65(Ft/s)
Travel time  =    4.44 min.
Time of concentration =    9.44 min.
Critical depth =      0.203(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.445(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      5.922(CFS) for    3.820(Ac.)
Total runoff =      6.377(CFS)  Total area =        4.05(Ac.)
End of computations, total study area =          4.050 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
       Rational Hydrology Study        Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 750 - EXISTING CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      750.000 to Point/Station      751.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =  120.000(Ft.)
Highest elevation =  657.000(Ft.)
Lowest elevation =  653.000(Ft.)
Elevation difference =    4.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     8.58 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 120.000^.5)/( 3.333^(1/3)]=   8.58
Rainfall intensity (I) =      3.567(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.385(CFS)
Total initial stream area =        0.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      751.000 to Point/Station      752.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   653.000(Ft.)
Downstream point elevation =   633.000(Ft.)
Channel length thru subarea  =   270.000(Ft.)
Channel base width       =     5.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      1.156(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =     2.000(Ft.)
Flow(q) thru subarea =      1.156(CFS)
Depth of flow =   0.079(Ft.), Average velocity =   2.100(Ft/s)
Channel flow top width =    8.946(Ft.)
Flow Velocity =    2.10(Ft/s)
Travel time  =    2.14 min.
Time of concentration =   10.72 min.
Critical depth =      0.100(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.290(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.421(CFS) for    0.960(Ac.)
Total runoff =      1.807(CFS)  Total area =        1.20(Ac.)
End of computations, total study area =          1.200 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/24/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 800 - EXISTING CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      800.000 to Point/Station      801.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =  120.000(Ft.)
Highest elevation =  727.000(Ft.)
Lowest elevation =  713.500(Ft.)
Elevation difference =   13.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     5.72 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 120.000^.5)/(11.250^(1/3)]=   5.72
Rainfall intensity (I) =      4.158(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.243(CFS)
Total initial stream area =        0.130(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      801.000 to Point/Station      802.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   713.500(Ft.)
Downstream point elevation =   630.000(Ft.)
Channel length thru subarea  =  1560.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =     10.225(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     10.225(CFS)
Depth of flow =   0.271(Ft.), Average velocity =   3.626(Ft/s)
Channel flow top width =   15.830(Ft.)
Flow Velocity =    3.63(Ft/s)
Travel time  =    7.17 min.
Time of concentration =   12.89 min.
Critical depth =      0.336(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.076(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     14.770(CFS) for   10.670(Ac.)
Total runoff =     15.013(CFS)  Total area =       10.80(Ac.)
End of computations, total study area =          10.800 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/24/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 900 - EXISTING CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   85.000(Ft.)
Highest elevation =  809.000(Ft.)
Lowest elevation =  804.500(Ft.)
Elevation difference =    4.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.19 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  85.000^.5)/( 5.294^(1/3)]=   6.19
Rainfall intensity (I) =      4.032(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.218(CFS)
Total initial stream area =        0.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      902.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____________________________________________________________________________
```



```
Upstream point elevation =   804.500(Ft.)
Downstream point elevation =   733.000(Ft.)
Channel length thru subarea  =  1400.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      9.289(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      9.289(CFS)
Depth of flow =   0.261(Ft.), Average velocity =   3.474(Ft/s)
Channel flow top width =   15.458(Ft.)
Flow Velocity =    3.47(Ft/s)
Travel time  =    6.72 min.
Time of concentration =   12.91 min.
Critical depth =      0.318(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.540 given for subarea
Rainfall intensity =      3.075(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.540
Subarea runoff =     16.603(CFS) for   10.000(Ac.)
Total runoff =     16.821(CFS)  Total area =       10.12(Ac.)
End of computations, total study area =          10.120 (Ac.)
```

Table 1: S900E100 Area Weighted Rational Method "C" Coefficient

Land Use Type	Area (SF)	% of DMA	Land Use "C" Coefficient	Area-Weighted "C" Coefficient
Parking Lot	102627	23.3%	0.85	**0.543**
Pervious Area	338409	76.7%	0.45	

Total Area (SF)=	441036
Total Area (AC)=	10.1

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/24/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 950 - EXISTING CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)   =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      950.000 to Point/Station      951.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                          ]
Note: user entry of impervious value, Ap = 0.850
Initial subarea flow distance  =  120.000(Ft.)
Highest elevation =  808.000(Ft.)
Lowest elevation =  802.000(Ft.)
Elevation difference =    6.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.27 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.9031)*( 120.000^.5)/(   5.000^(1/3)]=   2.27
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.903
Subarea runoff =      0.713(CFS)
Total initial stream area =        0.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      951.000 to Point/Station      952.000
```



```
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
--------------------------------------------------------------------------
Top of street segment elevation =   802.000(Ft.)
End of street segment elevation =   789.000(Ft.)
Length of street segment   =   255.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  10.000(Ft.)
Distance from crown to crossfall grade break  =   9.990(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  20.000(Ft.)
Slope from curb to property line (v/hz) =   0.000
Gutter width =   0.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      1.962(CFS)
Depth of flow =   0.279(Ft.), Average velocity =   3.115(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   5.611(Ft.)
Flow velocity =   3.12(Ft/s)
Travel time =    1.36 min.     TC =    6.36  min.
 Adding area flow to street
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                          ]
Rainfall intensity =      3.988(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      2.136(CFS) for    0.630(Ac.)
Total runoff =      2.849(CFS)  Total area =        0.81(Ac.)
Street flow at end of street =      2.849(CFS)
Half street flow at end of street =      1.425(CFS)
Depth of flow =   0.296(Ft.), Average velocity =   3.432(Ft/s)
Flow width (from curb towards crown)=   6.443(Ft.)
End of computations, total study area =           0.810 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/27/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 1100 - EXISTING CONDITION
100-YEAR STORM EVENT
EXISTING CONDITION
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1000.000 to Point/Station     1001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =  155.000(Ft.)
Highest elevation =  784.000(Ft.)
Lowest elevation =  757.000(Ft.)
Elevation difference =   27.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     5.62 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 155.000^.5)/(17.419^(1/3)]=   5.62
Rainfall intensity (I) =      4.187(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.678(CFS)
Total initial stream area =        0.360(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   757.000(Ft.)
```



```
Downstream point elevation =   641.000(Ft.)
Channel length thru subarea  =  1645.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =     11.654(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     11.654(CFS)
Depth of flow =   0.258(Ft.), Average velocity =   3.953(Ft/s)
Channel flow top width =   17.883(Ft.)
Flow Velocity =    3.95(Ft/s)
Travel time  =    6.94 min.
Time of concentration =   12.55 min.
Critical depth =      0.336(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.106(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =     16.284(CFS) for   11.650(Ac.)
Total runoff =     16.963(CFS)  Total area =       12.01(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     12.010(Ac.)
Runoff from this stream =     16.963(CFS)
Time of concentration =   12.55 min.
Rainfall intensity =     3.106(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1004.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =  100.000(Ft.)
Highest elevation =  679.000(Ft.)
Lowest elevation =  663.000(Ft.)
Elevation difference =   16.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.64 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 100.000^.5)/(  16.000^(1/3)]=   4.64
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.257(CFS)
Total initial stream area =        0.130(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1005.000
**** IMPROVED CHANNEL TRAVEL TIME ****

------------------------------------------------------------------------
Upstream point elevation =   663.000(Ft.)
Downstream point elevation =   654.000(Ft.)
Channel length thru subarea  =   380.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      3.012(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      3.012(CFS)
Depth of flow =   0.181(Ft.), Average velocity =   1.930(Ft/s)
Channel flow top width =   12.241(Ft.)
Flow Velocity =    1.93(Ft/s)
Travel time  =    3.28 min.
Time of concentration =    8.28 min.
Critical depth =      0.176(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.613(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      4.537(CFS) for    2.790(Ac.)
Total runoff =      4.793(CFS)  Total area =        2.92(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1002.000
**** IMPROVED CHANNEL TRAVEL TIME ****

------------------------------------------------------------------------
Upstream point elevation =   654.000(Ft.)
Downstream point elevation =   642.000(Ft.)
Channel length thru subarea  =   480.000(Ft.)
Channel base width       =    4.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      4.793(CFS)
Depth of flow =   0.240(Ft.), Average velocity =   2.264(Ft/s)
Channel flow top width =   13.617(Ft.)
Flow Velocity =    2.26(Ft/s)
Travel time  =    3.53 min.
Time of concentration =   11.82 min.
Critical depth =      0.242(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1002.000
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.920(Ac.)
Runoff from this stream =      4.793(CFS)
Time of concentration =   11.82 min.
Rainfall intensity =     3.176(In/Hr)
```



```
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       16.963     12.55                  3.106
2        4.793     11.82                  3.176
Qmax(1) =
           1.000 *    1.000 *    16.963) +
           0.978 *    1.000 *     4.793) + =      21.651
Qmax(2) =
           1.000 *    0.941 *    16.963) +
           1.000 *    1.000 *     4.793) + =      20.758

Total of 2 streams to confluence:
Flow rates before confluence point:
      16.963       4.793
Maximum flow rates at confluence using above data:
      21.651      20.758
Area of streams before confluence:
      12.010       2.920
Results of confluence:
Total flow rate =     21.651(CFS)
Time of concentration =    12.555 min.
Effective stream area after confluence =     14.930(Ac.)
End of computations, total study area =          14.930 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
       Rational Hydrology Study        Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 1300 - EXISTING CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1300.000 to Point/Station     1301.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   81.000(Ft.)
Highest elevation =  586.000(Ft.)
Lowest elevation =  579.000(Ft.)
Elevation difference =    7.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     5.13 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  81.000^.5)/( 8.642^(1/3)]=   5.13
Rainfall intensity (I) =      4.343(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.371(CFS)
Total initial stream area =        0.190(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1301.000 to Point/Station     1302.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   579.000(Ft.)
Downstream point elevation =   577.000(Ft.)
Channel length thru subarea  =   143.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      1.427(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      1.427(CFS)
Depth of flow =   0.137(Ft.), Average velocity =   1.239(Ft/s)
Channel flow top width =   11.840(Ft.)
Flow Velocity =    1.24(Ft/s)
Travel time  =    1.92 min.
Time of concentration =    7.06 min.
Critical depth =      0.112(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.835(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.864(CFS) for    1.080(Ac.)
Total runoff =      2.235(CFS)  Total area =        1.27(Ac.)
End of computations, total study area =          1.270 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 1500 - EXISTING CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1500.000 to Point/Station     1501.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   77.000(Ft.)
Highest elevation =  647.000(Ft.)
Lowest elevation =  644.000(Ft.)
Elevation difference =    3.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.52 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  77.000^.5)/( 3.896^(1/3)]=   6.52
Rainfall intensity (I) =      3.951(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.427(CFS)
Total initial stream area =        0.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1501.000 to Point/Station     1502.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
```



```
Upstream point elevation =   644.000(Ft.)
Downstream point elevation =   620.000(Ft.)
Channel length thru subarea  =   480.000(Ft.)
Channel base width       =     5.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      3.129(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =     2.000(Ft.)
Flow(q) thru subarea =      3.129(CFS)
Depth of flow =   0.148(Ft.), Average velocity =   2.442(Ft/s)
Channel flow top width =   12.375(Ft.)
Flow Velocity =    2.44(Ft/s)
Travel time  =    3.28 min.
Time of concentration =     9.80 min.
Critical depth =      0.172(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.399(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      4.649(CFS) for    3.040(Ac.)
Total runoff =      5.076(CFS)  Total area =        3.28(Ac.)
End of computations, total study area =           3.280 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/17/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 1600 - EXISTING CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1600.000 to Point/Station     1601.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =  105.000(Ft.)
Highest elevation =  667.000(Ft.)
Lowest elevation =  659.000(Ft.)
Elevation difference =    8.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.09 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 105.000^.5)/( 7.619^(1/3)]=   6.09
Rainfall intensity (I) =      4.056(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.602(CFS)
Total initial stream area =        0.330(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1601.000 to Point/Station     1602.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   659.000(Ft.)
Downstream point elevation =   652.600(Ft.)
Channel length thru subarea  =   190.000(Ft.)
Channel base width       =     5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      2.601(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =     2.000(Ft.)
Flow(q) thru subarea =      2.601(CFS)
Depth of flow =   0.153(Ft.), Average velocity =   2.101(Ft/s)
Channel flow top width =   11.138(Ft.)
Flow Velocity =    2.10(Ft/s)
Travel time  =    1.51 min.
Time of concentration =     7.60 min.
Critical depth =      0.162(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.730(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      3.676(CFS) for    2.190(Ac.)
Total runoff =      4.278(CFS)  Total area =        2.52(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1602.000 to Point/Station     1603.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
Upstream point elevation =   652.600(Ft.)
Downstream point elevation =   620.000(Ft.)
Channel length thru subarea  =   670.000(Ft.)
Channel base width       =     4.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Manning's 'N'    = 0.030
Maximum depth of channel  =     2.000(Ft.)
Flow(q) thru subarea =      4.278(CFS)
Depth of flow =   0.243(Ft.), Average velocity =   3.917(Ft/s)
Channel flow top width =    4.974(Ft.)
Flow Velocity =    3.92(Ft/s)
Travel time  =    2.85 min.
Time of concentration =   10.45 min.
Critical depth =      0.313(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1602.000 to Point/Station     1603.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.520(Ac.)
Runoff from this stream =      4.278(CFS)
Time of concentration =   10.45 min.
Rainfall intensity =     3.321(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1604.000 to Point/Station     1605.000
```

```
**** INITIAL AREA EVALUATION ****
-------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   96.000(Ft.)
Highest elevation =  659.000(Ft.)
Lowest elevation =  657.500(Ft.)
Elevation difference =    1.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.88 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  96.000^.5)/( 1.563^(1/3)]=   9.88
Rainfall intensity (I) =      3.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.397(CFS)
Total initial stream area =        0.260(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1605.000 to Point/Station     1606.000
**** IMPROVED CHANNEL TRAVEL TIME ****
-------------------------------------------------------------------------
Upstream point elevation =   657.500(Ft.)
Downstream point elevation =   634.000(Ft.)
Channel length thru subarea  =   500.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      2.661(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      2.661(CFS)
Depth of flow =   0.138(Ft.), Average velocity =   2.282(Ft/s)
Channel flow top width =   11.901(Ft.)
Flow Velocity =    2.28(Ft/s)
Travel time  =    3.65 min.
Time of concentration =   13.53 min.
Critical depth =      0.158(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.021(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      4.038(CFS) for    2.970(Ac.)
Total runoff =      4.434(CFS)  Total area =        3.23(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1606.000 to Point/Station     1603.000
**** CONFLUENCE OF MINOR STREAMS ****
-------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.230(Ac.)
Runoff from this stream =      4.434(CFS)
Time of concentration =   13.53 min.
Rainfall intensity =     3.021(In/Hr)
```



```
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        4.278     10.45                 3.321
2        4.434     13.53                 3.021
Qmax(1) =
           1.000 *    1.000 *     4.278) +
           1.000 *    0.772 *     4.434) + =       7.703
Qmax(2) =
           0.910 *    1.000 *     4.278) +
           1.000 *    1.000 *     4.434) + =       8.326

Total of 2 streams to confluence:
Flow rates before confluence point:
      4.278       4.434
Maximum flow rates at confluence using above data:
       7.703       8.326
Area of streams before confluence:
       2.520       3.230
Results of confluence:
Total flow rate =      8.326(CFS)
Time of concentration =    13.531 min.
Effective stream area after confluence =      5.750(Ac.)
End of computations, total study area =          5.750 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 1750 - EXISTING CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1750.000 to Point/Station     1751.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   90.000(Ft.)
Highest elevation =  701.000(Ft.)
Lowest elevation =  700.000(Ft.)
Elevation difference =    1.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    10.72 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  90.000^.5)/( 1.111^(1/3)]=  10.72
Rainfall intensity (I) =      3.291(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.237(CFS)
Total initial stream area =        0.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1751.000 to Point/Station     1752.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   700.000(Ft.)
Downstream point elevation =   693.000(Ft.)
Channel length thru subarea  =    68.000(Ft.)
Channel base width       =    4.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      0.437(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      0.437(CFS)
Depth of flow =   0.047(Ft.), Average velocity =   1.802(Ft/s)
Channel flow top width =    6.343(Ft.)
Flow Velocity =    1.80(Ft/s)
Travel time  =    0.63 min.
Time of concentration =   11.35 min.
Critical depth =      0.063(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.223(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.392(CFS) for    0.270(Ac.)
Total runoff =      0.629(CFS)  Total area =        0.43(Ac.)
End of computations, total study area =          0.430 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 04/01/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 1800 - EXISTING CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1800.000 to Point/Station     1801.000
**** INITIAL AREA EVALUATION ****
__________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   80.000(Ft.)
Highest elevation =  805.000(Ft.)
Lowest elevation =  801.000(Ft.)
Elevation difference =    4.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.12 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  80.000^.5)/( 5.000^(1/3)]=   6.12
Rainfall intensity (I) =      4.049(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.401(CFS)
Total initial stream area =        0.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1801.000 to Point/Station     1802.000
**** IMPROVED CHANNEL TRAVEL TIME ****
__________________________________________________________________________
```



```
Upstream point elevation =   801.000(Ft.)
Downstream point elevation =   680.000(Ft.)
Channel length thru subarea  =  1300.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      6.615(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      6.615(CFS)
Depth of flow =   0.191(Ft.), Average velocity =   3.937(Ft/s)
Channel flow top width =   12.626(Ft.)
Flow Velocity =    3.94(Ft/s)
Travel time  =    5.50 min.
Time of concentration =   11.62 min.
Critical depth =      0.268(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.195(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      9.806(CFS) for    6.820(Ac.)
Total runoff =     10.207(CFS)  Total area =        7.04(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1803.000 to Point/Station     1802.000
**** SUBAREA FLOW ADDITION ****
__________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration =    11.62 min.
Rainfall intensity =      3.195(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      8.009(CFS) for    5.570(Ac.)
Total runoff =     18.215(CFS)  Total area =       12.61(Ac.)
End of computations, total study area =          12.610 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/24/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 1850 - EXISTING CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  -  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1850.000 to Point/Station     1851.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   86.000(Ft.)
Highest elevation =  794.000(Ft.)
Lowest elevation =  791.000(Ft.)
Elevation difference =    3.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     7.15 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  86.000^.5)/( 3.488^(1/3)]=   7.15
Rainfall intensity (I) =      3.815(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.206(CFS)
Total initial stream area =        0.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1851.000 to Point/Station     1852.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------------
```



```
Upstream point elevation =   791.000(Ft.)
Downstream point elevation =   781.000(Ft.)
Channel length thru subarea  =   135.000(Ft.)
Channel base width       =     5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =       0.918(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =     2.000(Ft.)
Flow(q) thru subarea =       0.918(CFS)
Depth of flow =   0.071(Ft.), Average velocity =   2.020(Ft/s)
Channel flow top width =     7.834(Ft.)
Flow Velocity =    2.02(Ft/s)
Travel time  =    1.11 min.
Time of concentration =     8.27 min.
Critical depth =      0.090(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.616(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.350(CFS) for    0.830(Ac.)
Total runoff =      1.556(CFS)  Total area =        0.95(Ac.)
End of computations, total study area =           0.950 (Ac.)
```

APPENDIX 3

Proposed Conditions 100-year Rational Method Computer Output

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
       Rational Hydrology Study        Date: 10/01/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 1000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1000.000 to Point/Station     1001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.850 given for subarea
Initial subarea flow distance  =   83.000(Ft.)
Highest elevation =  792.000(Ft.)
Lowest elevation =  776.500(Ft.)
Elevation difference =   15.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     1.55 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  83.000^.5)/(  18.675^(1/3)]=   1.55
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.672(CFS)
Total initial stream area =        0.180(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1003.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   776.500(Ft.)
Downstream point elevation =   730.000(Ft.)
Channel length thru subarea  =   770.000(Ft.)
```



```
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =     12.460(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     12.460(CFS)
Depth of flow =   0.206(Ft.), Average velocity =   6.623(Ft/s)
Channel flow top width =   13.248(Ft.)
Flow Velocity =    6.62(Ft/s)
Travel time  =    1.94 min.
Time of concentration =    6.94 min.
Critical depth =      0.367(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.859(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     20.732(CFS) for    6.320(Ac.)
Total runoff =     21.404(CFS)  Total area =        6.50(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1002.000 to Point/Station     1003.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Time of concentration =     6.94 min.
Rainfall intensity =      3.859(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      2.622(CFS) for    1.510(Ac.)
Total runoff =     24.026(CFS)  Total area =        8.01(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1003.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Time of concentration =     6.94 min.
Rainfall intensity =      3.859(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.834(CFS) for    0.480(Ac.)
Total runoff =     24.860(CFS)  Total area =        8.49(Ac.)
End of computations, total study area =          8.490 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 10/07/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 2000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2000.000 to Point/Station     2001.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
User specified 'C' value of 0.450 given for subarea
Initial subarea flow distance  =  100.000(Ft.)
Highest elevation =  711.000(Ft.)
Lowest elevation =  706.500(Ft.)
Elevation difference =    4.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     7.09 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 100.000^.5)/( 4.500^(1/3)]=   7.09
Rainfall intensity (I) =      3.829(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.293(CFS)
Total initial stream area =        0.170(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2001.000 to Point/Station     2002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   706.500(Ft.)
Downstream point elevation =   690.000(Ft.)
Channel length thru subarea  =   470.000(Ft.)
Channel base width      =    5.000(Ft.)
```



```
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      2.498(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      2.498(CFS)
Depth of flow =   0.149(Ft.), Average velocity =   2.108(Ft/s)
Channel flow top width =   10.947(Ft.)
Flow Velocity =    2.11(Ft/s)
Travel time  =    3.72 min.
Time of concentration =   10.80 min.
Critical depth =      0.158(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.450 given for subarea
Rainfall intensity =      3.281(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      3.780(CFS) for    2.560(Ac.)
Total runoff =      4.073(CFS)  Total area =        2.73(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2002.000 to Point/Station     2003.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________________
Upstream point elevation =   690.000(Ft.)
Downstream point elevation =   620.000(Ft.)
Channel length thru subarea  =   855.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      8.198(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      8.198(CFS)
Depth of flow =   0.154(Ft.), Average velocity =   6.571(Ft/s)
Channel flow top width =   11.172(Ft.)
Flow Velocity =    6.57(Ft/s)
Travel time  =    2.17 min.
Time of concentration =   12.97 min.
Critical depth =      0.299(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.069(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     14.425(CFS) for    5.530(Ac.)
Total runoff =     18.498(CFS)  Total area =        8.26(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2003.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
User specified 'C' value of 0.450 given for subarea
Time of concentration =    12.97 min.
Rainfall intensity =      3.069(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.525(CFS) for    0.380(Ac.)
Total runoff =     19.023(CFS)  Total area =        8.64(Ac.)
End of computations, total study area =          8.640 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/19/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 5000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     5000.000 to Point/Station     5001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.850 given for subarea
Initial subarea flow distance  =   88.000(Ft.)
Highest elevation =  564.000(Ft.)
Lowest elevation =  560.000(Ft.)
Elevation difference =    4.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.55 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  88.000^.5)/(   4.545^(1/3)]=   2.55
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.858(CFS)
Total initial stream area =        0.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     5001.000 to Point/Station     5002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   560.000(Ft.)
Downstream point elevation =   550.000(Ft.)
Channel length thru subarea  =   335.000(Ft.)
```



```
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      4.794(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      4.794(CFS)
Depth of flow =   0.152(Ft.), Average velocity =   3.931(Ft/s)
Channel flow top width =   11.070(Ft.)
Flow Velocity =    3.93(Ft/s)
Travel time  =    1.42 min.
Time of concentration =    6.42 min.
Critical depth =      0.227(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.975(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =      7.129(CFS) for    2.110(Ac.)
Total runoff =      7.987(CFS)  Total area =        2.34(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     5002.000 to Point/Station     5002.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Time of concentration =     6.42 min.
Rainfall intensity =      3.975(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.501(CFS) for    0.280(Ac.)
Total runoff =      8.488(CFS)  Total area =        2.62(Ac.)
End of computations, total study area =          2.620 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 04/06/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 6000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     6000.000 to Point/Station     6001.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
User specified 'C' value of 0.450 given for subarea
Initial subarea flow distance  =  110.000(Ft.)
Highest elevation =  677.000(Ft.)
Lowest elevation =  675.000(Ft.)
Elevation difference =    2.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    10.05 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 110.000^.5)/( 1.818^(1/3)]=  10.05
Rainfall intensity (I) =      3.368(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.303(CFS)
Total initial stream area =        0.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     6001.000 to Point/Station     6002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   675.000(Ft.)
Downstream point elevation =   615.000(Ft.)
Channel length thru subarea  =   505.000(Ft.)
Channel base width      =    5.000(Ft.)
```



```
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      1.887(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      1.887(CFS)
Depth of flow =   0.093(Ft.), Average velocity =   2.977(Ft/s)
Channel flow top width =    8.701(Ft.)
Flow Velocity =    2.98(Ft/s)
Travel time  =    2.83 min.
Time of concentration =   12.88 min.
Critical depth =      0.136(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.450 given for subarea
Rainfall intensity =      3.077(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      2.894(CFS) for    2.090(Ac.)
Total runoff =      3.197(CFS)  Total area =        2.29(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     6002.000 to Point/Station     6003.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   615.000(Ft.)
Downstream point elevation =   560.000(Ft.)
Channel length thru subarea  =   670.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      6.450(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      6.450(CFS)
Depth of flow =   0.136(Ft.), Average velocity =   6.138(Ft/s)
Channel flow top width =   10.443(Ft.)
Flow Velocity =    6.14(Ft/s)
Travel time  =    1.82 min.
Time of concentration =   14.70 min.
Critical depth =      0.266(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      2.928(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     11.596(CFS) for    4.660(Ac.)
Total runoff =     14.793(CFS)  Total area =        6.95(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     6003.000 to Point/Station     6003.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
User specified 'C' value of 0.450 given for subarea
Time of concentration =    14.70 min.
Rainfall intensity =      2.928(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.303(CFS) for    0.230(Ac.)
Total runoff =     15.096(CFS)  Total area =        7.18(Ac.)
End of computations, total study area =           7.180 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
       Rational Hydrology Study        Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 7000 - PROPOSED CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     7000.000 to Point/Station     7001.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Initial subarea flow distance  =  110.000(Ft.)
Highest elevation =  660.000(Ft.)
Lowest elevation =  658.900(Ft.)
Elevation difference =    1.100(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =    12.27 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*( 110.000^.5)/( 1.000^(1/3)]=  12.27
Rainfall intensity (I) =      3.132(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.423(CFS)
Total initial stream area =        0.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     7001.000 to Point/Station     7002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
Upstream point elevation =   658.900(Ft.)
Downstream point elevation =   636.000(Ft.)
Channel length thru subarea  =   650.000(Ft.)
Channel base width      =    5.000(Ft.)
```



```
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      2.544(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      2.544(CFS)
Depth of flow =   0.145(Ft.), Average velocity =   2.031(Ft/s)
Channel flow top width =   12.258(Ft.)
Flow Velocity =    2.03(Ft/s)
Travel time  =    5.33 min.
Time of concentration =   17.60 min.
Critical depth =      0.154(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.450 given for subarea
Rainfall intensity =      2.725(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      3.691(CFS) for    3.010(Ac.)
Total runoff =      4.114(CFS)  Total area =        3.31(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     7003.000 to Point/Station     7002.000
**** SUBAREA FLOW ADDITION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration =    17.60 min.
Rainfall intensity =      2.725(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      2.379(CFS) for    1.940(Ac.)
Total runoff =      6.493(CFS)  Total area =        5.25(Ac.)
End of computations, total study area =          5.250 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 10/01/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 8000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     8000.000 to Point/Station     8001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.850 given for subarea
Initial subarea flow distance  =  120.000(Ft.)
Highest elevation =  700.000(Ft.)
Lowest elevation =  688.000(Ft.)
Elevation difference =   12.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.29 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*( 120.000^.5)/(  10.000^(1/3)]=   2.29
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.746(CFS)
Total initial stream area =        0.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     8001.000 to Point/Station     8002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   688.000(Ft.)
Downstream point elevation =   640.000(Ft.)
Channel length thru subarea  =  1100.000(Ft.)
```



```
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =     14.550(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     14.550(CFS)
Depth of flow =   0.241(Ft.), Average velocity =   6.140(Ft/s)
Channel flow top width =   14.648(Ft.)
Flow Velocity =    6.14(Ft/s)
Travel time  =    2.99 min.
Time of concentration =    7.99 min.
Critical depth =      0.398(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.662(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     23.035(CFS) for    7.400(Ac.)
Total runoff =     23.781(CFS)  Total area =        7.60(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     8003.000 to Point/Station     8002.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Time of concentration =     7.99 min.
Rainfall intensity =      3.662(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      4.449(CFS) for    2.700(Ac.)
Total runoff =     28.230(CFS)  Total area =       10.30(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     8002.000 to Point/Station     8002.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Time of concentration =     7.99 min.
Rainfall intensity =      3.662(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.824(CFS) for    0.500(Ac.)
Total runoff =     29.054(CFS)  Total area =       10.80(Ac.)
End of computations, total study area =          10.800 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/30/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 9000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9000.000 to Point/Station     9001.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
User specified 'C' value of 0.850 given for subarea
Initial subarea flow distance  =   90.000(Ft.)
Highest elevation =  802.000(Ft.)
Lowest elevation =  799.000(Ft.)
Elevation difference =    3.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.86 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  90.000^.5)/(   3.333^(1/3)]=   2.86
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      1.492(CFS)
Total initial stream area =        0.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9001.000 to Point/Station     9002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =   799.000(Ft.)
Downstream point elevation =   764.000(Ft.)
Channel length thru subarea  =   560.000(Ft.)
```



```
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =     12.945(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     12.945(CFS)
Depth of flow =   0.208(Ft.), Average velocity =   6.777(Ft/s)
Channel flow top width =   13.335(Ft.)
Flow Velocity =    6.78(Ft/s)
Travel time  =    1.38 min.
Time of concentration =    6.38 min.
Critical depth =      0.375(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.985(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     20.799(CFS) for    6.140(Ac.)
Total runoff =     22.292(CFS)  Total area =        6.54(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9002.000 to Point/Station     9003.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =   764.000(Ft.)
Downstream point/station elevation =   735.000(Ft.)
Pipe length  =   210.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    22.292(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    22.292(CFS)
Normal flow depth in pipe =   10.66(In.)
Flow top width inside pipe =   17.69(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.44(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =     6.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9003.000 to Point/Station     9003.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
User specified 'C' value of 0.450 given for subarea
Time of concentration =     6.55 min.
Rainfall intensity =      3.945(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.746(CFS) for    0.420(Ac.)
Total runoff =     23.037(CFS)  Total area =        6.96(Ac.)
End of computations, total study area =          6.960 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 10/23/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 9500 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9003.000 to Point/Station     9003.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
--------------------------------------------------------------------------
User specified 'C' value of 0.830 given for subarea
Rainfall intensity (I) =      2.001(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  32.55 min.  Rain intensity =       2.00(In/Hr)
Total area =        6.960(Ac.)  Total runoff =     3.300(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9003.000 to Point/Station     9004.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
--------------------------------------------------------------------------
Upstream point/station elevation =   732.000(Ft.)
Downstream point/station elevation =   730.000(Ft.)
Pipe length  =   100.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.300(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.300(CFS)
Normal flow depth in pipe =    7.79(In.)
Flow top width inside pipe =   11.45(In.)
Critical Depth =    9.33(In.)
Pipe flow velocity =       6.11(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    32.82 min.
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9003.000 to Point/Station     9004.000
**** CONFLUENCE OF MINOR STREAMS ****
--------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.960(Ac.)
Runoff from this stream =       3.300(CFS)
Time of concentration =   32.82 min.
Rainfall intensity =     1.991(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9005.000 to Point/Station     9006.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Initial subarea flow distance  =   55.000(Ft.)
Highest elevation =  762.000(Ft.)
Lowest elevation =  758.000(Ft.)
Elevation difference =    4.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     4.48 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  55.000^.5)/(   7.273^(1/3)]=   4.48
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.217(CFS)
Total initial stream area =        0.110(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     9006.000 to Point/Station     9004.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
Upstream point elevation =   758.000(Ft.)
Downstream point elevation =   733.000(Ft.)
Channel length thru subarea  =   430.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      2.933(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      2.933(CFS)
Depth of flow =   0.142(Ft.), Average velocity =   2.641(Ft/s)
Channel flow top width =   10.669(Ft.)
Flow Velocity =    2.64(Ft/s)
Travel time  =    2.71 min.
Time of concentration =    7.71 min.
Critical depth =      0.174(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.450 given for subarea
Rainfall intensity =      3.709(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      4.590(CFS) for    2.750(Ac.)
Total runoff =      4.808(CFS)  Total area =        2.86(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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```
Process from Point/Station     9006.000 to Point/Station     9004.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.860(Ac.)
Runoff from this stream =      4.808(CFS)
Time of concentration =    7.71 min.
Rainfall intensity =     3.709(In/Hr)
Summary of stream data:

Stream    Flow rate      TC            Rainfall Intensity
 No.        (CFS)      (min)                 (In/Hr)


1         3.300     32.82                  1.991
2         4.808      7.71                  3.709
Qmax(1) =
            1.000 *    1.000 *     3.300) +
            0.537 *    1.000 *     4.808) + =       5.881
Qmax(2) =
            1.000 *    0.235 *     3.300) +
            1.000 *    1.000 *     4.808) + =       5.583

Total of 2 streams to confluence:
Flow rates before confluence point:
        3.300        4.808
Maximum flow rates at confluence using above data:
        5.881        5.583
Area of streams before confluence:
        6.960        2.860
Results of confluence:
Total flow rate =      5.881(CFS)
Time of concentration =    32.823 min.
Effective stream area after confluence =      9.820(Ac.)
End of computations, total study area =           9.820 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/27/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 11000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    10000.000 to Point/Station    10001.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
User specified 'C' value of 0.850 given for subarea
Initial subarea flow distance  =   95.000(Ft.)
Highest elevation =  767.000(Ft.)
Lowest elevation =  758.000(Ft.)
Elevation difference =    9.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.07 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  95.000^.5)/(   9.474^(1/3)]=   2.07
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.522(CFS)
Total initial stream area =        0.140(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    10001.000 to Point/Station    10002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =   758.000(Ft.)
Downstream point elevation =   650.000(Ft.)
Channel length thru subarea  =  1975.000(Ft.)
```



```
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =     22.328(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     22.328(CFS)
Depth of flow =   0.281(Ft.), Average velocity =   7.483(Ft/s)
Channel flow top width =   16.239(Ft.)
Flow Velocity =    7.48(Ft/s)
Travel time  =    4.40 min.
Time of concentration =    9.40 min.
Critical depth =      0.492(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.451(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     34.288(CFS) for   11.690(Ac.)
Total runoff =     34.810(CFS)  Total area =       11.83(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    10003.000 to Point/Station    10002.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration =     9.40 min.
Rainfall intensity =      3.451(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.630(CFS) for    1.050(Ac.)
Total runoff =     36.441(CFS)  Total area =       12.88(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    10002.000 to Point/Station    10002.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
User specified 'C' value of 0.450 given for subarea
Time of concentration =     9.40 min.
Rainfall intensity =      3.451(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.901(CFS) for    0.580(Ac.)
Total runoff =     37.341(CFS)  Total area =       13.46(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    10004.000 to Point/Station    10002.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Time of concentration =     9.40 min.
Rainfall intensity =      3.451(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      2.283(CFS) for    1.470(Ac.)
```

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Total runoff =     39.624(CFS)  Total area =       14.93(Ac.)
End of computations, total study area =          14.930 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
       Rational Hydrology Study        Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 13000 - PROPOSED CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    13000.000 to Point/Station    13001.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   81.000(Ft.)
Highest elevation =  586.000(Ft.)
Lowest elevation =  578.600(Ft.)
Elevation difference =    7.400(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     5.04 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  81.000^.5)/( 9.136^(1/3)]=   5.04
Rainfall intensity (I) =      4.376(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.374(CFS)
Total initial stream area =        0.190(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    13001.000 to Point/Station    13002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   578.600(Ft.)
Downstream point elevation =   577.000(Ft.)
Channel length thru subarea  =   143.000(Ft.)
Channel base width       =    5.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      1.437(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      1.437(CFS)
Depth of flow =   0.145(Ft.), Average velocity =   1.146(Ft/s)
Channel flow top width =   12.267(Ft.)
Flow Velocity =    1.15(Ft/s)
Travel time  =    2.08 min.
Time of concentration =    7.12 min.
Critical depth =      0.112(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.822(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      1.858(CFS) for    1.080(Ac.)
Total runoff =      2.232(CFS)  Total area =        1.27(Ac.)
End of computations, total study area =          1.270 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
       Rational Hydrology Study        Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 15000 - PROPOSED CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    15000.000 to Point/Station    15001.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   77.000(Ft.)
Highest elevation =  647.000(Ft.)
Lowest elevation =  644.400(Ft.)
Elevation difference =    2.600(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.84 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  77.000^.5)/( 3.377^(1/3)]=   6.84
Rainfall intensity (I) =     3.879(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.419(CFS)
Total initial stream area =        0.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    15001.000 to Point/Station    15002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   644.400(Ft.)
Downstream point elevation =   620.000(Ft.)
Channel length thru subarea  =   480.000(Ft.)
Channel base width       =     5.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      3.072(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      3.072(CFS)
Depth of flow =   0.146(Ft.), Average velocity =   2.444(Ft/s)
Channel flow top width =   12.277(Ft.)
Flow Velocity =    2.44(Ft/s)
Travel time  =    3.27 min.
Time of concentration =   10.12 min.
Critical depth =      0.170(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.360(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      4.596(CFS) for    3.040(Ac.)
Total runoff =      5.015(CFS)  Total area =        3.28(Ac.)
End of computations, total study area =          3.280 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 09/17/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 16000
PROPOSED CONDITION
100-YEAR STORM EVENT
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    16000.000 to Point/Station    16001.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
User specified 'C' value of 0.850 given for subarea
Initial subarea flow distance  =   75.000(Ft.)
Highest elevation =  666.000(Ft.)
Lowest elevation =  664.000(Ft.)
Elevation difference =    2.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.81 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  75.000^.5)/(   2.667^(1/3)]=   2.81
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.746(CFS)
Total initial stream area =        0.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    16001.000 to Point/Station    16002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
Upstream point elevation =   664.000(Ft.)
Downstream point elevation =   635.000(Ft.)
Channel length thru subarea  =   800.000(Ft.)
Channel base width      =    5.000(Ft.)
```



```
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =     10.577(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =     10.577(CFS)
Depth of flow =   0.216(Ft.), Average velocity =   5.262(Ft/s)
Channel flow top width =   13.631(Ft.)
Flow Velocity =    5.26(Ft/s)
Travel time  =    2.53 min.
Time of concentration =    7.53 min.
Critical depth =      0.340(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.742(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     16.762(CFS) for    5.270(Ac.)
Total runoff =     17.508(CFS)  Total area =        5.47(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    16002.000 to Point/Station    16002.000
**** SUBAREA FLOW ADDITION ****
--------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Time of concentration =     7.53 min.
Rainfall intensity =      3.742(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.455(CFS) for    0.270(Ac.)
Total runoff =     17.963(CFS)  Total area =        5.74(Ac.)
End of computations, total study area =          5.740 (Ac.)
```

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                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 04/02/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 17000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    17000.000 to Point/Station    17001.000
**** INITIAL AREA EVALUATION ****
__________________________________________________________________________
User specified 'C' value of 0.850 given for subarea
Initial subarea flow distance  =   60.000(Ft.)
Highest elevation =  702.000(Ft.)
Lowest elevation =  701.500(Ft.)
Elevation difference =    0.500(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.70 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  60.000^.5)/(   0.833^(1/3)]=   3.70
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      0.448(CFS)
Total initial stream area =        0.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    17001.000 to Point/Station    17002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
__________________________________________________________________________
Upstream point elevation =   701.500(Ft.)
Downstream point elevation =   690.000(Ft.)
Channel length thru subarea  =   920.000(Ft.)
```



```
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      9.868(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      9.868(CFS)
Depth of flow =   0.271(Ft.), Average velocity =   3.503(Ft/s)
Channel flow top width =   15.822(Ft.)
Flow Velocity =    3.50(Ft/s)
Travel time  =    4.38 min.
Time of concentration =    9.38 min.
Critical depth =      0.328(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.454(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     14.825(CFS) for    5.050(Ac.)
Total runoff =     15.272(CFS)  Total area =        5.17(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    17002.000 to Point/Station    17002.000
**** SUBAREA FLOW ADDITION ****
__________________________________________________________________________
User specified 'C' value of 0.450 given for subarea
Time of concentration =     9.38 min.
Rainfall intensity =      3.454(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.606(CFS) for    0.390(Ac.)
Total runoff =     15.878(CFS)  Total area =        5.56(Ac.)
End of computations, total study area =          5.560 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 01/28/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 17500 - PROPOSED CONDITIONS
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********
--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    17500.000 to Point/Station    17501.000
**** INITIAL AREA EVALUATION ****
--------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Initial subarea flow distance  =   90.000(Ft.)
Highest elevation =  696.000(Ft.)
Lowest elevation =  692.000(Ft.)
Elevation difference =    4.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     6.75 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  90.000^.5)/( 4.444^(1/3)]=   6.75
Rainfall intensity (I) =      3.899(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.281(CFS)
Total initial stream area =        0.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    17501.000 to Point/Station    17502.000
**** IMPROVED CHANNEL TRAVEL TIME ****
--------------------------------------------------------------------------
```



```
Upstream point elevation =   692.000(Ft.)
Downstream point elevation =   691.300(Ft.)
Channel length thru subarea  =    68.000(Ft.)
Channel base width       =    4.000(Ft.)
Slope or 'Z' of left channel bank =  25.000
Slope or 'Z' of right channel bank =  25.000
Estimated mean flow rate at midpoint of channel =      0.518(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      0.518(CFS)
Depth of flow =   0.095(Ft.), Average velocity =   0.849(Ft/s)
Channel flow top width =    8.773(Ft.)
Flow Velocity =    0.85(Ft/s)
Travel time  =    1.33 min.
Time of concentration =    8.09 min.
Critical depth =      0.069(Ft.)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[RURAL(greater than 0.5 Ac, 0.2 ha) area type]
Rainfall intensity =      3.645(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.443(CFS) for    0.270(Ac.)
Total runoff =      0.724(CFS)  Total area =        0.43(Ac.)
End of computations, total study area =          0.430 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
       Rational Hydrology Study        Date: 09/30/19
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 18000 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  -  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    18000.000 to Point/Station    18001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
User specified 'C' value of 0.850 given for subarea
Initial subarea flow distance  =   90.000(Ft.)
Highest elevation =  802.000(Ft.)
Lowest elevation =  799.000(Ft.)
Elevation difference =    3.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     2.86 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  90.000^.5)/(   3.333^(1/3)]=   2.86
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      1.492(CFS)
Total initial stream area =        0.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    18001.000 to Point/Station    18002.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =   799.000(Ft.)
Downstream point elevation =   795.000(Ft.)
Channel length thru subarea  =   410.000(Ft.)
```



```
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =  20.000
Slope or 'Z' of right channel bank =  20.000
Estimated mean flow rate at midpoint of channel =      9.103(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      9.103(CFS)
Depth of flow =   0.276(Ft.), Average velocity =   3.131(Ft/s)
Channel flow top width =   16.050(Ft.)
Flow Velocity =    3.13(Ft/s)
Travel time  =    2.18 min.
Time of concentration =    7.18 min.
Critical depth =      0.316(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.850 given for subarea
Rainfall intensity =      3.809(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.850
Subarea runoff =     13.211(CFS) for    4.080(Ac.)
Total runoff =     14.703(CFS)  Total area =        4.48(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    18002.000 to Point/Station    18002.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
User specified 'C' value of 0.450 given for subarea
Time of concentration =     7.18 min.
Rainfall intensity =      3.809(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      0.411(CFS) for    0.240(Ac.)
Total runoff =     15.114(CFS)  Total area =        4.72(Ac.)
End of computations, total study area =          4.720 (Ac.)
```

```
                San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2003 Version 6.3

Rational method hydrology  program based on
San Diego County Flood Control Division 1985 hydrology manual
        Rational Hydrology Study        Date: 04/02/20
--------------------------------------------------------------------------
CARMEL MOUNTAIN RANCH
SYSTEM 18500 - PROPOSED CONDITION
100-YEAR STORM EVENT


--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity)  =  1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    18002.000 to Point/Station    18002.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
__________________________________________________________________________
User specified 'C' value of 0.830 given for subarea
Rainfall intensity (I) =      2.133(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  29.20 min.  Rain intensity =       2.13(In/Hr)
Total area =        4.720(Ac.)  Total runoff =     2.000(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    18002.000 to Point/Station    18003.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
__________________________________________________________________________
Upstream point/station elevation =   789.000(Ft.)
Downstream point/station elevation =   672.580(Ft.)
Pipe length  =  1085.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     2.000(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.000(CFS)
Normal flow depth in pipe =    4.10(In.)
Flow top width inside pipe =    8.96(In.)
Critical Depth =    7.71(In.)
Pipe flow velocity =     10.20(Ft/s)
Travel time through pipe =    1.77 min.
Time of concentration (TC) =    30.97 min.
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    18003.000 to Point/Station    18003.000
**** CONFLUENCE OF MINOR STREAMS ****
__________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.720(Ac.)
Runoff from this stream =      2.000(CFS)
Time of concentration =   30.97 min.
Rainfall intensity =     2.062(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    18004.000 to Point/Station    18005.000
**** INITIAL AREA EVALUATION ****
__________________________________________________________________________
User specified 'C' value of 0.450 given for subarea
Initial subarea flow distance  =   85.000(Ft.)
Highest elevation =  794.000(Ft.)
Lowest elevation =  772.000(Ft.)
Elevation difference =   22.000(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     3.65 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4500)*(  85.000^.5)/(  25.882^(1/3)]=   3.65
Setting time of concentration to 5 minutes
Rainfall intensity (I) =      4.389(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.450
Subarea runoff =      0.178(CFS)
Total initial stream area =        0.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    18005.000 to Point/Station    18003.000
**** IMPROVED CHANNEL TRAVEL TIME ****
__________________________________________________________________________
Upstream point elevation =   772.000(Ft.)
Downstream point elevation =   679.000(Ft.)
Channel length thru subarea  =   900.000(Ft.)
Channel base width      =    4.560(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Estimated mean flow rate at midpoint of channel =      4.681(CFS)
Manning's 'N'    = 0.005
Maximum depth of channel  =    0.100(Ft.)
Flow(q) thru subarea =      4.681(CFS)
Depth of flow =   0.067(Ft.), Average velocity =  15.404(Ft/s)
Channel flow top width =    4.560(Ft.)
Flow Velocity =   15.40(Ft/s)
Travel time  =    0.97 min.
Time of concentration =    5.97 min.
Critical depth =      0.320(Ft.)
 Adding area flow to channel
User specified 'C' value of 0.450 given for subarea
Rainfall intensity =      4.088(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.450
Subarea runoff =      8.388(CFS) for    4.560(Ac.)
Total runoff =      8.566(CFS)  Total area =        4.65(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station    18005.000 to Point/Station    18003.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      4.650(Ac.)
Runoff from this stream =      8.566(CFS)
Time of concentration =    5.97 min.
Rainfall intensity =     4.088(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    17002.000 to Point/Station    17002.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
____________________________________________________________________________
User specified 'C' value of 0.830 given for subarea
Rainfall intensity (I) =      2.675(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  18.40 min.  Rain intensity =       2.68(In/Hr)
Total area =        5.560(Ac.)  Total runoff =     2.600(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    17002.000 to Point/Station    18003.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =   675.000(Ft.)
Downstream point/station elevation =   672.580(Ft.)
Pipe length  =   100.00(Ft.)   Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     2.600(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.600(CFS)
Normal flow depth in pipe =    6.29(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    8.30(In.)
Pipe flow velocity =      6.24(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    18.67 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station    17002.000 to Point/Station    18003.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      5.560(Ac.)
Runoff from this stream =      2.600(CFS)
Time of concentration =   18.67 min.
Rainfall intensity =     2.659(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        2.000     30.97                2.062
2        8.566      5.97                4.088
3        2.600     18.67                2.659
Qmax(1) =
           1.000 *    1.000 *     2.000) +
           0.504 *    1.000 *     8.566) +
           0.775 *    1.000 *     2.600) + =       8.336
Qmax(2) =
```



```
           1.000 *    0.193 *     2.000) +
           1.000 *    1.000 *     8.566) +
           1.000 *    0.320 *     2.600) + =       9.783
Qmax(3) =
           1.000 *    0.603 *     2.000) +
           0.650 *    1.000 *     8.566) +
           1.000 *    1.000 *     2.600) + =       9.377

Total of 3 streams to confluence:
Flow rates before confluence point:
       2.000       8.566       2.600
Maximum flow rates at confluence using above data:
       8.336       9.783       9.377
Area of streams before confluence:
       4.720       4.650       5.560
Results of confluence:
Total flow rate =      9.783(CFS)
Time of concentration =     5.974 min.
Effective stream area after confluence =     14.930(Ac.)
End of computations, total study area =          14.930 (Ac.)
```

APPENDIX 4

Backbone Study As-Built Record Drawings

STORM DRAIN PROFILE (12)
(PRIVATE)

LEFT CURB RETURN PROFILE

RIGHT CURB RETURN PROFILE

PROFILE SCALE
HORIZ. 1"= 40'
VERT. 1"= 8'

PROFILE - CUL-DE-SAC
SCALE: HORIZ. 1"=40'
VERT. 1"=4'

S.S PROFILE
@ STA. 13+28.00

WATER PROFILE
STA. 15+17.42

LINE "10" "a" "11"

DETAIL "A"
FOR OFF SITE GRADING GRADING & PAVING SEE LETTER OF- PERMISSION DATED 5-16-89

STORM DRAIN CONCRETE ENCASEMENT DETAIL
(FROM STA. 10+49.00 TO STA. 11+25.00)

SCALE 1"=40'

LOT 1

LOT 2

LOT 3

SUBDIVISION BOUNDARY

WINDCREST AVENUE

RANCHO CARMEL DRIVE

"AS-BUILT"

NOTE: TOP OF CURB IS SAME AS ℄ CENTERLINE UNLESS SHOWN OTHERWISE.

CAUTION !!! EXISTING UNDERGROUND TELEPHONE CABLE.

SEE DETAIL "A"

NO	Δ/BEARING	R	L	REMARKS
5	18° 41'29"	375.00	122.33	
4	14° 27' 30"	375.00	94.63	
3	N 56° 49' 25" W	—	50.00	
2	10° 05' 25"	600.00	105.67	
1	N 46° 44' 00" W	—	443.83	

CENTERLINE DATA

NO	Δ/BEARING	R	L	REMARKS
13	N 46° 44' 00" E		380.59	6" TYPE "B" CURB & GTR.
12	25° 9' 13" 82"	35.00	153.34	6" "B" BERM
11	43° 14' 51"	30.00'	22.64	"
10	36° 49' 36"	30.00'	19.28'	"
9	0°19'35"14"	355.00'	77.99'	"
8	0°12'46"21"	355.00'	79.14'	6" "B" CURB & GTR.
7	0°12'05"06	395.00	83.31'	6" A.C. BERM
6	Δ=1°5' DC, D4"	395.00	103.11	6" TYPE "B" CURB
5	N 59°05'4 1"E	—	36.51	6" TYPE "B" CURB
4	Δ=1°9'47"	630.00	122.96'	6" TYPE "B" CURB
3	10°05.15	381.00	70.214	6" TYPE "B" CURB
2	N 46° 44' 00" W		374.85	6" TYPE "B" CURB
1	90° 00' 00"	30.00	47.12	6" TYPE "B" CURB

CURB DATA

NO	Δ/BEARING	R	L	REMARKS
9	N 43°18'46" E		380.59	6" A.C.P.
8	N 43° 16' 00" E		25.90	8" R.C.P.
7	Δ=01°31'40"	375.00	10.00	8" P.V.C.
6	Δ=12°50'22"	375.00	84.05	8" P.V.C.
5	N 56° 49' 25" W		50.00	8" P.V.C.
4	Δ=03°28' 40"	600.00	36.01	8" P.V.C.
3	N 46° 44' 00" W		172.36	8" P.V.C.
2	N 46° 44' 00" W		179.00	8" P.V.C.

SEWER DATA

NO	Δ/BEARING	R	L	REMARKS
11	N 43°18'46" E		74.01	6" A.C.P.
10	N 43° 16' 00" E		42.18'	6" A.C.P.
9	N 43° 16' 00" E		42.18'	6" A.C.P.
8	N 43° 16' 00" E		35.30'	6" A.C.P.
7	00° 15' 32"	365.00	1.65'	12" A.C.P.
6	14° 11' 16"	365.00	90.43'	"
5	N 56° 49' 25" W		50.00'	"
4	02° 26' 55"	610.00	26.07'	"
3	01° 21' 20"	610.00	14.98'	12" A.C.P.
2	N 46° 44' 00" W		171.95'	12" A.C.P.
1	N 56° 44' 00" W		267.03'	12" A.C.P.

WATER DATA

NO	Δ/BEARING	R	L	REMARKS
16	6° 41'18" 39"	387.00	29.12	18" A.C.P. (2000-D) PRIVATE
15	1° 20° 03' 42"	387.00'	136.18'	"
14	N 33°48' 12" W	—	92.00'	24" A.C.P. (2000-D)
13	N 43° 16' 00" E	—	16.00'	24" A.C.P. (3000-D)
12	N 43° 16' 00" E	—	6.25'	18" A.C.P. (3000-D)
11	N 43° 16' 00" E	—	30.25'	18" A.C.P. (3000-D)
10	N 43° 16' 00" E	—	308.25'	18" A.C.P. (3000-D)
9	Δ=9°26' 11"	387.00'	63.75'	18" A.C.P. (3000-D)
8	Δ=4°49' 18"	387.00'	32.57'	24" A.C.P. (2000-D)
7	N 56°49' 25" W	—	50.00'	24" A.C.P. (2000-D)
6	DW 10°04"	588.00'	43.23'	24" A.C.P. (2000-D)
5	05° 11' 55"	588.00'	56.32'	24" A.C.P. (2000-D)
4	N 46°44'00" W	—	123.84'	24" A.C.P. (2000-D)
3	N 46°44'00" W	—	242.30'	30" A.C.P. (3000-D)
2				
1	E 1° 08' 49"	45.00'	21.28'	30" A.C.P. (3000-D)

STORM DRAIN DATA

AS-BUILT	PLD	[illegible]	1-1-93
CONTRACTOR C.M.R.	DATE STARTED 1-1-88		
INSPECTOR R. GABRIEL	DATE COMPLETED 1-15-93		

PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF:

WINDCREST AVENUE

IN CARMEL MOUNTAIN RANCH, UNIT 15

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 5 OF 35 SHEETS

TM 85-0663
W.O. NO. 85-663

[illegible] 8-12-88
FOR CITY ENGINEER — DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
CHANGE	MCINTIRE GROUP	[illegible]	1-11-89	
CHANGE	MCINTIRE GROUP	[illegible]	3-8-89	

CONTROL IDENTIFICATION
294-1743
LANDSAT COORDINATES

22838-5-D

PROJECT NO 1090

CHANGE - REVISE STORM DRAIN PROFILE CORRECT C.O. LOCATION, STORM DRAIN REVISIONS 8" B.F.V. TO 8" G.V.

The McIntire Group
Land Planning • Water Design • Civil Engineering • Surveying

ENGINEER OF WORK
LEROY C. BODAS
R.C.E. 22312 (EXPIRES 9-30-89)
DATE 5-30-89

CRAIG TACKABERY
R.C.E. 43042
DATE
EXPIRES 3/31/96

AS-BUILT

STORM DRAIN PROFILE

LINE "A-3"

LINE "A-1"

LINE "A-2"

LINE "A"

FUT. N'LY. CURB LINE

S'LY. CURB LINE

GRADE

IDENTICAL POINTS

SUBDIVISION BOUNDARY

SHOAL CREEK DRIVE

CARMEL MOUNTAIN RANCH GOLF COURSE HOLE NO. 2

FUTURE UNIT

FUTURE CURB INLET & PIPE ON EACH SIDE

PROFILE SCALE
HORIZ 1"= 40'
VERT. 1"= 8'

SCALE 1"=40'

STORM DRAIN PROFILES

CENTERLINE DATA

NO	Δ/BEARING	R	L	REMARKS
1	N 59° 15' 00"W		67.63	
2	2°E 03' 00"	500'	183.91	
3	N 80° 18' 00"W		73.23	
4	N 59° 15' 00"W		15.84	
5	3° 42' 01"	500'	41.01	
6	N 59° 15' 00"W		345.13	

CURB DATA

NO	Δ/BEARING	R	L	REMARKS
1	86° 59' 59"	30'	45.49	"C-CURB & GTR."
2	N 59° 15' 00"W		42.52	"
3	N 59° 15' 00"W		355.14	"
4	21° 03' 00"	500'	191.01	"
5	N 80° 18' 00"W		20.90	"
6	1° 03' 12"	480'	3.66	"

SEWER DATA

NO	Δ/BEARING	R	L	REMARKS
1	N 59° 15' 00"W		343.13	8" PVC.
2	N 59° 15' 00"W		254.85	8" PVC.
3	N 59° 15' 00"W		22.88	"
4	21° 03' 00"	300'	183.70	"
5	N 80° 18' 00"W		73.23	"
6	N 80° 18' 00"W		15.84	8" PVC.
7	3° 20' 30"	500'	46.61	"
C	N 30° 45' 00"E		55.00	"
9	N05° 42' 00"E		47.00	"

WATER DATA

NO	Δ/BEARING	R	L	REMARKS
E	N 30° 45' 00"E		40.00	8" R.C.P.
3	N 59° 15' 00"W		870.38	16" A.C.P.
5	9° 05' 00"	450'	840.82	"
6	N 80° 18' 00"W		88.47	"
6	N 9° 42' 00"E		37.00	12" R.C.P.
7	3° 20' 30"	510'	47.45	16" A.C.P.
	N30° 45' 00"E		6.29	18" R.C.P.
	N30° 45' 00"E		28.25	16" R.C.P.
	N30° 45' 00"E		6.29	18" R.C.P.

STORM DRAIN DATA

NO	Δ/BEARING	R	L	REMARKS
1	N59° 15' 00"W		21.89	54" R.C.P.
2	N59° 15' 00"W		236.01	54" C.I.P.C.P.
3	N59° 15' 00"W		140.85	54" C.I.P.C.P.
4	N59° 15' 00"W		161.98	54" C.I.P.C.P.
5	2°E 03' 00"	311'	181.54	54" C.I.P.C.P.
6	N80° 18' 00"W		46.36	54" C.I.P.C.P.
7	N80° 18' 00"W		36.11	54" C.I.P.C.P.
8	C 10° 26'	489'	89.08	48" R.C.P.
9	N 75° 45' 00"E		16.11	30" R.C.P.
10	45° 00' 00"	45.00'	35.34	30" R.C.P.
11	N30° 45' 00"E		14.86	30" R.C.P.
12	N30° 45' 00"E		18.85	30" C.I.P.C.P.
13	N30° 45' 00"E		61.00	24" R.C.P.
14	N 75° 45' 00"W		3.00	18" R.C.P.
15	N30° 45' 00"E		28.25	18" R.C.P.
16	N30° 45' 00"E		6.29	18" R.C.P.

CHANGE - DELETED 8" MAIN
ADDED 16" VALVE & 8" VALVE
ADDED 4" SERVICE
ADDED 2" SERVICE

CHANGE - REVISED LOCATION S.D., SEW. & WTR., 5-6-86
(I.E. LINE "A-3") & ADDED C.O.

ENGINEER OF WORK
HOWARD BAIRD RCE 14795
6-13-85 DATE

PRIVATE CONTRACT PRD 84-0728

PLAN FOR THE IMPROVEMENT OF:

SHOAL CREEK DRIVE

IN CARMEL MOUNTAIN RANCH UNIT NO. 5

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 3 OF 8 SHEETS

T.M. 84-0728
NO. 840726

C.R. Stafford 12-13-85
DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
CHANGE	T.M.G.	C.R. Stafford	4-1-86	
CHANGE	J.M.S.	C.R. Stafford	11-14-86	
AS-BUILT	T.M.G.		8-25-87	

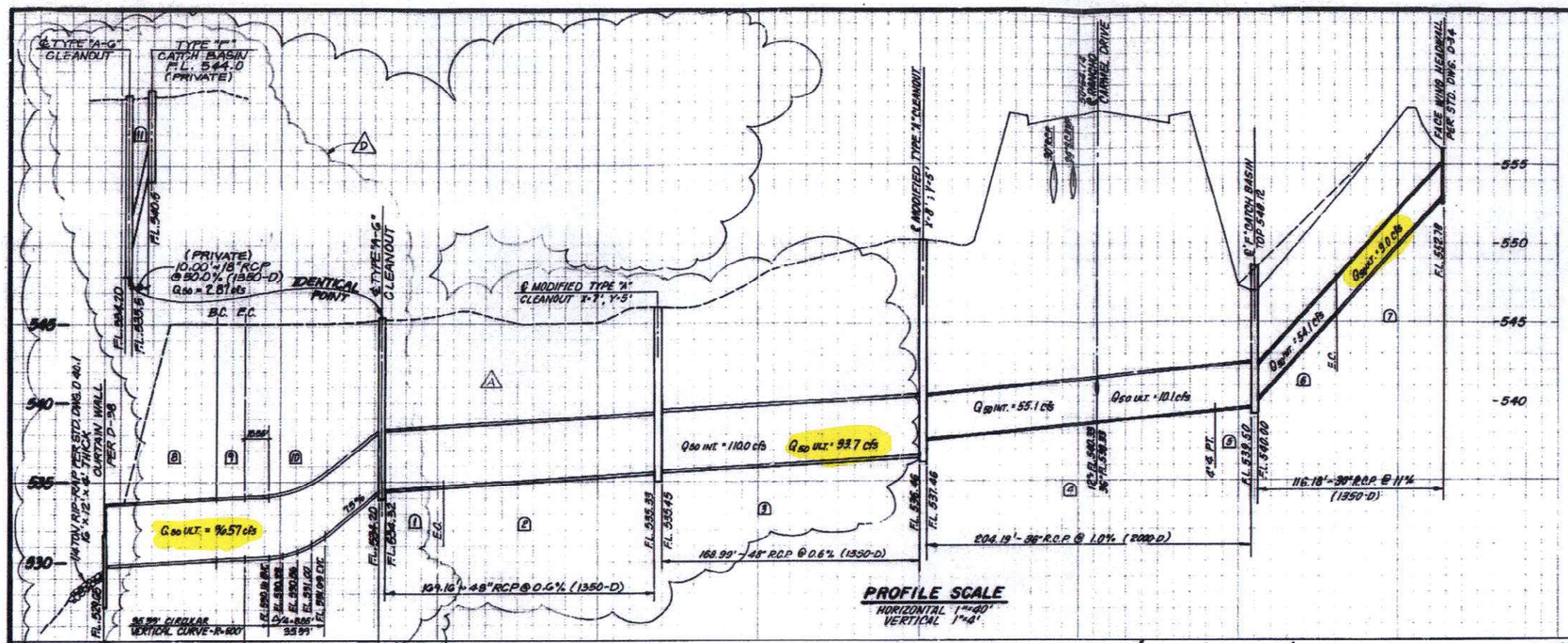
CONTROL STATION IDENTIFICATION
292-1743
SANGERT COORDINATES

CONTRACTOR SANGERT DATE STARTED 12-20-86
INSPECTOR L. PACHECA DATE COMPLETED 8-7-87

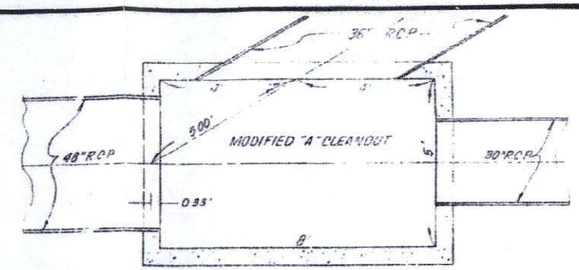
22082-3-D

AS BUILT

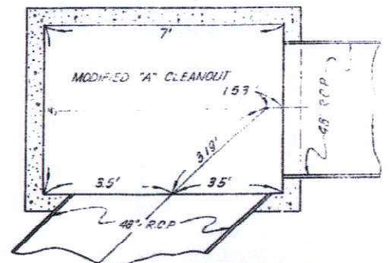
0 1 2 3 4 IN.



PROFILE SCALE
HORIZONTAL 1"=40'
VERTICAL 1"=4'



STORM DRAIN · DETAIL "A"
SCALE = 1" = 2'



STORM DRAIN · DETAIL "B"
SCALE = 1" = 2'

P&D Technologies
401 West "A" Street, Suite 2500
San Diego, CA 92101 619-232-4466
An Employee Owned Company

"AS-BUILT"
C. Tackabery 8/3/93
CRAIG TACKABERY R.C.E. 43042 — DATE EXPIRES 3/31/96

STORM DRAIN DATA				
NO.	A | BEARING	R	L	REMARKS
1	Δ=22°16'54"	900.00'	36.00'	48" R.C.P.
2	N 39°53'42" E		134.16'	" "
3	N 68°22'00" W		168.99'	" "
4	N 81°37'00" E		180.29'	36" R.C.P.
5	N 77°32'00" E		28.90'	
6	Δ=28°10'39"	100.00'	49.18'	30" R.C.P.
7	N 74°11'21" W		42.00'	" "
8	N 79°00'00" E		70.00'	48" R.C.P.
9	Δ=11°00'00"	90.00'	17.28'	48" R.C.P.
10	N 64°00'00" E		85.20'	48" R.C.P.
11	N 05°00'00" E		10.00'	18" R.C.P.

PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF:

RANCHO CARMEL DRIVE

IN CARMEL MOUNTAIN RANCH

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 5 OF 20 SHEETS

W.O. NO. 850717

C.E. Tackabery 8-15-96
FOR CITY ENGINEER — DATE

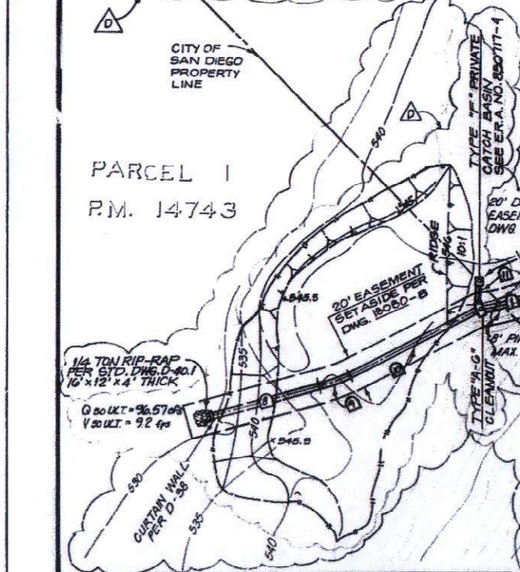
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
⚠ CHANGE	T.M.G.		12-2-96	
⚠ CHANGE	L.I.A.		1-7-97	
AS-BUILT	P&D		11-5-97	

294-1743

22917-5-D

J.N. 1088

CONTRACTOR PRESSLEY OF SD DATE STARTED 8-15-96
INSPECTOR C. PERSON/GABRIEL DATE COMPLETED 6-21-98



GRADING NOTE:
GRADING & COMPACTION AS SHOWN ON CONSTRUCTION CHANGE ⚠ SHALL BE IN CONFORMANCE WITH CURRENT STANDARD SPECIFICATIONS & DIVISION 4 SECTION 62 OF THE SAN DIEGO MUNICIPAL CODE.

LANDSCAPING NOTE:
ALL PLANTING ASSOCIATED WITH CONSTRUCTION CHANGE ⚠ SHALL CONFORM TO THE CITY OF SAN DIEGO LANDSCAPE TECHNICAL MANUAL (DOC. NO. R.R. 274806). PLANTING MIX TO BE APPROVED BY PARK DEVELOPMENT & OPEN SPACE DIVISIONS PRIOR TO HYDROSEEDING. AT START OF RAINY SEASON, CONTACT MERRIANNE DEAN @ CITY OF SAN DIEGO (533-4061) TO COORDINATE WORK WITH THE CITY.

The McGuire Group
Land Planning • Hillside Design • Civil Engineering • Surveying
ENGINEER OF WORK: (EXPIRES 9-30-98)
LEROY C. BODAS, R.C.E. 22312 — DATE 6/13/96

CHANGE "D" ONLY

LUNDSTROM & ASSOCIATES
5965 PACIFIC CENTER BLVD., SUITE 703
SAN DIEGO, CALIFORNIA 92121
(619) 450-1445 FAX 450-1091

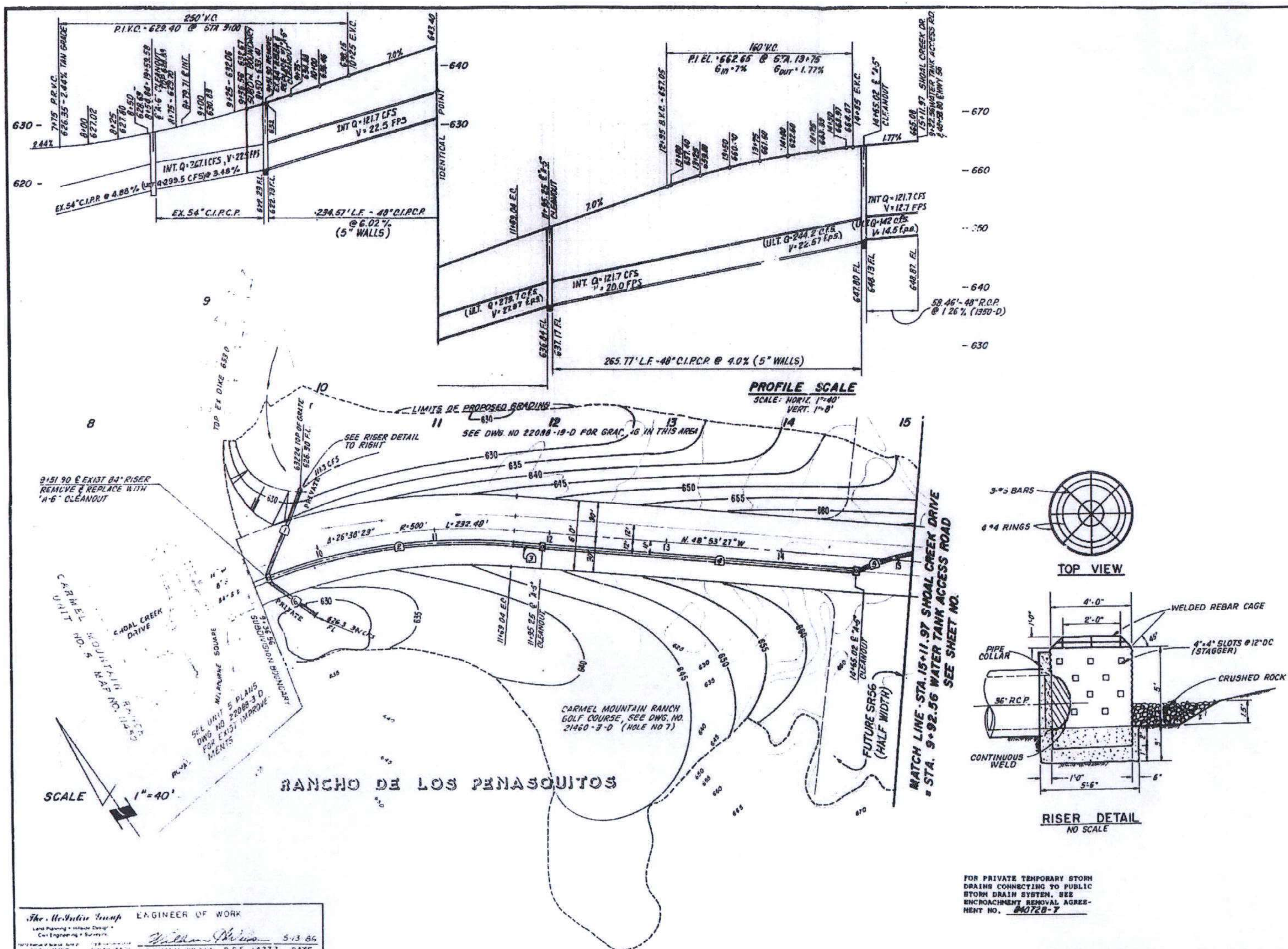
ENGINEER OF WORK:
JEFFREY R. LUNDSTROM — DATE: 11-15-96 — R.C.E. 21245

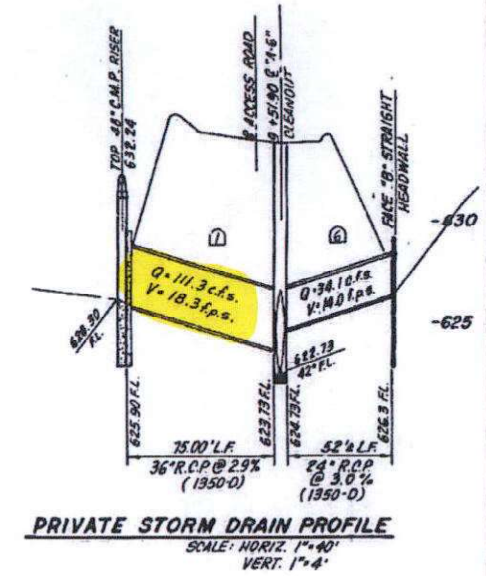
AS-BUILT

⚠D REMOVE DESILTING BASIN AND CONNECT STORM DRAIN, ADD ENGR LOGO.

⚠A MOVED STORM DRAIN, HEADWALL & CLEANOUT LOCATIONS & ADD DETAILS TO PROFILE.

0 1 2 3 4 IN.





STORM DRAIN DATA

NO.	Δ/BEARING	R	L	REMARKS
1	N.59°27'39"E.		82'±	36" R.C.P
2.	Δ=24°38'54"	489.00'	210.37'	48" C.I.P.C.P.
3.	N.48°53'27"W.		24.21'	"
4.	N.48°53'27"W.		256.35'	"
5.	Δ=16°44'48"	200.00'	58.46'	48" R.C.P.
6.	N.17°46'25"W.		50'±	24" R.C.P.

PRIVATE CONTRACT

GRADING PLANS FOR:

ACCESS EASEMENT FOR WATER TANK SITE

IN CARMEL MOUNTAIN RANCH

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 3 OF 8 SHEETS

W.O. NO. 840728

FOR CITY ENGINEER 9-2-86 DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
"AS-BUILT"	LAA	D. Manela	7-8-97	

CONTROL CERTIFICATION

294-1743
LAMBERT COORDINATES

CONTRACTOR PRESLEY DATE STARTED 1984
INSPECTOR D. MANELA DATE COMPLETED 8-15-87

22939-3-D

"AS-BUILT"

NOTE: TOP OF CURB ELEVATIONS ARE 0.01' ABOVE CORRESPONDING POINTS ON ℄ GRADE UNLESS OTHERWISE NOTED.

PROFILE
SCALE: HORIZ. 1"=40' VERT.: 1"=8'

NW CURB RETURN PROFILE
BOULTON AVE & MONTFORT CT.
SCALE: HORIZ. 1"=20' ; VERT. 1"=4'

NE CURB RETURN PROFILE
BOULTON AVE & MONTFORT CT.
SCALE: HORIZ. 1"=20' ; VERT. 1"=4'

BOULTON AVENUE

CURB DATA

NO.	DELTA	RADIUS	LENGTH	REMARKS
1			102.10'	6"H.C.B.
2	Δ=28°25'28"	182'	90.29'	"
3			130.00'	"
4	Δ=4°37'11"	82'	6.61'	"
5			307.63'	"
6			59.40'	"
7			139.91'	"
8			77.28'	"
9			266.42'	"
10			9.51'	"
11	Δ=26°25'28"	218'	100.54'	"
12	Δ=89°11'05"	80'	44.60	"

SEWER DATA

NO.	DELTA	RADIUS	LENGTH	REMARKS
(1)			150.00'	8" P.V.C
(2)	Δ=2°25'28"	200'	92.24'	"
(3)			130.00'	"
(4)	Δ=4°37'11"	100'	8.06'	"
(5)			307.63'	"
(6)	Δ=11°22'57"	500'	99.33'	"
(7)	Δ=20°17'24"	500'	177.06'	"
(8)			10.67'	"

WATER DATA

NO.	DELTA	RADIUS	LENGTH	REMARKS
(1)			140.00'	12" A.C.P.
(2)	Δ=26°25'28"	210'	96.85'	"
(3)			130.00'	"
(4)	Δ=4°37'11"	110'	8.87'	"
(5)			307.63'	"
(6)	Δ=31°26'21"	490'	270.87	"
(7)			77.28'	"
(8)				

STORM DRAIN DATA

NO.	DELTA	RADIUS	LENGTH	REMARKS
(1)			47.51'	24" R.C.P.
(2)			50.81'	24" R.C.P.
(3)	Δ=27°02'02"	180'	88.71'	24" R.C.P.
(4)			132.00'	24" R.C.P.
(5)	Δ=4°37'11"	88'	7.10'	24" R.C.P.
(6)			47.81'	24" R.C.P.
(7)			162.53'	21" R.C.P.
(8)	Δ 10°02'22"	512'	89.71	21" R.C.P.
(9)	Δ=21°11 07"	512'	189.30'	18" R.C.P.
(10)			10.70	18" R.C.P.

AS-BUILT ADD G.V., DELETE IRRIG METER 3-28-94

SAMUEL F. SAFINO R.C.E. 13177 EXP. 3-31-99 CIVIL — STATE OF CALIFORNIA

SAMUEL F. SAFINO RCE 13177

PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF:

BOULTON AVENUE

IN CARMEL MOUNTAIN RANCH UNIT 17

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 5 OF 20 SHEETS

I.M. 86-0376
DWG NO 860376

3-16-88

CHANGE 1 AS BUILT 5-10-88

292-1743

23805-5-D

37422.10

AS BUILT

PHASE 2 | PHASE 3

PAD 740.4

24.30% TAN. GRADE STORM DRAIN

5.29% TAN. GRADE SEWER

CUT-OFF WALL - TYPE "A" PER S-10 @ 30'O.C. FOR 18" R.C.P. S.D. & 8" PVC. SEWER.

47.94'~18" R.C.P. @ 50%

50' V.C. SEWER

PAD 693.7

107.63'~24" R.C.P. @ 1.50%

Q80 = 24.5 CFS

171.62'~8" PVC. @ 1.6%

50' V.C.* S.D.

WATER TIGHT JOINTS

* 50' VC = 212' HOR. RAD. USE 4' PIPE LENGTHS

SEWER & S.D. LINE "A" PROFILE

SCALES: (H) 1"=40' (V) 1"=8'

PHASE 1 | PHASE 3

10.3% TAN. FOR S.D.

S-10 TYPE "A" CUTOFF WALL

19.96% TAN. GRADE SEWER

50' V.C. SEWER

50' V.C.** STORM DRAIN WATER TIGHT JOINTS

Q80 = 12.4 CFS

** 50' V.C. = 202' HOR. RAD. USE 4' PIPE LENGTHS

30.29'~8" PVC. SEWER @ 60.0%

SEWER & S.D. LINE "B" PROFILE

SCALE: 1"=40' H. 1"=8' V.

BACK CORNER @ 2.85 G40.7 T.W.

BACK CORNER @ 3.03, G38.30 T.W.

EXIST. GROUND BACK OF WALL

PROFILE - RETAINING WALL

SCALES: HORIZ. 1"=5' VERT 1"=2'

1+23.49 E.A. G51.49 T.C.

1+00 R @ 'B' ST CDS G51.70 T.C.

CONT'D INDES SEE SHT. 4

TOP OF CURB

TOP OF 10" RCP WATER

9.69%

3' COVER

INSTALLATION PERFORMED CITY FORCES

PROFILE

6' HIGH CHAIN LINK FENCE PER M-G

FOR RET. WALL ELEV. SEE PROFILE ABOVE

DETAIL - C PLAN

N.T.S.

6" CONC. PAD FOR 4" DIAMETER SERVICE W/ FULL BYPASS BACK FLOW PREVENTION VALVE. METER CONST. TO BE DONE BY CITY

PROFILE: FIRE ACCESS ROAD

SCALES: HORIZ 1"=40' VERT 1"=8'

FIRE ACCESS ROAD

TYPICAL STREET SECTION

ELEV. SHOWN ON PROFILE

FIRE HYD LOCATION

6" TYPE 'G' CURB

6" F.C.C. SIDEWALK

PAVEMENT DEPTH DETERMINED IN FIELD BY SOIL ENGINEER PER SCHEDULE H.

ACCESS RD.

CART PATH

HIGHLAND RANCH RD.

WIER @ 624.40

Q80 = 38 CFS

15"~ EXIST 18" RCP @ 0.55% I350-12

Q80 = 18" RCP I350-D @ 0.55%

18" S.D. PROFILE

SCALE: 1"=40' H. 1"=4'

DETAIL: TYPICAL WATER-TIGHT JOINT

NO SCALE

NOTE: WATER TIGHT JOINTS SHALL BE USED WHEN STORM DRAIN PIPE GRADE IS 20.0% OR GREATER

SEE ENCROACHMENT REMOVAL AGREEMENT NO. 880522 - FOR PRIVATE (H.O.A.) 1½" IRR. SLEEVE W/ 1" IRR. LATERAL IN PUBLIC R/W

DETAIL 'B' CURB FORMED DITCH

NO SCALE

NOTES:
1. MAY BE POURED MONOLITHICALLY.
2. PROVIDE TRANSVERSE JOINTS PER REGIONAL STANDARD DRAWING NO. S-10 AS FOLLOWS:
- ½" EXPANSION JOINTS @ 45' O.C. AND ADJACENT TO DRAINAGES
- WEAKENED PLANE JOINTS @ 15' O.C.

SEWER & S.D. PLAN

SCALE: 1"=40'

FOR IMP'S SEE REF. DWG. NO. 24520-D

FOR IMP'S SEE REF. DWG. NO. 24533-D

UNIT 1 | UNIT 3 | UNIT 2

LINE A 18" R.C.P. 97.94'

108.27

169.03' 24" R.C.P. LINE B

20' WIDE SEWER & S.D. EASEMENT PER FINAL MAP

8" PVC. SEWER LINE A

8" SEWER LINE A

8" PVC. SEWER LINE B

18" R.C.P. LINE B

FERNCREST PL. SEE SHT 3

CHESTNUT HILL LANE SEE SHT 2

EXIST. 10" A.C.P. WATER

EXIST. 24" R.C.P. S.D.

EXIST. 10" R.C.P. I.D.

HIGHLAND RANCH RD.

EXIST. 8" WATER

EXIST. 18" R.C.P. I.D.

REMOVE CAP & TIE EXIST. 8" WATER

EXIST. 18" R.C.P. I.D.

TYPE 'F' CB RIM G22.53 WIER OPENING @ 624.40

25' TOP CURB @ 3.0%

G' GUTTER TRANS WARP GUTTER TO MEET WIER OPENING @ 624.40

TYPE 'F' CATCH BASIN

DETAIL 'A' N.T.S.

CB & GUTT. 1

CURB ONLY 1

4149.50 E.C.

PRIVATE WATER SERVICE

SEE DETAIL 'A' SHT 4

SEE DETAIL 'B' SHT 4

EXIST. DRAINAGE EASEMENT PER DEED

EXIST. ACCESS DWY.

EXIST. 10" R.C.P. I.D.

EXIST. 24" R.C.P. I.D.

EXIST. 10" A.C.P. WATER

EXIST. 18" R.C.P. I.D.

EXIST. HIGHLAND RANCH ROAD

BERM DATA
① Δ=69°20'32" R=92 L=99.06'

P.R.D. 87-0524
PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF:
CARMEL MOUNTAIN RANCH
20-B UNIT 3

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 2 OF 14 SHEETS

P.R. No. 87-0524
I.O. No. 880522

SB&O
PLANNING · DESIGN · CONSULTATION
Civil Engineering
Structural Engineering
Land Surveying
SAFINO, BUTCHER & ORMONDE, INC.
7055 Kearny Villa Road Suite 201
San Diego, California 92123 (619) 560-1131

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
A CHANGE	SB&O	CR	4-11-89	
B CHANGE	SB&O	CR	5-3-89	
C AS-BUILT	SB&O	Revised	8-24-89	

Wesley K. Zicker 9.27.88
WESLEY K. ZICKER R.C.E. 51160

292-1747

CONTRACTOR: PRESLEY DEV. CO. DATE STARTED 1-10-89
INSPECTOR: PEREIRA, RAMIREZ DATE COMPLETED 1-18-89

24565-2-D

34182.10

AS BUILT

Δ AS-BUILT - E.R.A. (PRIVATE IRR. SLEEVE) 5-27-93

Δ CHANGED WATER MAIN MATERIALS FROM PVC TO ACP ADDED 4" METER SERVICE. ADDED PLAN, PROFILE & DETAIL OF RETAINING WALL.

5/23/88
7/17/89
7-27-92

WERRIS CREEK LANE

Cb. INLET @ STA. 11+13.83

WERRIS CREEK LANE

Cb IN. FT AT STA. 10+83.19

WERRIS CREEK LANE

Cb. INLET AT STA. 10+49.19 (RT)

SCALE: HOR. 1"=20'
VER. 1"=4'

EASTBOURNE ROAD

Cb. INLET AT STA. 22+40.30

WERRIS CREEK LANE

Cb. INLET AT STA. 10+49.19 (LT)

GABLE RIDGE ROAD

Cb. INLET AT STA. 36+36.53

GABLE RIDGE ROAD

Cb. INLET AT STA. 36+08.59

GABLE RIDGE ROAD

Cb. INLET AT STA. 37+06.59

EASTBOURNE ROAD

Cb. INLET AT STA. 22+13.97

Cb. INLET AT STA. 23+14.97

SCALE: HOR. 1"=20'
VER. 1"=4'

F.S. & PROFILE 3.393 %

TOP. 8" A.C.P. WATER

12" P.V.C. @ 3.1% SAN. SEW.

12" P.V.C. SAN. SEW.

24+03.00 SAN. MH. NO. 22

37+06.69 6"-7" CLEANOUT
635.67 RIM

37+49.09 6"-7" CLEANOUT
634.80 RIM, NO2. X-7'; Y-5'

37+49.09 6"-7"
634.63 F.S.

634 ± 2 FL.

Q_{100} = 486 C.F.S.
V_n = F.P.S.

606.56' - 72" C.I.P.C.P. @ 2.12% (7' WALLS)

34+49.09 B.C.
622.702 FL.

35+43.41 E.C.
624.90 FL.

622.07 FL.
18" R.C.P.

624.14 FL.
18" R.C.P.

6" P.V.C.
622.70 FL.

622.21 FL.
18" R.C.P.
SEE SHEET 22 FOR PROFILE

Q_{100} = 676 cfs
V_n = 28.2 fps

623.60 FL.
24" R.C.P.

621.67 FL.

621.08 FL.

619.60 FL.

618.47 FL.

38.00'-72" C.I.P.C.P.
@ 2.96% (7' WALLS)

37+49.09 6"-7"
CLEANOUT
618.11 FL.

33+11.09 6"-7" CLEANOUT
621.07 RIM

39+96.09 INSIDE FACE
WING HEADWALL

TO BE "AS-BUILT"

40+53.00 CAYLIGHT JOIN
& NATURAL CHANNEL
616.5 FL.

612.39

612.50

FL. 618.49

EAST GROUND

2177.50'-72" R.C.P @ 2.76%
(1350-D)

RIP RAP ENERGY DISSIPATOR TO ELEVATION 617.5 MIN PER D-401 TYPE 2. 2 TON ROCK 54" THICK MIN & 12" FILTER BLANKET (10" OF 2" AGGREGATE & 12" SAND)

2300'-78" R.C.P.
@ 1.88 % (1350-D)

PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=4'

SCALE: 1"=40'

SEE SHEET NO. 20
MATCH LINE STA. 31+00

24+03.00
SAN. MH. NO. 22

35+43.41 E.C.

SEE SHT. NO. 19
FOR INLET STA.
23+14.97

23+14.97 - 5' TYPE 'B'
CURB INLET

S.M.H. NO. 5
37+53.39
@ 37+49.09
EASTBOURNE RD.

37+49.09 6"-7"
CLEANOUT
MODIFIED X-7'; Y-5'

8" A.C.P. WATER

12" P.V.C. SAN. SEW.

8" A.C.P. WATER

36" R.C.P. SAN. SEW.

L=46.80'

L=44.02'

L=41.01'

L=41.01'

L=5.82'

45.08'

44.00'

28.00'

36.02'

44.00'

81.67'

200'

ROAD

EASTBOURNE

20' STORM DRAIN EASEMENT

12.5'

12.5'

13.5'

66.0'

49.41'±

39+71.09 6"-8"
CLEANOUT

39+96.09 WING
HEADWALL PER
STD D-35

MATCH EXIST
CHANNEL

37+06.69 6"-7"
CLEANOUT

CONCRETE LUG PER
STD DRAWING D-63

NOTE: FOR STREET IMPROVEMENT
SEE SHEET NO 12

AS OF 2-10-86 I AM THE ENGINEER OF RECORD. TO THE BEST OF MY KNOWLEDGE, THIS PLAN SHOWS THE FACILITIES AND THEIR LOCATION BASED ON DATA FURNISHED BY THE CONTRACTOR AND INSPECTED BY THE CITY'S RESIDENT ENGINEER. FOR PURPOSES OF FUTURE CONSTRUCTION LOCATION OF FACILITIES MUST BE VERIFIED IN THE FIELD.

"AS-BUILT"

BRUCE A. ROBERTSON
R.C.E. 48529

DATE
EXPIRES 6-30-86

P&D CONSULTANTS, INC.

The McGuire Group — ENGINEER OF WORK — (EXPIRES 9-30-88)

LEROY C. BODAS, R.C.E. 22312 — DATE

STORM DRAIN DATA

NO	BEARING	R	L	REMARKS
1.	N 01°02'00" E.		34.09	72" CIRCP (7' WALLS)
2.	S 11°16'00" E.	510.00'	100.23'	"
3.	N 10°14'00" W.		157.18'	"
4.	N 10°14'00" W.		38.00'	"
5.	N 10°14'00" W.		2177.50'	72" R.C.P.
6.	N 10°14'00" W.		23.00'	78" R.C.P.

PRIVATE CONTRACT

PLAN FOR THE IMPROVEMENT OF:

STORM DRAIN
GABLE RIDGE ROAD
CARMEL MOUNTAIN RANCH UNIT NO. 10

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 21 OF 43 SHEETS

T.M. 85-0401
W.O. NO. 850401

C.R. Stadtlander 4-17-86

DESCRIPTION	BY	L.A. ROLLED	DATE	FILMED
ORIGINAL				
"A" CHANGE	McGUIRE GROUP	CR Stadtlander	12-22-87	
AS-BUILT	P&D	Chuck Wilkes		

CONTROL IDENTIFICATION
296-1747

CONTRACTOR PDQ-SLOAT — DATE STARTED 10-1-86
INSPECTOR D. GABRIEL — DATE COMPLETED 1-6-88

22745-21-D
PROJECT NO. 1063

AS BUILT

A CHANGE - ADD STORM DRAIN

STORM DRAIN @ EASTBOURNE RD. CARMEL RIDGE RD.

PROFILE

SCALES: HORIZ 1"=40' VERT. 1"=8'

E'LY CURB RETURN EASTBOURNE @ CARMEL RIDGE RD.

SCALE: HORIZ. 1"=20' VERT. 1"=4'

W'LY CURB RETURN EASTBOURNE @ CARMEL RIDGE RD.

SCALE: HORIZ. 1"=20' VERT. 1"=4'

NOTE: T.C. EL. = ℄ +0.04' UNLESS OTHERWISE SHOWN

PRIVATE STORM DRAIN, SEE ENCROACHMENT REMOVAL AGREEMENT NO. 870255-3

10' STORM DRAIN EASEMENT

SEE SHEET NO. 6 FOR STORM DRAIN THROUGH LOTS 10-31

NOT ON FINAL MAP (NOT INSTALLED)

SCALE: 1"=40'

18+98.83 E.C. MATCH LINE SEE SHT. 5

EASTBOURNE ROAD

PRIVATE STORM DRAIN DATA				
NO	DELTA/BEAR	RADIUS	LENGTH	REMARK
(1)	N18°38'03"W	35.00'	24"R.C.P.	
(2)	16°42'15"	163.00'	47.52'	24"R.C.P.
(3)	68°03'35"	45.00'	46.60'	24"R.C.P.

CURB DATA			
NO	DELTA	RADIUS	LENGTH
(1)	86°26'45"	30.00'	45.26'
(2)	93°50'42"	30.00'	49.14'

PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF:

CARMEL MOUNTAIN RANCH UNIT 20-A

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 4 OF 29 SHEETS

T.M. 87-0255
W.O. 870298
NO

C R Stafford 2-17-88

AS-BUILT 5810 Mylar 8-5-95

294-1745

20088-4-D

SAMUEL F SAFINO R.C.E. 13177 11-5-97

AS-BUILT: 8-17-95

AS BUILT

38842.10

TC = 719.62 TYPE "D" INLET
11187.60 DWY "B"
5112.99 LINE "C"

PRIVATE RET. WALL PER SHT 45

720

710

700

FOR CONTINUATION OF 18" R.C.P. SEE SHEET 39

CUT OFF WALL PER S-10 (TYP. 2 PL.)

"A" LINE

SUBDIVISION BOUNDARY

"C" LINE

T.B. 700.71 TYPE "B" C.O.
4+22.02

E 700.63

E 698.87

E 692.11

E 691.78

Q = 4.8 CFS

EXIST. AND FINISHED GRADE OVER TOP OF PIPE

IDENTICAL POINT

E 686.20

56.97'~18" R.C.P. (1350-D) @ 29.00% USE WATER TIGHT JOINTS

165.22'~18" RCP @ 3.50% (1350-D)

5 4 3 2 1

T.B. GALLOS TYPE "A-A" C.O.
2+92.80 ~ LINE "C"

Q = 4.8 C.F.S.

EXIST. AND FINISHED GRADE OVER TOP OF PIPE

I.E. 684.65	1+88.92
I.E. 684.57	1+99.56
I.E. 683.73	1+70.18
I.E. 682.73	1+60.81
I.E. 681.35	1+51.44

101.88'~18" RCP @ 1% (1350-D)

57.49'+CIRCULAR VC
RADIUS = 242'
NOTE: USE WATERTIGHT JOINT (18" RCP) 1350-D

49.5'±~18" RCP @ 12.74% (1350-D)

T.B. 680.19 ~ EXIST. TYPE "F" C.B.
1+00.00 ~ LINE "C"

I.E. 673.05

T.E. 672.58

680

670

Q = 18.1 C.F.S.

EXIST. 24" RCP @ 1% PER DWG. NO. 24088-4-D

PROFILE: STORM DRAIN LINE "C"

SCALE: HORZ 1"=20' VERT: 1"=4'

FOR PRIVATE RETAINING WALL WITHIN DRAINAGE EASEMENT, SEE ENCROACHMENT REMOVAL AGREEMENT NO. 920035-4

FOR PRIVATE STORM DRAIN WITHIN PUBLIC DRAIN ESMT SEE ENCROACHMENT REMOVAL AGREEMENT NO. 920035-2

SCALE: 1"=20'

10' WIDE STORM DRAIN EASEMENT DEDICATED PER DWG. NO. 11948-2-B

2+92.80 ~ LINE "C" TYPE "A" C.O.

11+62.02 ~ E.O.

EAST BOURNE WAY

FOR EXIST. STREET IMPROVEMENT SEE DWG. NO. 24088-4-D

ROAD

PARCEL 3 OF PARCEL MAP NO. 16647 CARMEL MOUNTAIN RANCH GOLF COURSE

10' CABLE ESMT PER FINAL MAP

24" RCP TYP. @ 1% MIN. SLOPE

SEE SHT 45 FOR RET WALL "C" DETAILS

LOT 3

LOT 12

SUBDIVISION BOUNDARY

DRIVEWAY "G"

LOT 4

10" PVC (IPAN) @ 1.0% MIN

FOR STORM DRAIN CONTINUATION SEE SHEET 39

1+00 ~ LINE "C"
11+21.90 ~ 40' LT.
± EXIST TYPE "F" C.B.
WEIR ELEV. = 677.0

EXIST 24" R.C.P. @ 1% PER DWG. NO. 24088-4-D

PLAN: STORM DRAIN LINE "C"

STORM DRAIN DATA				
NO.	DELTA OR BRG.	RADIUS	LENGTH	REMARKS
(1)	Δ = 35°52'13"	91'	* 56.97'	18" RCP 1350-D
(2)	N 67° 16' 04" W		165.22'	"
(3)	N 00° 56' 04" W		198.80'	"

* USE WATERTIGHT JOINTS (SEE SHEET 10 FOR DETAIL)

BEVEL NOTE:
·BEVELLING SHOULD BE DONE IN VERTICAL DIRECTION. BEVEL INFORMATION IS TO BE PROVIDED BY PIPE MANUFACTURER AND SUBMITTED TO FIELD INSPECTOR FOR APPROVAL PRIOR TO CONSTRUCTION OF PIPE

LUNDSTROM & ASSOCIATES
3665 PACIFIC CENTER BLVD., SUITE 703
SAN DIEGO, CALIFORNIA 92121
(619) 450-1445 FAX 450-1094

BENCHMARK:
BRASS PIN IN NORTHERLY CURB RETURN AT INTERSECTION CARMEL MOUNTAIN ROAD & PENASQUITOS DRIVE, ELEV. 626.012 M.S.L. DATUM.

ENGINEER OF WORK:
JEFFREY R. LUNDSTROM
DATE: 12-14-92
R.C.E. 21245

PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF:

STORM DRAIN LINE "C"

IN CARMEL MOUNTAIN RANCH UNIT NO. 19

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 11 OF 57 SHEETS

T.M. 90-1148
W.O. NO. 920035

For City Engineer — Date: 2/19/93

DESCRIPTION	BY	APPROVED	DATE	FILED
ORIGINAL	L&A			
A CHANGE	L&A			
AS-BUILT	L&A			

1936-6305
NAD 83C
296-1745
LOCKHEED NUMBER

CONTRACTOR FREBLEY U.S.D. DATE STARTED 3-1-93
INSPECTOR R. GABRIEL DATE COMPLETED 11-1-93

26514-11-D

"AS-BUILT"

A CHANGE: REVISE GRADING, REVISE STORM DRAIN

APPENDIX 5

Detention Basin Routing Analysis

PROJECT DESIGN CONSULTANTS

PLANNING | LANDSCAPE ARCHITECTURE
ENGINEERING | SURVEY

WWW.PROJECTDESIGN.COM

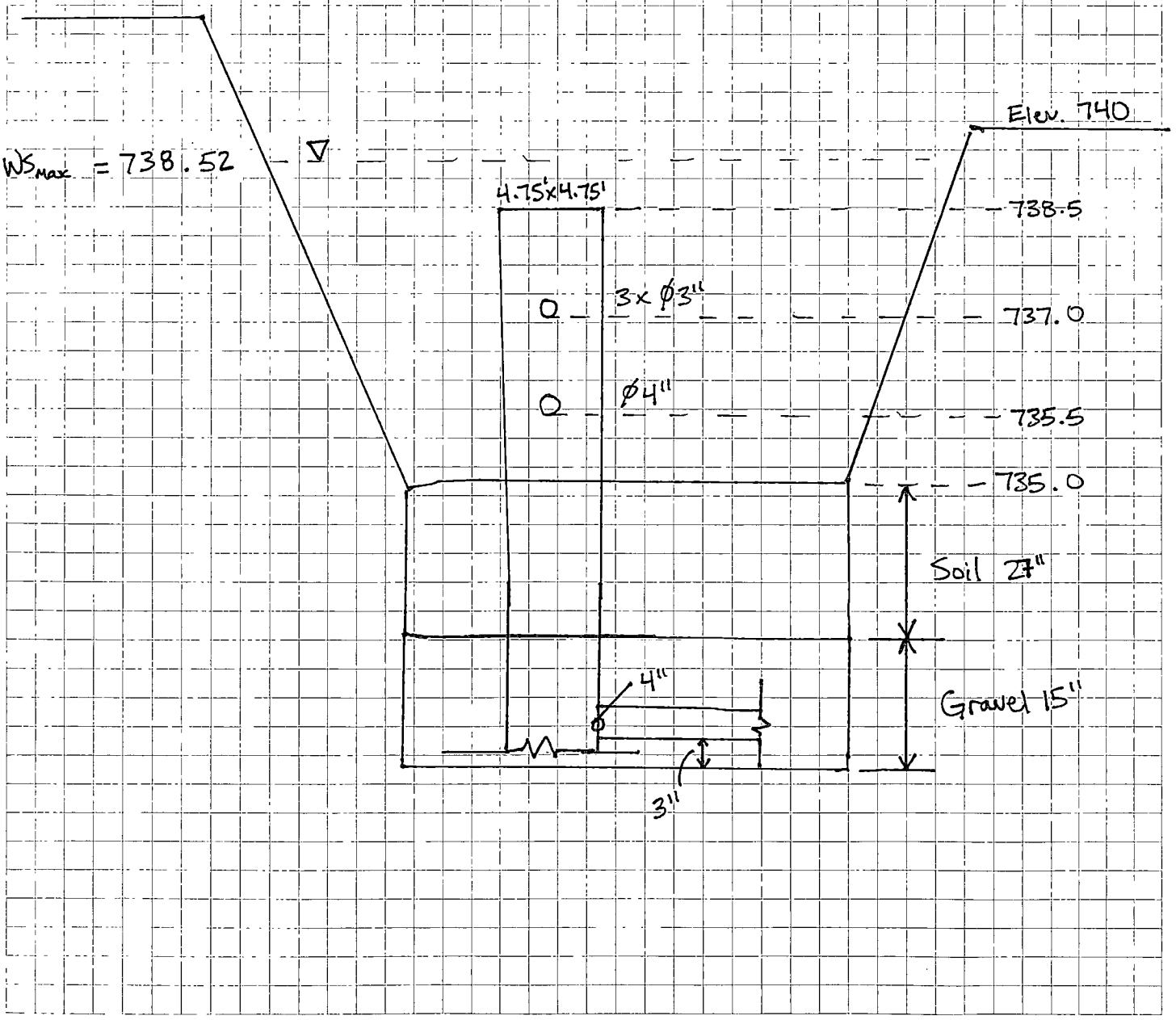
PROJECT The Hills at CMR
SUBJECT BMP Basin 9

PAGE : _____ OF _____ JOB NO. : 4394.00
DRAWN BY : G. Anderson DATE : _____
CHECKED BY : _____ DATE : _____

$Q_{max\ in}$ = 23.0 cfs

Q_{out} = 2.93 cfs

WS_{max} = 738.52

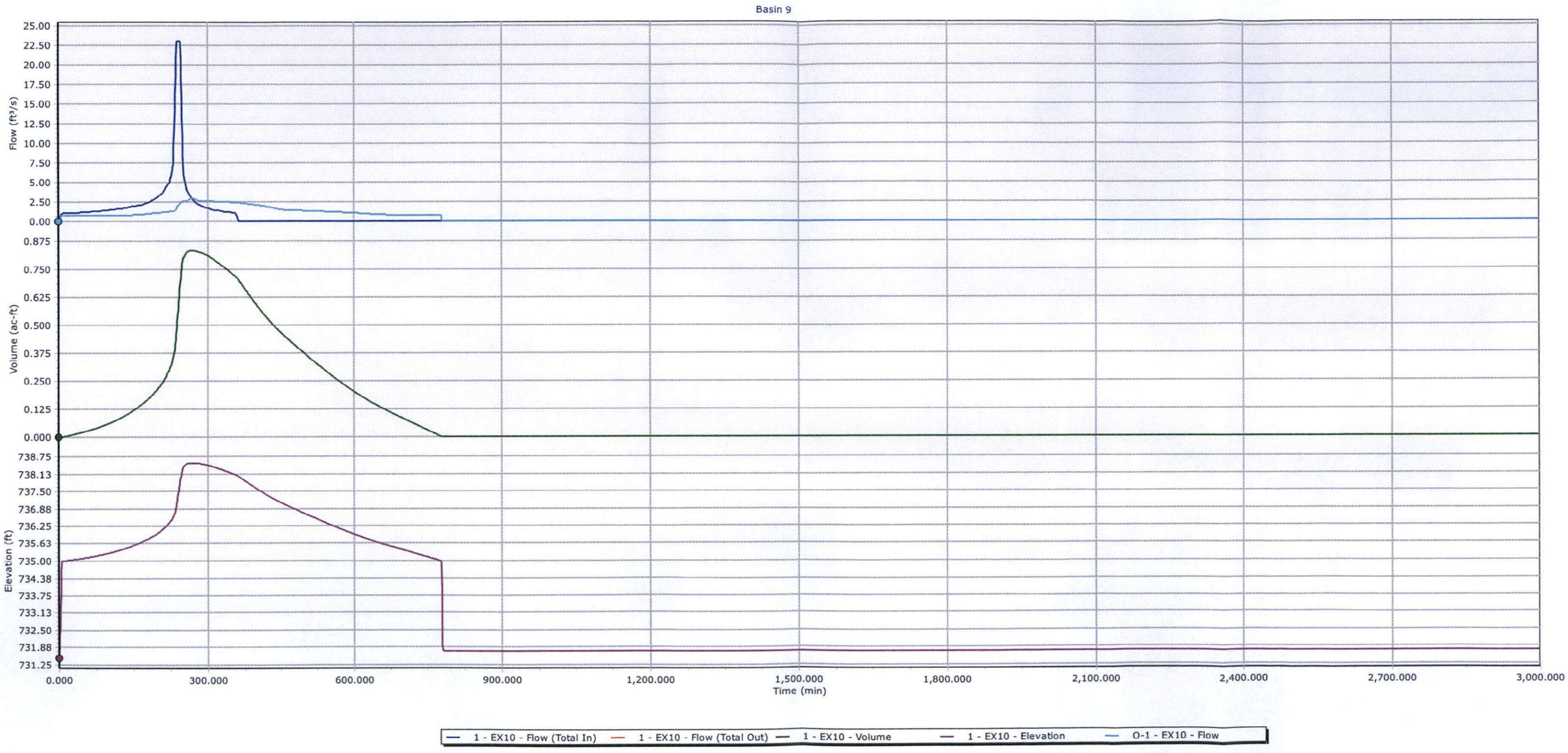


RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 9/30/2019
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 7 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 6.96 ACRES
RUNOFF COEFFICIENT 0.83
PEAK DISCHARGE 23 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 7	DISCHARGE (CFS) = 1
TIME (MIN) = 14	DISCHARGE (CFS) = 1.1
TIME (MIN) = 21	DISCHARGE (CFS) = 1.1
TIME (MIN) = 28	DISCHARGE (CFS) = 1.1
TIME (MIN) = 35	DISCHARGE (CFS) = 1.1
TIME (MIN) = 42	DISCHARGE (CFS) = 1.1
TIME (MIN) = 49	DISCHARGE (CFS) = 1.2
TIME (MIN) = 56	DISCHARGE (CFS) = 1.2
TIME (MIN) = 63	DISCHARGE (CFS) = 1.2
TIME (MIN) = 70	DISCHARGE (CFS) = 1.3
TIME (MIN) = 77	DISCHARGE (CFS) = 1.3
TIME (MIN) = 84	DISCHARGE (CFS) = 1.3
TIME (MIN) = 91	DISCHARGE (CFS) = 1.4
TIME (MIN) = 98	DISCHARGE (CFS) = 1.4
TIME (MIN) = 105	DISCHARGE (CFS) = 1.5
TIME (MIN) = 112	DISCHARGE (CFS) = 1.5
TIME (MIN) = 119	DISCHARGE (CFS) = 1.6
TIME (MIN) = 126	DISCHARGE (CFS) = 1.6
TIME (MIN) = 133	DISCHARGE (CFS) = 1.7
TIME (MIN) = 140	DISCHARGE (CFS) = 1.8
TIME (MIN) = 147	DISCHARGE (CFS) = 1.9
TIME (MIN) = 154	DISCHARGE (CFS) = 1.9
TIME (MIN) = 161	DISCHARGE (CFS) = 2.1
TIME (MIN) = 168	DISCHARGE (CFS) = 2.1
TIME (MIN) = 175	DISCHARGE (CFS) = 2.3
TIME (MIN) = 182	DISCHARGE (CFS) = 2.4
TIME (MIN) = 189	DISCHARGE (CFS) = 2.7
TIME (MIN) = 196	DISCHARGE (CFS) = 2.9
TIME (MIN) = 203	DISCHARGE (CFS) = 3.3
TIME (MIN) = 210	DISCHARGE (CFS) = 3.6
TIME (MIN) = 217	DISCHARGE (CFS) = 4.4
TIME (MIN) = 224	DISCHARGE (CFS) = 5
TIME (MIN) = 231	DISCHARGE (CFS) = 7.3
TIME (MIN) = 238	DISCHARGE (CFS) = 24
TIME (MIN) = 245	DISCHARGE (CFS) = 23
TIME (MIN) = 252	DISCHARGE (CFS) = 5.8
TIME (MIN) = 259	DISCHARGE (CFS) = 3.9

TIME (MIN) = 266	DISCHARGE (CFS) = 3.1
TIME (MIN) = 273	DISCHARGE (CFS) = 2.6
TIME (MIN) = 280	DISCHARGE (CFS) = 2.2
TIME (MIN) = 287	DISCHARGE (CFS) = 2
TIME (MIN) = 294	DISCHARGE (CFS) = 1.8
TIME (MIN) = 301	DISCHARGE (CFS) = 1.7
TIME (MIN) = 308	DISCHARGE (CFS) = 1.5
TIME (MIN) = 315	DISCHARGE (CFS) = 1.4
TIME (MIN) = 322	DISCHARGE (CFS) = 1.4
TIME (MIN) = 329	DISCHARGE (CFS) = 1.3
TIME (MIN) = 336	DISCHARGE (CFS) = 1.2
TIME (MIN) = 343	DISCHARGE (CFS) = 1.2
TIME (MIN) = 350	DISCHARGE (CFS) = 1.1
TIME (MIN) = 357	DISCHARGE (CFS) = 1.1
TIME (MIN) = 364	DISCHARGE (CFS) = 0


Basin 9
Flow (ft³/s)
25.00
22.50
20.00
17.50
15.00
12.50
10.00
7.50
5.00
2.50
0.00
Volume (ac-ft)
0.875
0.750
0.625
0.500
0.375
0.250
0.125
0.000
Elevation (ft)
738.75
738.13
737.50
736.88
736.25
735.63
735.00
734.38
733.75
733.13
732.50
731.88
731.25
0.000
300.000
600.000
900.000
1,200.000
1,500.000
1,800.000
2,100.000
2,400.000
2,700.000
3,000.000
Time (min)
1 - EX10 - Flow (Total In)
1 - EX10 - Flow (Total Out)
1 - EX10 - Volume
1 - EX10 - Elevation
O-1 - EX10 - Flow

Basin 9

Project Summary	
Title	Basin 9
Engineer	PDC
Company	PDC
Date	9/30/2019

Notes

Basin 9

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
CM-1	EX10	0	1.424	238.000	23.00

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
O-1	EX10	0	1.424	268.000	2.93

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	1.424	238.000	23.00	(N/A)	(N/A)
1 (OUT)	EX10	0	1.424	268.000	2.93	738.52	0.833

Basin 9

Subsection: Read Hydrograph
Label: CM-1

Return Event: 100 years
Storm Event:

Peak Discharge	23.00 ft³/s
Time to Peak	245.000 min
Hydrograph Volume	1.424 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 7.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	1.00	1.10	1.10	1.10
35.000	1.10	1.10	1.20	1.20	1.20
70.000	1.30	1.30	1.30	1.40	1.40
105.000	1.50	1.50	1.60	1.60	1.70
140.000	1.80	1.90	1.90	2.10	2.10
175.000	2.30	2.40	2.70	2.90	3.30
210.000	3.60	4.40	5.00	7.30	23.00
245.000	23.00	5.80	3.90	3.10	2.60
280.000	2.20	2.00	1.80	1.70	1.50
315.000	1.40	1.40	1.30	1.20	1.20
350.000	1.10	1.10	0.00	(N/A)	(N/A)

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
5.000	0.001	0.001	0.001	0.001	0.001
10.000	0.001	0.001	0.002	0.002	0.003
15.000	0.003	0.004	0.004	0.005	0.006
20.000	0.006	0.007	0.007	0.008	0.008
25.000	0.009	0.009	0.010	0.010	0.011
30.000	0.011	0.012	0.012	0.013	0.013
35.000	0.014	0.015	0.015	0.016	0.016
40.000	0.017	0.017	0.018	0.018	0.019
45.000	0.019	0.020	0.021	0.021	0.022
50.000	0.022	0.023	0.024	0.024	0.025
55.000	0.025	0.026	0.027	0.027	0.028
60.000	0.028	0.029	0.030	0.030	0.031
65.000	0.032	0.032	0.033	0.034	0.034
70.000	0.035	0.036	0.037	0.037	0.038
75.000	0.039	0.040	0.040	0.041	0.042
80.000	0.043	0.043	0.044	0.045	0.046
85.000	0.046	0.047	0.048	0.049	0.049
90.000	0.050	0.051	0.052	0.053	0.054
95.000	0.055	0.056	0.056	0.057	0.058
100.000	0.059	0.060	0.061	0.062	0.063
105.000	0.064	0.065	0.066	0.067	0.068
110.000	0.069	0.070	0.071	0.072	0.073
115.000	0.074	0.075	0.076	0.077	0.078
120.000	0.079	0.081	0.082	0.083	0.084
125.000	0.085	0.086	0.087	0.088	0.090
130.000	0.091	0.092	0.093	0.094	0.096
135.000	0.097	0.098	0.100	0.101	0.102
140.000	0.104	0.105	0.107	0.108	0.109
145.000	0.111	0.112	0.114	0.115	0.117
150.000	0.118	0.120	0.121	0.123	0.124
155.000	0.126	0.127	0.129	0.131	0.132
160.000	0.134	0.136	0.137	0.139	0.141
165.000	0.142	0.144	0.146	0.147	0.149
170.000	0.151	0.153	0.154	0.156	0.158
175.000	0.160	0.162	0.164	0.166	0.168
180.000	0.170	0.172	0.173	0.175	0.178
185.000	0.180	0.182	0.184	0.186	0.188
190.000	0.191	0.193	0.195	0.198	0.200
195.000	0.203	0.205	0.208	0.210	0.213
200.000	0.216	0.219	0.222	0.225	0.228

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
205.000	0.231	0.234	0.237	0.240	0.244
210.000	0.247	0.250	0.254	0.258	0.262
215.000	0.266	0.270	0.274	0.279	0.283
220.000	0.288	0.293	0.298	0.303	0.308
225.000	0.313	0.319	0.325	0.332	0.339
230.000	0.347	0.355	0.364	0.377	0.393
235.000	0.412	0.434	0.459	0.487	0.517
240.000	0.546	0.575	0.604	0.632	0.661
245.000	0.689	0.716	0.739	0.759	0.776
250.000	0.789	0.798	0.804	0.809	0.812
255.000	0.816	0.819	0.822	0.824	0.826
260.000	0.828	0.829	0.830	0.831	0.832
265.000	0.833	0.833	0.833	0.833	0.833
270.000	0.833	0.833	0.833	0.833	0.832
275.000	0.832	0.831	0.831	0.830	0.829
280.000	0.829	0.828	0.828	0.827	0.826
285.000	0.825	0.825	0.824	0.823	0.822
290.000	0.821	0.820	0.819	0.818	0.817
295.000	0.816	0.815	0.814	0.813	0.811
300.000	0.810	0.809	0.808	0.807	0.805
305.000	0.804	0.803	0.801	0.800	0.798
310.000	0.797	0.795	0.794	0.792	0.791
315.000	0.789	0.787	0.786	0.784	0.783
320.000	0.781	0.780	0.778	0.777	0.775
325.000	0.774	0.772	0.770	0.769	0.767
330.000	0.765	0.764	0.762	0.760	0.759
335.000	0.757	0.755	0.753	0.752	0.750
340.000	0.748	0.746	0.745	0.743	0.741
345.000	0.740	0.738	0.736	0.734	0.732
350.000	0.731	0.729	0.727	0.725	0.723
355.000	0.722	0.720	0.718	0.716	0.714
360.000	0.712	0.709	0.707	0.704	0.700
365.000	0.697	0.694	0.691	0.688	0.684
370.000	0.681	0.678	0.675	0.672	0.669
375.000	0.666	0.662	0.659	0.656	0.653
380.000	0.650	0.647	0.644	0.641	0.638
385.000	0.635	0.632	0.629	0.626	0.623
390.000	0.620	0.617	0.614	0.611	0.608
395.000	0.605	0.602	0.599	0.597	0.594
400.000	0.591	0.588	0.585	0.582	0.580
405.000	0.577	0.574	0.571	0.569	0.566

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
410.000	0.563	0.560	0.558	0.555	0.552
415.000	0.550	0.547	0.544	0.542	0.539
420.000	0.536	0.534	0.531	0.529	0.526
425.000	0.524	0.521	0.519	0.516	0.514
430.000	0.511	0.509	0.507	0.504	0.502
435.000	0.499	0.497	0.495	0.493	0.490
440.000	0.488	0.486	0.484	0.482	0.479
445.000	0.477	0.475	0.473	0.471	0.469
450.000	0.467	0.465	0.463	0.461	0.459
455.000	0.457	0.455	0.453	0.451	0.449
460.000	0.447	0.445	0.443	0.441	0.439
465.000	0.437	0.435	0.433	0.431	0.429
470.000	0.427	0.425	0.423	0.421	0.419
475.000	0.417	0.415	0.414	0.412	0.410
480.000	0.408	0.406	0.404	0.402	0.400
485.000	0.398	0.396	0.395	0.393	0.391
490.000	0.389	0.387	0.385	0.383	0.381
495.000	0.380	0.378	0.376	0.374	0.372
500.000	0.370	0.368	0.367	0.365	0.363
505.000	0.361	0.359	0.357	0.356	0.354
510.000	0.352	0.350	0.348	0.347	0.345
515.000	0.343	0.341	0.339	0.338	0.336
520.000	0.334	0.332	0.330	0.329	0.327
525.000	0.325	0.323	0.322	0.320	0.318
530.000	0.316	0.315	0.313	0.311	0.309
535.000	0.308	0.306	0.304	0.303	0.301
540.000	0.299	0.297	0.296	0.294	0.292
545.000	0.291	0.289	0.287	0.286	0.284
550.000	0.282	0.281	0.279	0.277	0.276
555.000	0.274	0.272	0.271	0.269	0.267
560.000	0.266	0.264	0.262	0.261	0.259
565.000	0.258	0.256	0.254	0.253	0.251
570.000	0.250	0.248	0.246	0.245	0.243
575.000	0.242	0.240	0.239	0.237	0.235
580.000	0.234	0.232	0.231	0.229	0.228
585.000	0.226	0.225	0.223	0.222	0.220
590.000	0.219	0.217	0.215	0.214	0.213
595.000	0.211	0.210	0.208	0.207	0.205
600.000	0.204	0.202	0.201	0.199	0.198
605.000	0.196	0.195	0.193	0.192	0.191
610.000	0.189	0.188	0.186	0.185	0.184

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
615.000	0.182	0.181	0.179	0.178	0.177
620.000	0.175	0.174	0.173	0.171	0.170
625.000	0.169	0.167	0.166	0.165	0.163
630.000	0.162	0.161	0.160	0.158	0.157
635.000	0.156	0.154	0.153	0.152	0.151
640.000	0.150	0.148	0.147	0.146	0.145
645.000	0.144	0.142	0.141	0.140	0.139
650.000	0.138	0.136	0.135	0.134	0.133
655.000	0.132	0.131	0.129	0.128	0.127
660.000	0.126	0.125	0.124	0.123	0.122
665.000	0.120	0.119	0.118	0.117	0.116
670.000	0.115	0.114	0.113	0.111	0.110
675.000	0.109	0.108	0.107	0.106	0.105
680.000	0.104	0.103	0.102	0.101	0.099
685.000	0.098	0.097	0.096	0.095	0.094
690.000	0.093	0.092	0.091	0.090	0.089
695.000	0.087	0.086	0.085	0.084	0.083
700.000	0.082	0.081	0.080	0.079	0.078
705.000	0.077	0.076	0.075	0.073	0.072
710.000	0.071	0.070	0.069	0.068	0.067
715.000	0.066	0.065	0.064	0.063	0.062
720.000	0.061	0.060	0.059	0.058	0.056
725.000	0.055	0.054	0.053	0.052	0.051
730.000	0.050	0.049	0.048	0.047	0.046
735.000	0.045	0.044	0.043	0.042	0.041
740.000	0.040	0.039	0.038	0.036	0.035
745.000	0.034	0.033	0.032	0.031	0.030
750.000	0.029	0.028	0.027	0.026	0.025
755.000	0.024	0.023	0.022	0.021	0.020
760.000	0.019	0.018	0.017	0.015	0.014
765.000	0.013	0.012	0.011	0.010	0.009
770.000	0.008	0.007	0.006	0.005	0.003
775.000	0.002	0.001	0.001	0.001	0.000
780.000	0.000	0.000	0.000	0.000	0.000
785.000	0.000	0.000	0.000	0.000	0.000
790.000	0.000	0.000	0.000	0.000	0.000
795.000	0.000	0.000	0.000	0.000	0.000
800.000	0.000	0.000	0.000	0.000	0.000
805.000	0.000	0.000	0.000	0.000	0.000
810.000	0.000	0.000	0.000	0.000	0.000
815.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
820.000	0.000	0.000	0.000	0.000	0.000
825.000	0.000	0.000	0.000	0.000	0.000
830.000	0.000	0.000	0.000	0.000	0.000
835.000	0.000	0.000	0.000	0.000	0.000
840.000	0.000	0.000	0.000	0.000	0.000
845.000	0.000	0.000	0.000	0.000	0.000
850.000	0.000	0.000	0.000	0.000	0.000
855.000	0.000	0.000	0.000	0.000	0.000
860.000	0.000	0.000	0.000	0.000	0.000
865.000	0.000	0.000	0.000	0.000	0.000
870.000	0.000	0.000	0.000	0.000	0.000
875.000	0.000	0.000	0.000	0.000	0.000
880.000	0.000	0.000	0.000	0.000	0.000
885.000	0.000	0.000	0.000	0.000	0.000
890.000	0.000	0.000	0.000	0.000	0.000
895.000	0.000	0.000	0.000	0.000	0.000
900.000	0.000	0.000	0.000	0.000	0.000
905.000	0.000	0.000	0.000	0.000	0.000
910.000	0.000	0.000	0.000	0.000	0.000
915.000	0.000	0.000	0.000	0.000	0.000
920.000	0.000	0.000	0.000	0.000	0.000
925.000	0.000	0.000	0.000	0.000	0.000
930.000	0.000	0.000	0.000	0.000	0.000
935.000	0.000	0.000	0.000	0.000	0.000
940.000	0.000	0.000	0.000	0.000	0.000
945.000	0.000	0.000	0.000	0.000	0.000
950.000	0.000	0.000	0.000	0.000	0.000
955.000	0.000	0.000	0.000	0.000	0.000
960.000	0.000	0.000	0.000	0.000	0.000
965.000	0.000	0.000	0.000	0.000	0.000
970.000	0.000	0.000	0.000	0.000	0.000
975.000	0.000	0.000	0.000	0.000	0.000
980.000	0.000	0.000	0.000	0.000	0.000
985.000	0.000	0.000	0.000	0.000	0.000
990.000	0.000	0.000	0.000	0.000	0.000
995.000	0.000	0.000	0.000	0.000	0.000
1,000.000	0.000	0.000	0.000	0.000	0.000
1,005.000	0.000	0.000	0.000	0.000	0.000
1,010.000	0.000	0.000	0.000	0.000	0.000
1,015.000	0.000	0.000	0.000	0.000	0.000
1,020.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,025.000	0.000	0.000	0.000	0.000	0.000
1,030.000	0.000	0.000	0.000	0.000	0.000
1,035.000	0.000	0.000	0.000	0.000	0.000
1,040.000	0.000	0.000	0.000	0.000	0.000
1,045.000	0.000	0.000	0.000	0.000	0.000
1,050.000	0.000	0.000	0.000	0.000	0.000
1,055.000	0.000	0.000	0.000	0.000	0.000
1,060.000	0.000	0.000	0.000	0.000	0.000
1,065.000	0.000	0.000	0.000	0.000	0.000
1,070.000	0.000	0.000	0.000	0.000	0.000
1,075.000	0.000	0.000	0.000	0.000	0.000
1,080.000	0.000	0.000	0.000	0.000	0.000
1,085.000	0.000	0.000	0.000	0.000	0.000
1,090.000	0.000	0.000	0.000	0.000	0.000
1,095.000	0.000	0.000	0.000	0.000	0.000
1,100.000	0.000	0.000	0.000	0.000	0.000
1,105.000	0.000	0.000	0.000	0.000	0.000
1,110.000	0.000	0.000	0.000	0.000	0.000
1,115.000	0.000	0.000	0.000	0.000	0.000
1,120.000	0.000	0.000	0.000	0.000	0.000
1,125.000	0.000	0.000	0.000	0.000	0.000
1,130.000	0.000	0.000	0.000	0.000	0.000
1,135.000	0.000	0.000	0.000	0.000	0.000
1,140.000	0.000	0.000	0.000	0.000	0.000
1,145.000	0.000	0.000	0.000	0.000	0.000
1,150.000	0.000	0.000	0.000	0.000	0.000
1,155.000	0.000	0.000	0.000	0.000	0.000
1,160.000	0.000	0.000	0.000	0.000	0.000
1,165.000	0.000	0.000	0.000	0.000	0.000
1,170.000	0.000	0.000	0.000	0.000	0.000
1,175.000	0.000	0.000	0.000	0.000	0.000
1,180.000	0.000	0.000	0.000	0.000	0.000
1,185.000	0.000	0.000	0.000	0.000	0.000
1,190.000	0.000	0.000	0.000	0.000	0.000
1,195.000	0.000	0.000	0.000	0.000	0.000
1,200.000	0.000	0.000	0.000	0.000	0.000
1,205.000	0.000	0.000	0.000	0.000	0.000
1,210.000	0.000	0.000	0.000	0.000	0.000
1,215.000	0.000	0.000	0.000	0.000	0.000
1,220.000	0.000	0.000	0.000	0.000	0.000
1,225.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,230.000	0.000	0.000	0.000	0.000	0.000
1,235.000	0.000	0.000	0.000	0.000	0.000
1,240.000	0.000	0.000	0.000	0.000	0.000
1,245.000	0.000	0.000	0.000	0.000	0.000
1,250.000	0.000	0.000	0.000	0.000	0.000
1,255.000	0.000	0.000	0.000	0.000	0.000
1,260.000	0.000	0.000	0.000	0.000	0.000
1,265.000	0.000	0.000	0.000	0.000	0.000
1,270.000	0.000	0.000	0.000	0.000	0.000
1,275.000	0.000	0.000	0.000	0.000	0.000
1,280.000	0.000	0.000	0.000	0.000	0.000
1,285.000	0.000	0.000	0.000	0.000	0.000
1,290.000	0.000	0.000	0.000	0.000	0.000
1,295.000	0.000	0.000	0.000	0.000	0.000
1,300.000	0.000	0.000	0.000	0.000	0.000
1,305.000	0.000	0.000	0.000	0.000	0.000
1,310.000	0.000	0.000	0.000	0.000	0.000
1,315.000	0.000	0.000	0.000	0.000	0.000
1,320.000	0.000	0.000	0.000	0.000	0.000
1,325.000	0.000	0.000	0.000	0.000	0.000
1,330.000	0.000	0.000	0.000	0.000	0.000
1,335.000	0.000	0.000	0.000	0.000	0.000
1,340.000	0.000	0.000	0.000	0.000	0.000
1,345.000	0.000	0.000	0.000	0.000	0.000
1,350.000	0.000	0.000	0.000	0.000	0.000
1,355.000	0.000	0.000	0.000	0.000	0.000
1,360.000	0.000	0.000	0.000	0.000	0.000
1,365.000	0.000	0.000	0.000	0.000	0.000
1,370.000	0.000	0.000	0.000	0.000	0.000
1,375.000	0.000	0.000	0.000	0.000	0.000
1,380.000	0.000	0.000	0.000	0.000	0.000
1,385.000	0.000	0.000	0.000	0.000	0.000
1,390.000	0.000	0.000	0.000	0.000	0.000
1,395.000	0.000	0.000	0.000	0.000	0.000
1,400.000	0.000	0.000	0.000	0.000	0.000
1,405.000	0.000	0.000	0.000	0.000	0.000
1,410.000	0.000	0.000	0.000	0.000	0.000
1,415.000	0.000	0.000	0.000	0.000	0.000
1,420.000	0.000	0.000	0.000	0.000	0.000
1,425.000	0.000	0.000	0.000	0.000	0.000
1,430.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,435.000	0.000	0.000	0.000	0.000	0.000
1,440.000	0.000	0.000	0.000	0.000	0.000
1,445.000	0.000	0.000	0.000	0.000	0.000
1,450.000	0.000	0.000	0.000	0.000	0.000
1,455.000	0.000	0.000	0.000	0.000	0.000
1,460.000	0.000	0.000	0.000	0.000	0.000
1,465.000	0.000	0.000	0.000	0.000	0.000
1,470.000	0.000	0.000	0.000	0.000	0.000
1,475.000	0.000	0.000	0.000	0.000	0.000
1,480.000	0.000	0.000	0.000	0.000	0.000
1,485.000	0.000	0.000	0.000	0.000	0.000
1,490.000	0.000	0.000	0.000	0.000	0.000
1,495.000	0.000	0.000	0.000	0.000	0.000
1,500.000	0.000	0.000	0.000	0.000	0.000
1,505.000	0.000	0.000	0.000	0.000	0.000
1,510.000	0.000	0.000	0.000	0.000	0.000
1,515.000	0.000	0.000	0.000	0.000	0.000
1,520.000	0.000	0.000	0.000	0.000	0.000
1,525.000	0.000	0.000	0.000	0.000	0.000
1,530.000	0.000	0.000	0.000	0.000	0.000
1,535.000	0.000	0.000	0.000	0.000	0.000
1,540.000	0.000	0.000	0.000	0.000	0.000
1,545.000	0.000	0.000	0.000	0.000	0.000
1,550.000	0.000	0.000	0.000	0.000	0.000
1,555.000	0.000	0.000	0.000	0.000	0.000
1,560.000	0.000	0.000	0.000	0.000	0.000
1,565.000	0.000	0.000	0.000	0.000	0.000
1,570.000	0.000	0.000	0.000	0.000	0.000
1,575.000	0.000	0.000	0.000	0.000	0.000
1,580.000	0.000	0.000	0.000	0.000	0.000
1,585.000	0.000	0.000	0.000	0.000	0.000
1,590.000	0.000	0.000	0.000	0.000	0.000
1,595.000	0.000	0.000	0.000	0.000	0.000
1,600.000	0.000	0.000	0.000	0.000	0.000
1,605.000	0.000	0.000	0.000	0.000	0.000
1,610.000	0.000	0.000	0.000	0.000	0.000
1,615.000	0.000	0.000	0.000	0.000	0.000
1,620.000	0.000	0.000	0.000	0.000	0.000
1,625.000	0.000	0.000	0.000	0.000	0.000
1,630.000	0.000	0.000	0.000	0.000	0.000
1,635.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,640.000	0.000	0.000	0.000	0.000	0.000
1,645.000	0.000	0.000	0.000	0.000	0.000
1,650.000	0.000	0.000	0.000	0.000	0.000
1,655.000	0.000	0.000	0.000	0.000	0.000
1,660.000	0.000	0.000	0.000	0.000	0.000
1,665.000	0.000	0.000	0.000	0.000	0.000
1,670.000	0.000	0.000	0.000	0.000	0.000
1,675.000	0.000	0.000	0.000	0.000	0.000
1,680.000	0.000	0.000	0.000	0.000	0.000
1,685.000	0.000	0.000	0.000	0.000	0.000
1,690.000	0.000	0.000	0.000	0.000	0.000
1,695.000	0.000	0.000	0.000	0.000	0.000
1,700.000	0.000	0.000	0.000	0.000	0.000
1,705.000	0.000	0.000	0.000	0.000	0.000
1,710.000	0.000	0.000	0.000	0.000	0.000
1,715.000	0.000	0.000	0.000	0.000	0.000
1,720.000	0.000	0.000	0.000	0.000	0.000
1,725.000	0.000	0.000	0.000	0.000	0.000
1,730.000	0.000	0.000	0.000	0.000	0.000
1,735.000	0.000	0.000	0.000	0.000	0.000
1,740.000	0.000	0.000	0.000	0.000	0.000
1,745.000	0.000	0.000	0.000	0.000	0.000
1,750.000	0.000	0.000	0.000	0.000	0.000
1,755.000	0.000	0.000	0.000	0.000	0.000
1,760.000	0.000	0.000	0.000	0.000	0.000
1,765.000	0.000	0.000	0.000	0.000	0.000
1,770.000	0.000	0.000	0.000	0.000	0.000
1,775.000	0.000	0.000	0.000	0.000	0.000
1,780.000	0.000	0.000	0.000	0.000	0.000
1,785.000	0.000	0.000	0.000	0.000	0.000
1,790.000	0.000	0.000	0.000	0.000	0.000
1,795.000	0.000	0.000	0.000	0.000	0.000
1,800.000	0.000	0.000	0.000	0.000	0.000
1,805.000	0.000	0.000	0.000	0.000	0.000
1,810.000	0.000	0.000	0.000	0.000	0.000
1,815.000	0.000	0.000	0.000	0.000	0.000
1,820.000	0.000	0.000	0.000	0.000	0.000
1,825.000	0.000	0.000	0.000	0.000	0.000
1,830.000	0.000	0.000	0.000	0.000	0.000
1,835.000	0.000	0.000	0.000	0.000	0.000
1,840.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,845.000	0.000	0.000	0.000	0.000	0.000
1,850.000	0.000	0.000	0.000	0.000	0.000
1,855.000	0.000	0.000	0.000	0.000	0.000
1,860.000	0.000	0.000	0.000	0.000	0.000
1,865.000	0.000	0.000	0.000	0.000	0.000
1,870.000	0.000	0.000	0.000	0.000	0.000
1,875.000	0.000	0.000	0.000	0.000	0.000
1,880.000	0.000	0.000	0.000	0.000	0.000
1,885.000	0.000	0.000	0.000	0.000	0.000
1,890.000	0.000	0.000	0.000	0.000	0.000
1,895.000	0.000	0.000	0.000	0.000	0.000
1,900.000	0.000	0.000	0.000	0.000	0.000
1,905.000	0.000	0.000	0.000	0.000	0.000
1,910.000	0.000	0.000	0.000	0.000	0.000
1,915.000	0.000	0.000	0.000	0.000	0.000
1,920.000	0.000	0.000	0.000	0.000	0.000
1,925.000	0.000	0.000	0.000	0.000	0.000
1,930.000	0.000	0.000	0.000	0.000	0.000
1,935.000	0.000	0.000	0.000	0.000	0.000
1,940.000	0.000	0.000	0.000	0.000	0.000
1,945.000	0.000	0.000	0.000	0.000	0.000
1,950.000	0.000	0.000	0.000	0.000	0.000
1,955.000	0.000	0.000	0.000	0.000	0.000
1,960.000	0.000	0.000	0.000	0.000	0.000
1,965.000	0.000	0.000	0.000	0.000	0.000
1,970.000	0.000	0.000	0.000	0.000	0.000
1,975.000	0.000	0.000	0.000	0.000	0.000
1,980.000	0.000	0.000	0.000	0.000	0.000
1,985.000	0.000	0.000	0.000	0.000	0.000
1,990.000	0.000	0.000	0.000	0.000	0.000
1,995.000	0.000	0.000	0.000	0.000	0.000
2,000.000	0.000	0.000	0.000	0.000	0.000
2,005.000	0.000	0.000	0.000	0.000	0.000
2,010.000	0.000	0.000	0.000	0.000	0.000
2,015.000	0.000	0.000	0.000	0.000	0.000
2,020.000	0.000	0.000	0.000	0.000	0.000
2,025.000	0.000	0.000	0.000	0.000	0.000
2,030.000	0.000	0.000	0.000	0.000	0.000
2,035.000	0.000	0.000	0.000	0.000	0.000
2,040.000	0.000	0.000	0.000	0.000	0.000
2,045.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,050.000	0.000	0.000	0.000	0.000	0.000
2,055.000	0.000	0.000	0.000	0.000	0.000
2,060.000	0.000	0.000	0.000	0.000	0.000
2,065.000	0.000	0.000	0.000	0.000	0.000
2,070.000	0.000	0.000	0.000	0.000	0.000
2,075.000	0.000	0.000	0.000	0.000	0.000
2,080.000	0.000	0.000	0.000	0.000	0.000
2,085.000	0.000	0.000	0.000	0.000	0.000
2,090.000	0.000	0.000	0.000	0.000	0.000
2,095.000	0.000	0.000	0.000	0.000	0.000
2,100.000	0.000	0.000	0.000	0.000	0.000
2,105.000	0.000	0.000	0.000	0.000	0.000
2,110.000	0.000	0.000	0.000	0.000	0.000
2,115.000	0.000	0.000	0.000	0.000	0.000
2,120.000	0.000	0.000	0.000	0.000	0.000
2,125.000	0.000	0.000	0.000	0.000	0.000
2,130.000	0.000	0.000	0.000	0.000	0.000
2,135.000	0.000	0.000	0.000	0.000	0.000
2,140.000	0.000	0.000	0.000	0.000	0.000
2,145.000	0.000	0.000	0.000	0.000	0.000
2,150.000	0.000	0.000	0.000	0.000	0.000
2,155.000	0.000	0.000	0.000	0.000	0.000
2,160.000	0.000	0.000	0.000	0.000	0.000
2,165.000	0.000	0.000	0.000	0.000	0.000
2,170.000	0.000	0.000	0.000	0.000	0.000
2,175.000	0.000	0.000	0.000	0.000	0.000
2,180.000	0.000	0.000	0.000	0.000	0.000
2,185.000	0.000	0.000	0.000	0.000	0.000
2,190.000	0.000	0.000	0.000	0.000	0.000
2,195.000	0.000	0.000	0.000	0.000	0.000
2,200.000	0.000	0.000	0.000	0.000	0.000
2,205.000	0.000	0.000	0.000	0.000	0.000
2,210.000	0.000	0.000	0.000	0.000	0.000
2,215.000	0.000	0.000	0.000	0.000	0.000
2,220.000	0.000	0.000	0.000	0.000	0.000
2,225.000	0.000	0.000	0.000	0.000	0.000
2,230.000	0.000	0.000	0.000	0.000	0.000
2,235.000	0.000	0.000	0.000	0.000	0.000
2,240.000	0.000	0.000	0.000	0.000	0.000
2,245.000	0.000	0.000	0.000	0.000	0.000
2,250.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,255.000	0.000	0.000	0.000	0.000	0.000
2,260.000	0.000	0.000	0.000	0.000	0.000
2,265.000	0.000	0.000	0.000	0.000	0.000
2,270.000	0.000	0.000	0.000	0.000	0.000
2,275.000	0.000	0.000	0.000	0.000	0.000
2,280.000	0.000	0.000	0.000	0.000	0.000
2,285.000	0.000	0.000	0.000	0.000	0.000
2,290.000	0.000	0.000	0.000	0.000	0.000
2,295.000	0.000	0.000	0.000	0.000	0.000
2,300.000	0.000	0.000	0.000	0.000	0.000
2,305.000	0.000	0.000	0.000	0.000	0.000
2,310.000	0.000	0.000	0.000	0.000	0.000
2,315.000	0.000	0.000	0.000	0.000	0.000
2,320.000	0.000	0.000	0.000	0.000	0.000
2,325.000	0.000	0.000	0.000	0.000	0.000
2,330.000	0.000	0.000	0.000	0.000	0.000
2,335.000	0.000	0.000	0.000	0.000	0.000
2,340.000	0.000	0.000	0.000	0.000	0.000
2,345.000	0.000	0.000	0.000	0.000	0.000
2,350.000	0.000	0.000	0.000	0.000	0.000
2,355.000	0.000	0.000	0.000	0.000	0.000
2,360.000	0.000	0.000	0.000	0.000	0.000
2,365.000	0.000	0.000	0.000	0.000	0.000
2,370.000	0.000	0.000	0.000	0.000	0.000
2,375.000	0.000	0.000	0.000	0.000	0.000
2,380.000	0.000	0.000	0.000	0.000	0.000
2,385.000	0.000	0.000	0.000	0.000	0.000
2,390.000	0.000	0.000	0.000	0.000	0.000
2,395.000	0.000	0.000	0.000	0.000	0.000
2,400.000	0.000	0.000	0.000	0.000	0.000
2,405.000	0.000	0.000	0.000	0.000	0.000
2,410.000	0.000	0.000	0.000	0.000	0.000
2,415.000	0.000	0.000	0.000	0.000	0.000
2,420.000	0.000	0.000	0.000	0.000	0.000
2,425.000	0.000	0.000	0.000	0.000	0.000
2,430.000	0.000	0.000	0.000	0.000	0.000
2,435.000	0.000	0.000	0.000	0.000	0.000
2,440.000	0.000	0.000	0.000	0.000	0.000
2,445.000	0.000	0.000	0.000	0.000	0.000
2,450.000	0.000	0.000	0.000	0.000	0.000
2,455.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,460.000	0.000	0.000	0.000	0.000	0.000
2,465.000	0.000	0.000	0.000	0.000	0.000
2,470.000	0.000	0.000	0.000	0.000	0.000
2,475.000	0.000	0.000	0.000	0.000	0.000
2,480.000	0.000	0.000	0.000	0.000	0.000
2,485.000	0.000	0.000	0.000	0.000	0.000
2,490.000	0.000	0.000	0.000	0.000	0.000
2,495.000	0.000	0.000	0.000	0.000	0.000
2,500.000	0.000	0.000	0.000	0.000	0.000
2,505.000	0.000	0.000	0.000	0.000	0.000
2,510.000	0.000	0.000	0.000	0.000	0.000
2,515.000	0.000	0.000	0.000	0.000	0.000
2,520.000	0.000	0.000	0.000	0.000	0.000
2,525.000	0.000	0.000	0.000	0.000	0.000
2,530.000	0.000	0.000	0.000	0.000	0.000
2,535.000	0.000	0.000	0.000	0.000	0.000
2,540.000	0.000	0.000	0.000	0.000	0.000
2,545.000	0.000	0.000	0.000	0.000	0.000
2,550.000	0.000	0.000	0.000	0.000	0.000
2,555.000	0.000	0.000	0.000	0.000	0.000
2,560.000	0.000	0.000	0.000	0.000	0.000
2,565.000	0.000	0.000	0.000	0.000	0.000
2,570.000	0.000	0.000	0.000	0.000	0.000
2,575.000	0.000	0.000	0.000	0.000	0.000
2,580.000	0.000	0.000	0.000	0.000	0.000
2,585.000	0.000	0.000	0.000	0.000	0.000
2,590.000	0.000	0.000	0.000	0.000	0.000
2,595.000	0.000	0.000	0.000	0.000	0.000
2,600.000	0.000	0.000	0.000	0.000	0.000
2,605.000	0.000	0.000	0.000	0.000	0.000
2,610.000	0.000	0.000	0.000	0.000	0.000
2,615.000	0.000	0.000	0.000	0.000	0.000
2,620.000	0.000	0.000	0.000	0.000	0.000
2,625.000	0.000	0.000	0.000	0.000	0.000
2,630.000	0.000	0.000	0.000	0.000	0.000
2,635.000	0.000	0.000	0.000	0.000	0.000
2,640.000	0.000	0.000	0.000	0.000	0.000
2,645.000	0.000	0.000	0.000	0.000	0.000
2,650.000	0.000	0.000	0.000	0.000	0.000
2,655.000	0.000	0.000	0.000	0.000	0.000
2,660.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,665.000	0.000	0.000	0.000	0.000	0.000
2,670.000	0.000	0.000	0.000	0.000	0.000
2,675.000	0.000	0.000	0.000	0.000	0.000
2,680.000	0.000	0.000	0.000	0.000	0.000
2,685.000	0.000	0.000	0.000	0.000	0.000
2,690.000	0.000	0.000	0.000	0.000	0.000
2,695.000	0.000	0.000	0.000	0.000	0.000
2,700.000	0.000	0.000	0.000	0.000	0.000
2,705.000	0.000	0.000	0.000	0.000	0.000
2,710.000	0.000	0.000	0.000	0.000	0.000
2,715.000	0.000	0.000	0.000	0.000	0.000
2,720.000	0.000	0.000	0.000	0.000	0.000
2,725.000	0.000	0.000	0.000	0.000	0.000
2,730.000	0.000	0.000	0.000	0.000	0.000
2,735.000	0.000	0.000	0.000	0.000	0.000
2,740.000	0.000	0.000	0.000	0.000	0.000
2,745.000	0.000	0.000	0.000	0.000	0.000
2,750.000	0.000	0.000	0.000	0.000	0.000
2,755.000	0.000	0.000	0.000	0.000	0.000
2,760.000	0.000	0.000	0.000	0.000	0.000
2,765.000	0.000	0.000	0.000	0.000	0.000
2,770.000	0.000	0.000	0.000	0.000	0.000
2,775.000	0.000	0.000	0.000	0.000	0.000
2,780.000	0.000	0.000	0.000	0.000	0.000
2,785.000	0.000	0.000	0.000	0.000	0.000
2,790.000	0.000	0.000	0.000	0.000	0.000
2,795.000	0.000	0.000	0.000	0.000	0.000
2,800.000	0.000	0.000	0.000	0.000	0.000
2,805.000	0.000	0.000	0.000	0.000	0.000
2,810.000	0.000	0.000	0.000	0.000	0.000
2,815.000	0.000	0.000	0.000	0.000	0.000
2,820.000	0.000	0.000	0.000	0.000	0.000
2,825.000	0.000	0.000	0.000	0.000	0.000
2,830.000	0.000	0.000	0.000	0.000	0.000
2,835.000	0.000	0.000	0.000	0.000	0.000
2,840.000	0.000	0.000	0.000	0.000	0.000
2,845.000	0.000	0.000	0.000	0.000	0.000
2,850.000	0.000	0.000	0.000	0.000	0.000
2,855.000	0.000	0.000	0.000	0.000	0.000
2,860.000	0.000	0.000	0.000	0.000	0.000
2,865.000	0.000	0.000	0.000	0.000	0.000

Basin 9

Subsection: Time vs. Volume
Label: 1

Return Event: 100 years
Storm Event:

Time vs. Volume (ac-ft)

Output Time increment = 1.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
2,870.000	0.000	0.000	0.000	0.000	0.000
2,875.000	0.000	0.000	0.000	0.000	0.000
2,880.000	0.000	0.000	0.000	0.000	0.000
2,885.000	0.000	0.000	0.000	0.000	0.000
2,890.000	0.000	0.000	0.000	0.000	0.000
2,895.000	0.000	0.000	0.000	0.000	0.000
2,900.000	0.000	0.000	0.000	0.000	0.000
2,905.000	0.000	0.000	0.000	0.000	0.000
2,910.000	0.000	0.000	0.000	0.000	0.000
2,915.000	0.000	0.000	0.000	0.000	0.000
2,920.000	0.000	0.000	0.000	0.000	0.000
2,925.000	0.000	0.000	0.000	0.000	0.000
2,930.000	0.000	0.000	0.000	0.000	0.000
2,935.000	0.000	0.000	0.000	0.000	0.000
2,940.000	0.000	0.000	0.000	0.000	0.000
2,945.000	0.000	0.000	0.000	0.000	0.000
2,950.000	0.000	0.000	0.000	0.000	0.000
2,955.000	0.000	0.000	0.000	0.000	0.000
2,960.000	0.000	0.000	0.000	0.000	0.000
2,965.000	0.000	0.000	0.000	0.000	0.000
2,970.000	0.000	0.000	0.000	0.000	0.000
2,975.000	0.000	0.000	0.000	0.000	0.000
2,980.000	0.000	0.000	0.000	0.000	0.000
2,985.000	0.000	0.000	0.000	0.000	0.000
2,990.000	0.000	0.000	0.000	0.000	0.000
2,995.000	0.000	0.000	0.000	0.000	0.000
3,000.000	0.000	(N/A)	(N/A)	(N/A)	(N/A)

Basin 9

Subsection: Elevation-Area Volume Curve
Label: 1

Return Event: 100 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr (A1*A2) (ft²)	Volume (ac-ft)	Volume (Total) (ac-ft)
731.49	0.0	10.000	0.000	0.000	0.000
734.99	0.0	10.000	30.000	0.001	0.001
735.00	0.0	8,913.670	9,222.228	0.001	0.002
736.00	0.0	9,681.500	27,884.825	0.213	0.215
737.00	0.0	10,474.470	30,226.153	0.231	0.446
738.00	0.0	11,292.570	32,642.870	0.250	0.696
739.00	0.0	12,135.800	35,134.965	0.269	0.965
740.00	0.0	13,004.160	37,702.439	0.288	1.253

Basin 9

Subsection: Volume Equations
Label: 1

Return Event: 100 years
Storm Event:

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Basin 9

Subsection: Outlet Input Data
Label: Outlet#1

Return Event: 100 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	731.49 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	740.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	735.50	740.00
Orifice-Circular	Orifice - 2	Forward	TW	737.00	740.00
Inlet Box	Riser - 1	Forward	TW	738.50	740.00
Orifice-Circular	Orifice - Underdrain	Forward	TW	731.75	740.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Basin 9

Subsection: Outlet Input Data
Label: Outlet#1

Return Event: 100 years
Storm Event:

Structure ID: Orifice - 1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	735.50 ft
Orifice Diameter	4.0 in
Orifice Coefficient	0.600

Structure ID: Riser - 1 Structure Type: Inlet Box	
Number of Openings	1
Elevation	738.50 ft
Orifice Area	16.1 ft²
Orifice Coefficient	0.600
Weir Length	16.50 ft
Weir Coefficient	3.00 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: Orifice - Underdrain Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	731.75 ft
Orifice Diameter	4.0 in
Orifice Coefficient	0.600

Structure ID: Orifice - 2 Structure Type: Orifice-Circular	
Number of Openings	3
Elevation	737.00 ft
Orifice Diameter	3.0 in
Orifice Coefficient	0.600

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft

Basin 9

Subsection: Outlet Input Data
Label: Outlet#1

Return Event: 100 years
Storm Event:

Convergence Tolerances	
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Basin 9

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
731.49	0.00	(N/A)	0.00
731.59	0.00	(N/A)	0.00
731.69	0.00	(N/A)	0.00
731.75	0.00	(N/A)	0.00
731.79	0.00	(N/A)	0.00
731.89	0.04	(N/A)	0.00
731.99	0.10	(N/A)	0.00
732.09	0.17	(N/A)	0.00
732.19	0.22	(N/A)	0.00
732.29	0.26	(N/A)	0.00
732.39	0.29	(N/A)	0.00
732.49	0.32	(N/A)	0.00
732.59	0.34	(N/A)	0.00
732.69	0.37	(N/A)	0.00
732.79	0.39	(N/A)	0.00
732.89	0.41	(N/A)	0.00
732.99	0.44	(N/A)	0.00
733.09	0.45	(N/A)	0.00
733.19	0.47	(N/A)	0.00
733.29	0.49	(N/A)	0.00
733.39	0.51	(N/A)	0.00
733.49	0.53	(N/A)	0.00
733.59	0.54	(N/A)	0.00
733.69	0.56	(N/A)	0.00
733.79	0.57	(N/A)	0.00
733.89	0.59	(N/A)	0.00
733.99	0.60	(N/A)	0.00
734.09	0.62	(N/A)	0.00
734.19	0.63	(N/A)	0.00
734.29	0.65	(N/A)	0.00
734.39	0.66	(N/A)	0.00
734.49	0.67	(N/A)	0.00
734.59	0.69	(N/A)	0.00
734.69	0.70	(N/A)	0.00
734.79	0.71	(N/A)	0.00
734.89	0.72	(N/A)	0.00
734.99	0.74	(N/A)	0.00
735.09	0.75	(N/A)	0.00
735.19	0.76	(N/A)	0.00
735.29	0.77	(N/A)	0.00
735.39	0.78	(N/A)	0.00
735.49	0.79	(N/A)	0.00
735.50	0.80	(N/A)	0.00

Basin 9

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
735.59	0.82	(N/A)	0.00
735.69	0.88	(N/A)	0.00
735.79	0.96	(N/A)	0.00
735.89	1.04	(N/A)	0.00
735.99	1.09	(N/A)	0.00
736.09	1.13	(N/A)	0.00
736.19	1.17	(N/A)	0.00
736.29	1.21	(N/A)	0.00
736.39	1.25	(N/A)	0.00
736.49	1.28	(N/A)	0.00
736.59	1.31	(N/A)	0.00
736.69	1.34	(N/A)	0.00
736.79	1.37	(N/A)	0.00
736.89	1.40	(N/A)	0.00
736.99	1.43	(N/A)	0.00
737.00	1.43	(N/A)	0.00
737.09	1.50	(N/A)	0.00
737.19	1.64	(N/A)	0.00
737.29	1.80	(N/A)	0.00
737.39	1.90	(N/A)	0.00
737.49	1.99	(N/A)	0.00
737.59	2.07	(N/A)	0.00
737.69	2.14	(N/A)	0.00
737.79	2.21	(N/A)	0.00
737.89	2.27	(N/A)	0.00
737.99	2.33	(N/A)	0.00
738.09	2.39	(N/A)	0.00
738.19	2.45	(N/A)	0.00
738.29	2.51	(N/A)	0.00
738.39	2.56	(N/A)	0.00
738.49	2.61	(N/A)	0.00
738.50	2.62	(N/A)	0.00
738.59	4.00	(N/A)	0.00
738.69	6.81	(N/A)	0.00
738.79	10.49	(N/A)	0.00
738.89	14.86	(N/A)	0.00
738.99	19.83	(N/A)	0.00
739.09	25.33	(N/A)	0.00
739.19	31.31	(N/A)	0.00
739.29	37.74	(N/A)	0.00
739.39	44.59	(N/A)	0.00
739.49	51.83	(N/A)	0.00
739.59	59.44	(N/A)	0.00

Basin 9

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
739.69	67.41	(N/A)	0.00
739.79	75.71	(N/A)	0.00
739.89	84.35	(N/A)	0.00
739.99	93.30	(N/A)	0.00
740.00	94.21	(N/A)	0.00

Contributing Structures
None Contributing
None Contributing
None Contributing
None Contributing
Orifice - Underdrain
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Orifice - Underdrain
Orifice - Underdrain
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Basin 9

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Orifice - Underdrain
Orifice - Underdrain
Orifice - Underdrain
Orifice - Underdrain
Orifice - Underdrain
Orifice - Underdrain
Orifice - Underdrain
Orifice - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - Underdrain
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Orifice - 1 + Orifice - 2 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Orifice - Underdrain

Basin 9

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Orifice - 1 + Orifice - 2 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Orifice - Underdrain
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Orifice - 1 + Orifice - 2 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain

Basin 9

Subsection: Composite Rating Curve
Label: Outlet#1

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
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Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain
Orifice - 1 + Orifice - 2 + Riser - 1 + Orifice - Underdrain

Basin 9

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	731.49 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
731.49	0.00	0.000	10.000	0.00	0.00	0.00
731.59	0.00	0.000	10.000	0.00	0.00	0.03
731.69	0.00	0.000	10.000	0.00	0.00	0.07
731.75	0.00	0.000	10.000	0.00	0.00	0.09
731.79	0.00	0.000	10.000	0.00	0.00	0.10
731.89	0.04	0.000	10.000	0.00	0.04	0.17
731.99	0.10	0.000	10.000	0.00	0.10	0.26
732.09	0.17	0.000	10.000	0.00	0.17	0.37
732.19	0.22	0.000	10.000	0.00	0.22	0.45
732.29	0.26	0.000	10.000	0.00	0.26	0.52
732.39	0.29	0.000	10.000	0.00	0.29	0.59
732.49	0.32	0.000	10.000	0.00	0.32	0.65
732.59	0.34	0.000	10.000	0.00	0.34	0.71
732.69	0.37	0.000	10.000	0.00	0.37	0.77
732.79	0.39	0.000	10.000	0.00	0.39	0.83
732.89	0.41	0.000	10.000	0.00	0.41	0.88
732.99	0.44	0.000	10.000	0.00	0.44	0.94
733.09	0.45	0.000	10.000	0.00	0.45	0.99
733.19	0.47	0.000	10.000	0.00	0.47	1.04
733.29	0.49	0.000	10.000	0.00	0.49	1.09
733.39	0.51	0.000	10.000	0.00	0.51	1.14
733.49	0.53	0.000	10.000	0.00	0.53	1.19
733.59	0.54	0.000	10.000	0.00	0.54	1.24
733.69	0.56	0.001	10.000	0.00	0.56	1.29
733.79	0.57	0.001	10.000	0.00	0.57	1.34
733.89	0.59	0.001	10.000	0.00	0.59	1.39
733.99	0.60	0.001	10.000	0.00	0.60	1.44
734.09	0.62	0.001	10.000	0.00	0.62	1.49
734.19	0.63	0.001	10.000	0.00	0.63	1.53

Basin 9

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 100 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
734.29	0.65	0.001	10.000	0.00	0.65	1.58
734.39	0.66	0.001	10.000	0.00	0.66	1.63
734.49	0.67	0.001	10.000	0.00	0.67	1.67
734.59	0.69	0.001	10.000	0.00	0.69	1.72
734.69	0.70	0.001	10.000	0.00	0.70	1.77
734.79	0.71	0.001	10.000	0.00	0.71	1.81
734.89	0.72	0.001	10.000	0.00	0.72	1.86
734.99	0.74	0.001	10.000	0.00	0.74	1.90
735.09	0.75	0.020	8,981.476	0.00	0.75	29.78
735.19	0.76	0.041	9,057.117	0.00	0.76	59.86
735.29	0.77	0.062	9,133.075	0.00	0.77	90.19
735.39	0.78	0.083	9,209.351	0.00	0.78	120.77
735.49	0.79	0.104	9,285.943	0.00	0.79	151.61
735.50	0.80	0.106	9,293.620	0.00	0.80	154.70
735.59	0.82	0.125	9,362.853	0.00	0.82	182.71
735.69	0.88	0.147	9,440.080	0.00	0.88	214.11
735.79	0.96	0.169	9,517.625	0.00	0.96	245.78
735.89	1.04	0.191	9,595.486	0.00	1.04	277.72
735.99	1.09	0.213	9,673.665	0.00	1.09	309.88
736.09	1.13	0.235	9,751.589	0.00	1.13	342.30
736.19	1.17	0.257	9,829.763	0.00	1.17	374.98
736.29	1.21	0.280	9,908.248	0.00	1.21	407.91
736.39	1.25	0.303	9,987.046	0.00	1.25	441.11
736.49	1.28	0.326	10,066.156	0.00	1.28	474.56
736.59	1.31	0.349	10,145.578	0.00	1.31	508.28
736.69	1.34	0.373	10,225.312	0.00	1.34	542.27
736.79	1.37	0.396	10,305.358	0.00	1.37	576.51
736.89	1.40	0.420	10,385.716	0.00	1.40	611.03
736.99	1.43	0.444	10,466.386	0.00	1.43	645.81
737.00	1.43	0.446	10,474.470	0.00	1.43	649.30
737.09	1.50	0.468	10,546.839	0.00	1.50	680.90
737.19	1.64	0.492	10,627.542	0.00	1.64	716.33
737.29	1.80	0.517	10,708.552	0.00	1.80	752.05
737.39	1.90	0.541	10,789.870	0.00	1.90	787.98
737.49	1.99	0.566	10,871.496	0.00	1.99	824.17
737.59	2.07	0.591	10,953.429	0.00	2.07	860.63
737.69	2.14	0.617	11,035.669	0.00	2.14	897.35
737.79	2.21	0.642	11,118.218	0.00	2.21	934.34
737.89	2.27	0.668	11,201.073	0.00	2.27	971.60
737.99	2.33	0.693	11,284.237	0.00	2.33	1,009.14
738.09	2.39	0.719	11,367.217	0.00	2.39	1,046.95
738.19	2.45	0.746	11,450.448	0.00	2.45	1,085.04
738.29	2.51	0.772	11,533.981	0.00	2.51	1,123.40

Basin 9

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1

Return Event: 100 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
738.39	2.56	0.799	11,617.818	0.00	2.56	1,162.04
738.49	2.61	0.825	11,701.959	0.00	2.61	1,200.96
738.50	2.62	0.828	11,710.390	0.00	2.62	1,204.86
738.59	4.00	0.852	11,786.404	0.00	4.00	1,241.49
738.69	6.81	0.879	11,871.152	0.00	6.81	1,283.73
738.79	10.49	0.907	11,956.203	0.00	10.49	1,327.12
738.89	14.86	0.934	12,041.559	0.00	14.86	1,371.49
738.99	19.83	0.962	12,127.217	0.00	19.83	1,416.74
739.09	25.33	0.990	12,212.724	0.00	25.33	1,462.81
739.19	31.31	1.018	12,298.480	0.00	31.31	1,509.64
739.29	37.74	1.046	12,384.536	0.00	37.74	1,557.21
739.39	44.59	1.075	12,470.892	0.00	44.59	1,605.48
739.49	51.83	1.104	12,557.548	0.00	51.83	1,654.43
739.59	59.44	1.133	12,644.504	0.00	59.44	1,704.05
739.69	67.41	1.162	12,731.760	0.00	67.41	1,754.31
739.79	75.71	1.191	12,819.316	0.00	75.71	1,805.20
739.89	84.35	1.221	12,907.172	0.00	84.35	1,856.72
739.99	93.30	1.250	12,995.328	0.00	93.30	1,908.83
740.00	94.21	1.253	13,004.160	0.00	94.21	1,914.08

Basin 9

Subsection: Level Pool Pond Routing Summary
Label: 1 (IN)

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	731.49 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	23.00 ft³/s	Time to Peak (Flow, In)	238.000 min
Flow (Peak Outlet)	2.93 ft³/s	Time to Peak (Flow, Outlet)	268.000 min

Elevation (Water Surface, Peak)	738.52 ft
Volume (Peak)	0.833 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	1.424 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	1.424 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

PROJECT DESIGN CONSULTANTS

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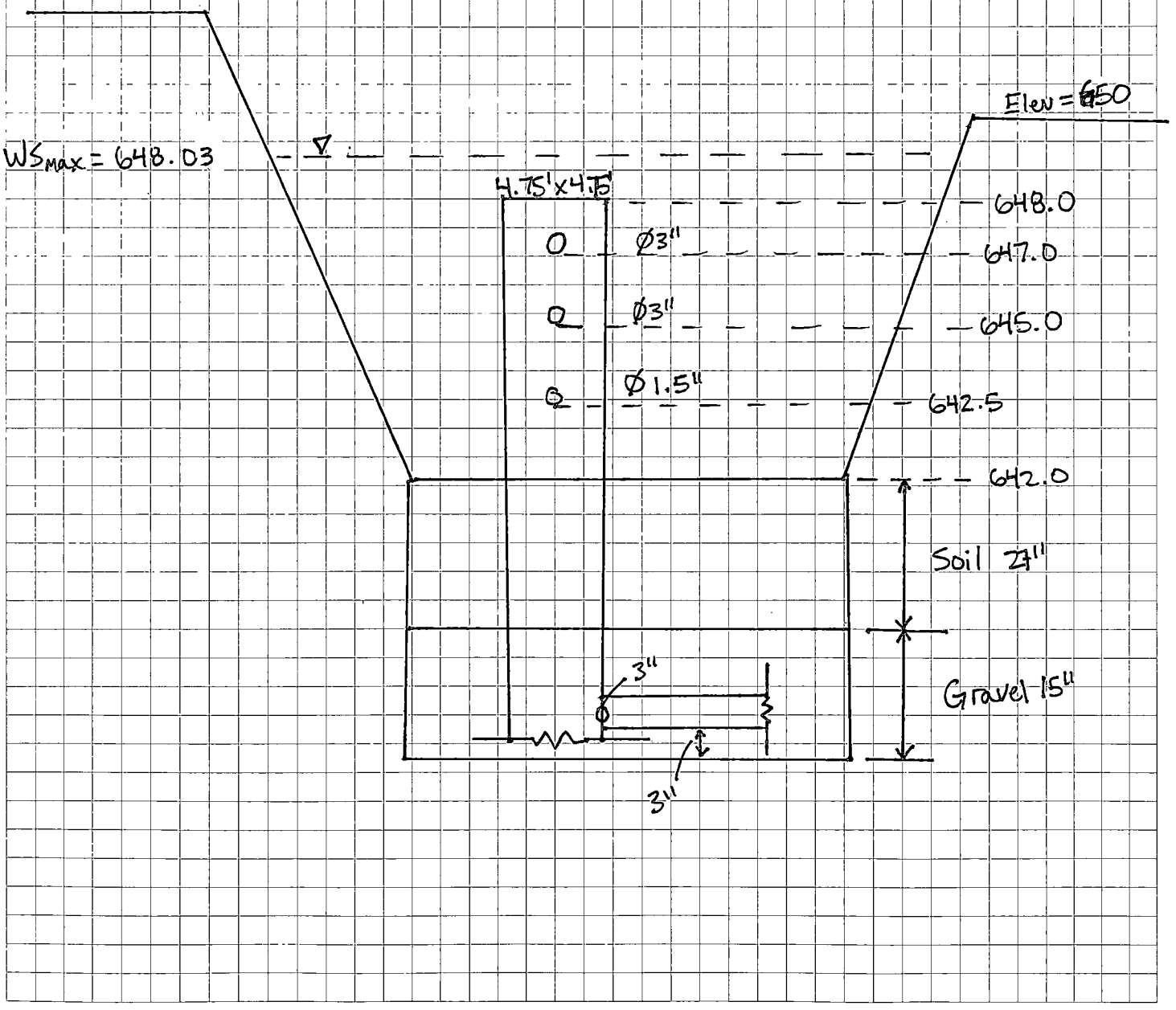
PROJECT The Hills at CMR
SUBJECT BMP Basin 11

PAGE : _____ OF _____ JOB NO. : 4394.00
DRAWN BY : G. Anderson DATE : _____
CHECKED BY : _____ DATE : _____

$Q_{max\ in} = 39.6$ cfs

$Q_{out} = 1.90$ cfs

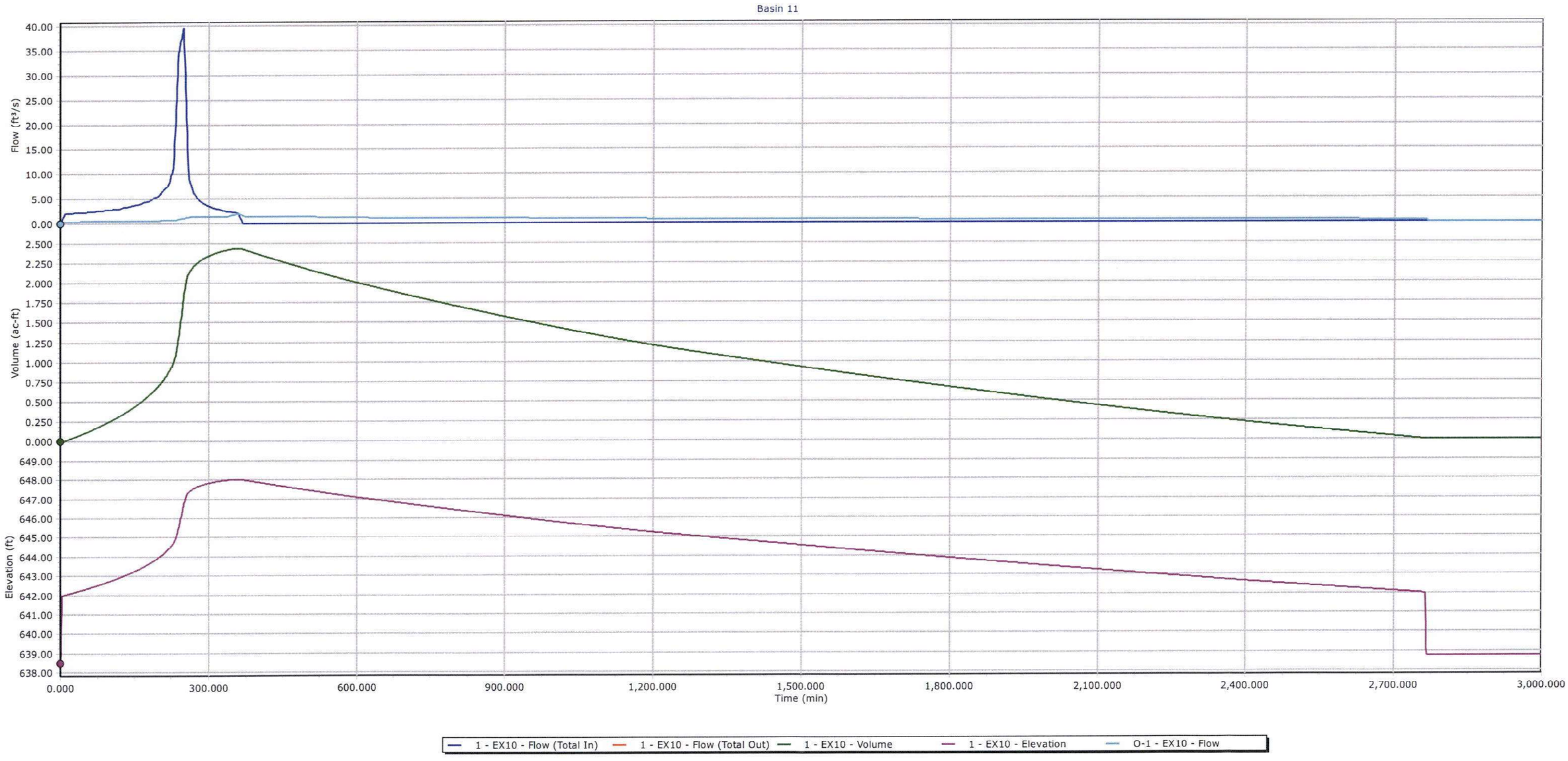
$WS_{max} = 648.03$



RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 9/27/2019
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 14.93 ACRES
RUNOFF COEFFICIENT 0.77
PEAK DISCHARGE 39.6 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 2.1
TIME (MIN) = 20	DISCHARGE (CFS) = 2.1
TIME (MIN) = 30	DISCHARGE (CFS) = 2.2
TIME (MIN) = 40	DISCHARGE (CFS) = 2.2
TIME (MIN) = 50	DISCHARGE (CFS) = 2.3
TIME (MIN) = 60	DISCHARGE (CFS) = 2.4
TIME (MIN) = 70	DISCHARGE (CFS) = 2.5
TIME (MIN) = 80	DISCHARGE (CFS) = 2.6
TIME (MIN) = 90	DISCHARGE (CFS) = 2.7
TIME (MIN) = 100	DISCHARGE (CFS) = 2.8
TIME (MIN) = 110	DISCHARGE (CFS) = 2.9
TIME (MIN) = 120	DISCHARGE (CFS) = 3
TIME (MIN) = 130	DISCHARGE (CFS) = 3.3
TIME (MIN) = 140	DISCHARGE (CFS) = 3.4
TIME (MIN) = 150	DISCHARGE (CFS) = 3.7
TIME (MIN) = 160	DISCHARGE (CFS) = 3.9
TIME (MIN) = 170	DISCHARGE (CFS) = 4.3
TIME (MIN) = 180	DISCHARGE (CFS) = 4.5
TIME (MIN) = 190	DISCHARGE (CFS) = 5.2
TIME (MIN) = 200	DISCHARGE (CFS) = 5.6
TIME (MIN) = 210	DISCHARGE (CFS) = 6.9
TIME (MIN) = 220	DISCHARGE (CFS) = 7.8
TIME (MIN) = 230	DISCHARGE (CFS) = 11.5
TIME (MIN) = 240	DISCHARGE (CFS) = 34.7
TIME (MIN) = 250	DISCHARGE (CFS) = 39.6
TIME (MIN) = 260	DISCHARGE (CFS) = 9.2
TIME (MIN) = 270	DISCHARGE (CFS) = 6.2
TIME (MIN) = 280	DISCHARGE (CFS) = 4.8
TIME (MIN) = 290	DISCHARGE (CFS) = 4
TIME (MIN) = 300	DISCHARGE (CFS) = 3.5
TIME (MIN) = 310	DISCHARGE (CFS) = 3.1
TIME (MIN) = 320	DISCHARGE (CFS) = 2.9
TIME (MIN) = 330	DISCHARGE (CFS) = 2.6
TIME (MIN) = 340	DISCHARGE (CFS) = 2.4
TIME (MIN) = 350	DISCHARGE (CFS) = 2.3
TIME (MIN) = 360	DISCHARGE (CFS) = 2.1
TIME (MIN) = 370	DISCHARGE (CFS) = 0


Basin 11
Flow (ft³/s)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Volume (ac-ft)
2.500
2.250
2.000
1.750
1.500
1.250
1.000
0.750
0.500
0.250
0.000
Elevation (ft)
649.00
648.00
647.00
646.00
645.00
644.00
643.00
642.00
641.00
640.00
639.00
638.00
0.000
300.000
600.000
900.000
1,200.000
1,500.000
1,800.000
2,100.000
2,400.000
2,700.000
3,000.000
Time (min)
1 - EX10 - Flow (Total In)
1 - EX10 - Flow (Total Out)
1 - EX10 - Volume
1 - EX10 - Elevation
O-1 - EX10 - Flow