APPENDIX M

Water Demand Analysis

RICK
ENGINEERING COMPANY

Preliminary Water Demand Analysis for the Balboa Park Plaza de Panama Project

City of San Diego Project # 233598

May 3, 2011

Background:

The following an assessment of the Balboa Park Plaza de Panama Project's anticipated water demand. The purpose of this assessment is to determine if a Water Supply Assessment (WSA) is required.

Legislation:

- January 1, 2002, Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221)
- Link between water supply availability and certain land-use decisions
- Requires documentation of adequate water supplies for larger projects
- Foundational document for comliance for SB 610 and SB 221 is the Urban Water Management Plan (UWMP)

Projects Requiring a WSA:

- Any proposed project that would demand an amount of water equivalent, or greater than, the amount of water required by a 500 dwelling unit project (EDU).

Conclusion:

As shown in the attached summary calculations, the net increase in the estimated total water use (ETWU) for the proposed project is anticipated to be 5.85 AF/Yr.

Baseline Comparsion (500 dwelling units):

1 EDU = 500 gallons per day

500 EDUs = 250,000 gallons/day

Proposed Water Use:

5.85 AF/Yr = 1,907,100 gallons/year = 5,225 gallons/day

5,225 gal/day << 250,000 gal/day.

Therefore, a Water Supply Assessment is not required for the proposed project.

RICK ENGINEERING COMPANY

Landscape Architecture Division

Balboa Park Improvements
Plaza De Panama & Parking Structure Project

Site Development

Date : 4/29/2011
Preliminary

Irrigation Use Assessment, Summary Sheet

ESTIMATED TOTAL WATER USE (ETWU)

	Acre Ft. / Yr.
Proposed Landscape Demand	**8.85**
Current Landscape Demand	**2.99**
Additional Lands. Irri. Demand	**5.85**

Definitions:

Proposed Landscape Demand: new landscape irrigation area(s) within the design foot-print, which are not currently irrigated (hardscape), and/or will have a greater demand.
Current Landscape Demand: existing landscape irrigation requirement prior to re-design.
Additional Landscape Irrigation Demand: differential of additional irrigation demand from proposed landscape vs. current demand.

Criteria

1. Only area's that are redesigned with a different type of plant material and/or surface were evaluated in the calculations. Ex. if a turf area was kept as turf it was not included, if paving (road / sidewalk) becomes a planter, it was included as an adt'l. irrigation demand etc.

2. Calculation's were performed per the City of San Diego Land Development Code, Landscape Standards.

3. Plant Factor's were derived from WUCOLS III.

City of San Diego Land Development Code

Landscape Standards, Appendix E: Water Requirement Worksheet

PROJECT NAME:	Balboa Park Improvements Plaza De Panama & Parking Structure		
WATER TYPE:	Potable	**CONTROLLER:**	**Proposed**
METER:	Landscape	**DATE:**	4/29/2011 Preliminary

ESTIMATED TOTAL WATER USE (ETWU) - For Proposed Landscape Demands

Formula

ETWU = [(ETo) x (0.62)][((PF x HA) / IE)) + SLA]

ETo	=	**47.0**	Evapotranspiration (Eto Map / Table 6)
	=	**0.62**	Conversion factor to gallons
PF (WUCOLS III)	=	**0.3**	Low water using plants
		0.5	Medium water using plants
		0.8	High water using plants
HA	=		Hydrozone Area
			(See below for Square Footage)
IE	=	**0.9**	Drip
		0.85	Bubblers
		0.8	Drip Irrigation
		0.75	MP Rotators
		0.7	Micro Sprays, Rotors, Rotator Spray
		0.6	Spray Heads
		0.55	Fixed Spray
SLA	=	**1.0**	Special Landscape Area (Sq. Ft.)
		0	Sq. Ft.

Hydrozone Type	**Area (Sq. Ft.)**				
SPRAY (Shrub PF .5)	1,056		ETWU =	25,643	GPY
ROTORS (Turf PF .8)	47,276		ETWU =	1,469,464	GPY
ROTORS (Shrub PF .5)	62,288		ETWU =	1,210,048	GPY
ROTORS (Shrub PF .3)	15,227		ETWU =	177,485.91	GPY
Totals	125,847	Sq. Ft.	ETWU =	2,882,641	GPY
	2.89	Acre(s)			

Estimated Total Water Use (ETWU)	**2,882,641**	**GPY**
	8.85	**AF / YR**

City of San Diego Land Development Code

Landscape Standards, Appendix E: Water Requirement Worksheet

PROJECT NAME:	Balboa Park Improvements Plaza De Panama & Parking Structure		
WATER TYPE:	Potable	**CONTROLLER:**	**Existing**
METER:	Landscape	**DATE:**	4/29/2011 Preliminary

ESTIMATED TOTAL WATER USE (ETWU) - For Current Landscape Demand

Formula

ETWU = [(ETo) x (0.62)][((PF x HA) / IE)) + SLA]

ETo	=	**47.0**	Evapotranspiration (Eto Map / Table 6)
	=	**0.62**	Conversion factor to gallons
PF (WUCOLS III)	=	**0.3**	Low water using plants
		0.5	Medium water using plants
		0.8	High water using plants
HA	=		Hydrozone Area
			(See below for Square Footage)
IE	=	**0.9**	Drip
		0.85	Bubblers
		0.8	Drip Irrigation
		0.75	MP Rotators
		0.7	Micro Sprays, Rotors, Rotator Spray
		0.6	Spray Heads
		0.55	Fixed Spray
SLA	=	**1.0**	Special Landscape Area (Sq. Ft.)
		0	Sq. Ft.

Hydrozone Type	**Area (Sq. Ft.)**				
SPRAY (Turf PF .8)	5185		ETWU=	201,455	GPY
SPRAY (Shrub PF .5)	3,379		ETWU =	82,053	GPY
ROTORS (Turf PF .8)	7,684		ETWU =	255,899	GPY
ROTORS (Shrub PF .5)	20,961		ETWU =	436,288	GPY
ROTORS (Shrub PF .3)	0		ETWU =	0.00	GPY
Totals	32,024	Sq. Ft.	ETWU =	975,695	GPY
	0.74	Acre(s)			

Estimated Total Water Use (ETWU)	**975,695**	**GPY**
	2.99	**AF / YR**

APPENDIX N

Sewer Study

SEWER STUDY FOR
BALBOA PARK – PLAZA DE PANAMA PROJECT

PTS NO. 233958
I.O. NO. 21002440

OCTOBER 14, 2011

(JOB NUMBER 16325)

RICK ENGINEERING COMPANY

SEWER STUDY FOR

BALBOA PARK – PLAZA DE PANAMA PROJECT

PTS NO. 233958

I.O. NO. 21002440

PREPARED BY:

RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CALIFORNIA 92110-2596

October 14, 2011

(JOB NUMBER 16325)

_____ _____

MICHAEL S. WHILE, R.C.E. 49865 **DATE**

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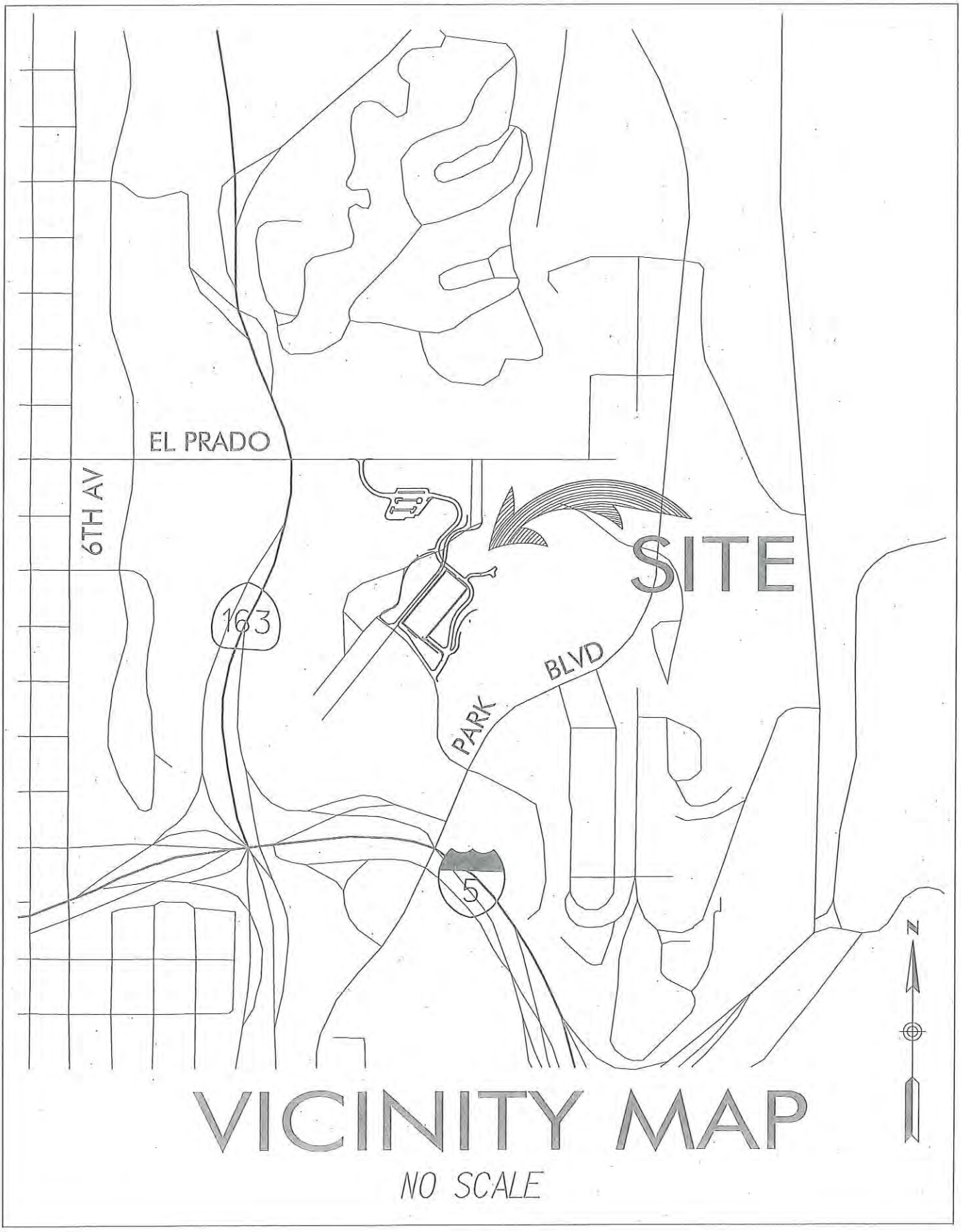


VICINITY MAP

NO SCALE

INTRODUCTION

The Balboa Park Plaza de Panama Project will affect a portion of the existing public sewer system within the Central Mesa of Balboa Park. Specifically, this portion runs through the International Villages in Pan American Road West and Pan American Road East. Due to the removal and relocation of an existing restroom facility just west of the Organ Pavilion, the wastewater flow will be reduced in the leg of sewer main that runs in Pan American Road West. Correspondingly, the wastewater flows in the sewer main running in Pan American Road East will increase from the new restroom facilities located within the rooftop park. The purpose of this study is to compare existing sewer flow calculations and capacity information to proposed sewer flow calculations and capacity information within this section of the system in order to confirm that there is sufficient capacity and acceptable velocities in the proposed sewer system.

The proposed changes affect two existing 8" PVC public sewer systems that eventually converge into one at existing Manhole No. 23. We labeled the two sewer systems, Sewer System 1 and Sewer System 2 (See Map Pocket A & Map Pocket B). These sewer systems were built per Drawing Number 28573-D.

In Sewer System 1, there will be a rerouting of flow by proposed 8" PVC sewer lines (Line AA, B, 27*, 27A, 29* & 29A), proposed Manholes No. "B", 26A, 27A, and 29A, and the abandonment and removal of existing 8" PVC sewer lines (Line A, 27 & 29). The rerouting will come off of existing Manholes No. "A", No. 27, and No. 29. It will tie back into existing Sewer System 1 at proposed Manhole No. 26A. As mentioned above, flow will be decreased in Sewer System 1 due to the removal of a restroom that drained into that system.

Additionally, to be able to serve the new restrooms, there is a proposed 4" PVC lateral (Line 5A) serving the small visitor center's restroom, a proposed 6" PVC sewer line (Line 1A) serving the main rooftop park restroom and proposed Manholes No. 1, 2, 3, 4, 5 and 6 in Sewer System 2. This new flow will tie into Sewer System 2 at the existing 8" PVC sewer line at the existing Manhole No. 35.

The results of this sewer study indicate that there is sufficient capacity for the proposed condition in Sewer System 1, Sewer System 2 and at the point of convergence of these two systems. According to the Proposed Sewer Calculation Tables, the ratio of depth of flow to pipe diameter (dn/D) is 0.16 downstream of Sewer System 1 and 0.08 downstream of Sewer System 2. These ratios are well below the maximum allowable 0.5 ratio. Additionally, the total flow (cfs) for the proposed condition at the point of convergence at existing Manhole No. 23 is only 0.005cfs greater than the existing condition. The total flow for the proposed condition is 0.124cfs, and the total flow for the existing condition is 0.119cfs. Thus the proposed system can handle the new restroom facilities located within the new rooftop park.

Velocities are still above 2 feet per second (fps) in Proposed Sewer System 1 downstream of where the restroom will be removed. Thus adequate velocities are met. In the proposed

Sewer System 2, there are existing and proposed sewer runs where the velocities are below 2fps. However, the slope in those areas is at or above 2%.

POPULATION AND DESIGN CRITERIA

This sewer study was completed in accordance with the design criteria listed in the "Sewer Design Guide" by the Metropolitan Wastewater Department, City of San Diego, filed June 11, 2001 with October 2004 revisions, Document Number 769875.

Please note that there is no zone available for parks for determining population in Balboa Park. In order to take into account the amount of pedestrian traffic in the area, a Commercial Zone was used. Commercial Zone assigns a maximum density of 12.5 dwelling units/ net acre. The population/ dwelling unit was 3.5.

All of the buildings that the sewer system serves were taken into account. To get the equivalent dwelling units of each building, the square footage of each building was obtained and turned into acreage. That acreage was assumed to be the net acreage. Then that acreage was multiplied by 12.5 in order to get the equivalent dwelling units of that building. Some of the buildings had a small footprint and totaled less than 1 dwelling unit. If that was the case, then 1 dwelling unit was used. If the building's footprint totaled more than one dwelling unit, then that number was used as its equivalent dwelling unit.

To obtain the equivalent dwelling units for the new restroom facilities, City of San Diego bulletin 104 and form DS-16 were used in where twenty fixture units, or fraction thereof equaled 1 equivalent dwelling unit.

BALBOA PARK – PLAZA DE PANAMA PROJECT

SEWER STUDY CALCULATIONS

EXISTING SEWER STUDY SUMMARY FOR BALBOA PARK- PLAZA DE PANAMA PROJECT

JOB NO. 16325 BY: RICK ENGINEERING COMPANY PREPARED BY: JL DATE: 10-02-2011

FILE: Existing_BPP_SewerStudy_2_20111002.xls CHECK BY: REFER TO PLAN SHEET: Existing_Sewer_Study_Map.dgn

DRAWING NO. *REVISED:*

EXISTING SEWER SYSTEM 1

LINE NO.	FROM M.H. #	TO M.H. #	IN LINE D.U.'S OR ACRES	POP. UNIT	POP. SERVED INLINE	POP. SERVED TOTAL	PEAK DESIGN FLOW			LINE SIZE (INCHES)	DESIGN SLOPE (%)	dn(FT) n= 0.013	dn/D	Rh (ft)	VELOCITY (fps)
							PEAK/AVG RATIO	M.G.D.	CFS						
33	33	32	19.6	3.5	68.6	68.6	4.00	0.022	0.034	8	1.90	0.06	0.09	0.04	1.8
32	32	31	0	3.5	0.0	68.6	4.00	0.022	0.034	8	2.15	0.06	0.09	0.04	1.9
31	31	30	0	3.5	0.0	68.6	4.00	0.022	0.034	8	2.16	0.06	0.09	0.04	1.9
A	A	30	13.9	3.5	48.7	117.3	4.00	0.038	0.058	8	2.38	0.08	0.12	0.05	2.4
30	30	29	0	3.5	0.0	117.3	4.00	0.038	0.058	8	1.74	0.09	0.13	0.05	2.2
29	29	27	2.5	3.5	8.8	126.0	4.00	0.040	0.062	8	1.84	0.09	0.13	0.05	2.2
28	28	27	1	3.5	3.5	129.5	4.00	0.041	0.064	8	50.81	0.04	0.06	0.03	7.1
27	27	26	1	3.5	3.5	133.0	4.00	0.043	0.066	8	1.85	0.09	0.13	0.05	2.2
26	26	25	3	3.5	10.5	143.5	4.00	0.046	0.071	8	1.93	0.09	0.14	0.06	2.4
25	25	24A	4	3.5	14.0	157.5	4.00	0.050	0.078	8	1.84	0.09	0.14	0.06	2.3
24A	24A	24	7.1	3.5	24.9	182.4	4.00	0.058	0.090	8	1.84	0.10	0.15	0.06	2.4
24	24	23	5.6	3.5	19.6	202.0	4.00	0.065	0.100	8	1.87	0.11	0.16	0.07	2.5

EXISTING SEWER SYSTEM 2

LINE NO.	FROM M.H. #	TO M.H. #	IN LINE D.U.'S OR ACRES	POP. UNIT	POP. SERVED INLINE	POP. SERVED TOTAL	PEAK DESIGN FLOW			LINE SIZE (INCHES)	DESIGN SLOPE (%)	dn(FT) n= 0.850	dn/D	Rh (ft)	VELOCITY (fps)
							PEAK/AVG RATIO	M.G.D.	CFS						
37	37	36	8	3.5	28.0	28.0	4.00	0.009	0.014	8	2.51	0.04	0.06	0.03	1.6
36	36	35	1	3.5	3.5	31.5	4.00	0.010	0.016	8	2.37	0.04	0.06	0.03	1.5
35	35	34	1	3.5	3.5	35.0	4.00	0.011	0.017	8	3.85	0.04	0.06	0.03	2.0
34	34	23	1	3.5	3.5	38.5	4.00	0.012	0.019	8	2.58	0.05	0.07	0.03	1.8

TOTAL CFS @ MH. 23 **0.119**

(EX. SEWER SYSTEM 1 + EX. SEWER SYSTEM 2)

PROPOSED SEWER STUDY SUMMARY FOR BALBOA PARK - PLAZA DE PANAMA PROJECT

JOB NO. 16325 BY: RICK ENGINEERING COMPANY PREPARED BY: JL DATE: 10-10-2011

FILE: Proposed_BPP_SewerStudy_3_20111003.xls CHECK BY: REFER TO PLAN SHEET:Proposed_Sewer_Study_Map.dgn

DRAWING NO. *REVISED:*

PROPOSED SEWER SYSTEM 1

LINE NO.	FROM M.H. #	TO M.H. #	IN LINE D.U.'S OR ACRES	POP. UNIT	POP. SERVED INLINE	POP. SERVED TOTAL	PEAK DESIGN FLOW			LINE SIZE (INCHES)	DESIGN SLOPE (%)	dn(FT) n= 0.013	dn/D	Rh (ft)	VELOCITY (fps)
							PEAK/AVG RATIO	M.G.D.	CFS						
33	33	32	19.6	3.5	68.6	68.6	4.00	0.022	0.034	8	1.90	0.06	0.09	0.04	1.8
32	32	31	0	3.5	0.0	68.6	4.00	0.022	0.034	8	2.15	0.06	0.09	0.04	1.9
31	31	30	0	3.5	0.0	68.6	4.00	0.022	0.034	8	2.16	0.06	0.09	0.04	1.9
30	30	29	0	3.5	0.0	68.6	4.00	0.022	0.034	8	1.74	0.07	0.10	0.04	1.8
AA	A	B	13.9	3.5	48.7	117.3	4.00	0.038	0.058	8	2.60	0.07	0.11	0.05	2.4
B	B	29A	0	3.5	0.0	117.3	4.00	0.038	0.058	8	2.80	0.07	0.11	0.05	2.5
29*	29	29A	0	3.5	0.0	117.3	4.00	0.038	0.058	8	2.00	0.08	0.12	0.05	2.2
29A	29A	27A	0	3.5	0.0	117.3	4.00	0.038	0.058	8	1.85	0.08	0.12	0.05	2.1
28	28	27	1	3.5	3.5	120.8	4.00	0.039	0.060	8	50.81	0.03	0.05	0.02	6.3
27*	27	27A	0	3.5	0.0	120.8	4.00	0.039	0.060	8	2.70	0.07	0.11	0.05	2.4
27A	27A	26A	0	3.5	0.0	120.8	4.00	0.039	0.060	8	1.50	0.09	0.13	0.05	2.0
26A	26A	26	1	3.5	3.5	124.3	4.00	0.040	0.062	8	1.85	0.09	0.13	0.05	2.2
26	26	25	3	3.5	10.5	134.8	4.00	0.043	0.067	8	1.93	0.09	0.13	0.05	2.3
25	25	24A	4	3.5	14.0	148.8	4.00	0.048	0.074	8	1.84	0.09	0.14	0.06	2.3
24A	24A	24	7.1	3.5	24.9	173.6	4.00	0.056	0.086	8	1.84	0.10	0.15	0.06	2.4
24	24	23	5.6	3.5	19.6	193.2	4.00	0.062	0.096	8	1.87	0.11	0.16	0.07	2.5

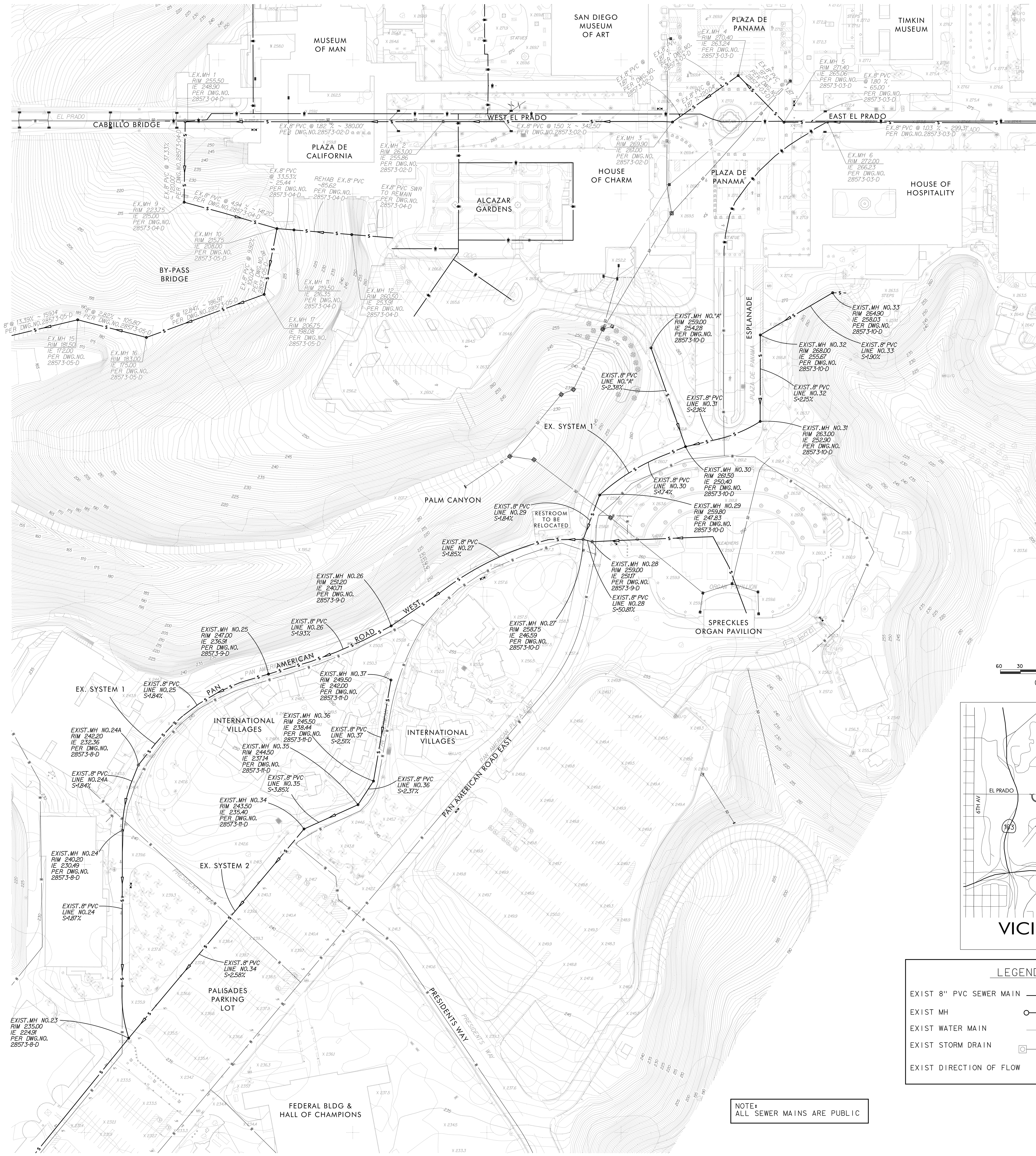
PROPOSED SEWER SYSTEM 2

LINE NO.	FROM M.H. #	TO M.H. #	IN LINE D.U.'S OR ACRES	POP. UNIT	POP. SERVED INLINE	POP. SERVED TOTAL	PEAK DESIGN FLOW			LINE SIZE (INCHES)	DESIGN SLOPE (%)	dn(FT) n= 1.349	dn/D	Rh (ft)	VELOCITY (fps)
							PEAK/AVG RATIO	M.G.D.	CFS						
37	37	36	8	3.5	28.0	28.0	4.00	0.009	0.014	8	2.51	0.04	0.06	0.03	1.6
36	36	35	1	3.5	3.5	31.5	4.00	0.010	0.016	8	2.37	0.04	0.06	0.03	1.5
1A	RSTRM A	1	4.5	3.5	15.8	47.3	4.00	0.015	0.023	6	2.00	0.06	0.11	0.03	1.7
1B	1	2	0	3.5	0.0	47.3	4.00	0.015	0.023	6	7.90	0.04	0.08	0.03	2.8
2	2	3	0	3.5	0.0	47.3	4.00	0.015	0.023	6	3.90	0.05	0.10	0.03	2.3
5A	RSTRM B	5	1	3.5	3.5	50.8	4.00	0.016	0.025	4	2.00	0.07	0.20	0.04	1.9
5B	5	6	0	3.5	0.0	50.8	4.00	0.016	0.025	4	17.40	0.04	0.12	0.03	4.1
6	6	3	0	3.5	0.0	50.8	4.00	0.016	0.025	4	2.00	0.07	0.20	0.04	1.9
3	3	4	0	3.5	0.0	50.8	4.00	0.016	0.025	6	2.00	0.06	0.12	0.04	1.8
4	4	35	0	3.5	0.0	50.8	4.00	0.016	0.025	6	2.00	0.06	0.12	0.04	1.8
35	35	34	1	3.5	3.5	54.3	4.00	0.017	0.027	8	3.85	0.05	0.07	0.03	2.2
34	34	23	1	3.5	3.5	57.8	4.00	0.018	0.029	8	2.58	0.05	0.08	0.03	1.9

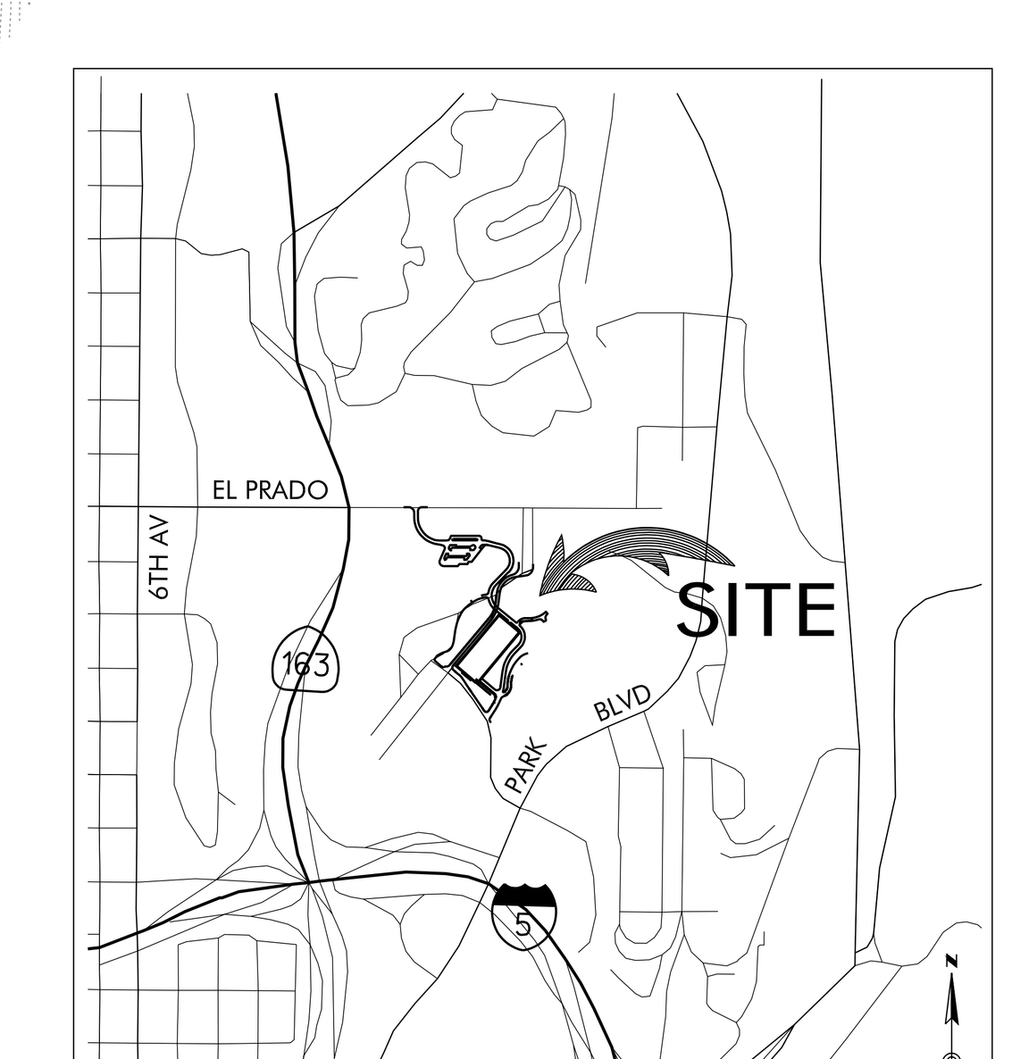
TOTAL CFS @ MH. 23 **0.124**

(PROPOSED SEWER SYSTEM 1 + PROPOSED SEWER SYSTEM 2)

BALBOA PARK-PLAZA DE PANAMA PROJECT
EXISTING SEWER STUDY MAP



NOTE:
ALL SEWER MAINS ARE PUBLIC



VICINITY MAP
NO SCALE

LEGEND

EXIST 8" PVC SEWER MAIN	S
EXIST MH	S
EXIST WATER MAIN	W
EXIST STORM DRAIN	SD
EXIST DIRECTION OF FLOW	

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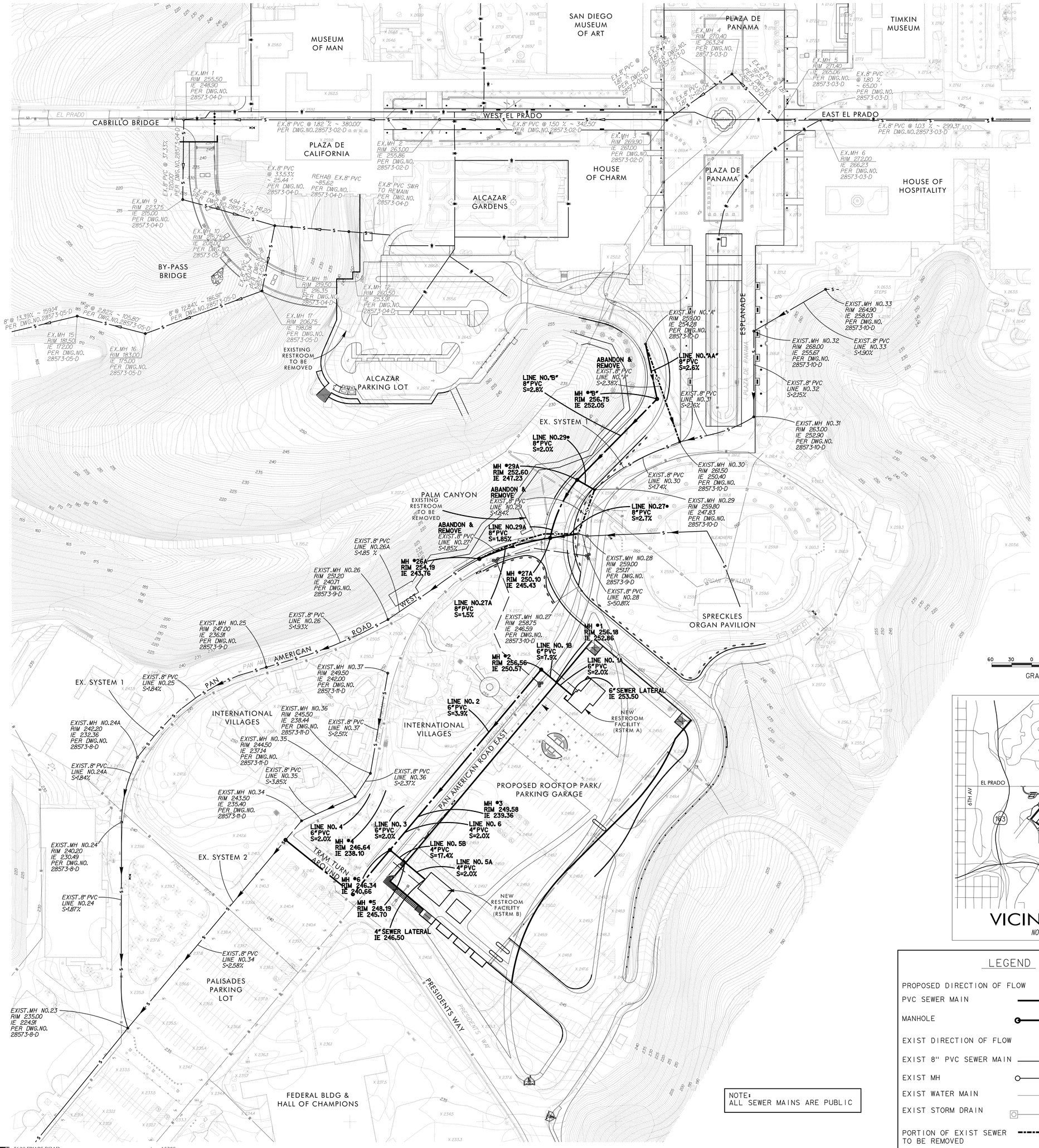
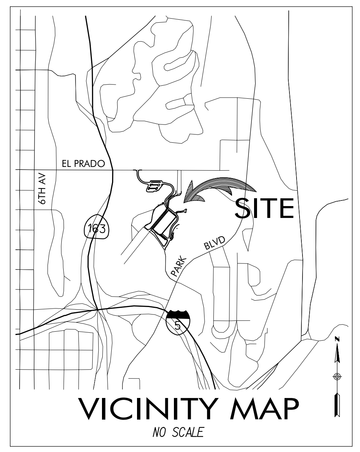
BALBOA PARK-PLAZA DE PANAMA PROJECT
PROPOSED SEWER STUDY MAP





LEGEND

- PROPOSED DIRECTION OF FLOW
- PVC SEWER MAIN
- MANHOLE
- EXIST DIRECTION OF FLOW
- EXIST 8" PVC SEWER MAIN — S
- EXIST MH — S
- EXIST WATER MAIN — W
- EXIST STORM DRAIN — SD
- PORTION OF EXIST SEWER TO BE REMOVED — S

NOTE:
ALL SEWER MAINS ARE PUBLIC

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J- 16325

J-16325

EL PRADO

EL PRADO

PLAZA DE PANAMA

MH. NO. 1
STA. 0+00

MH. NO. 2
STA. 3+82.50

MH. NO. 3
STA. 7+25.00

EX. PAVEMENT

4" CI WTR
EL. UNK.

TEL.
EL. UNK.

2" MP GAS
EL. UNK.

EX. DECORATIVE TILES

EX. 8" VCP SWR

EX. 6" PVC SWR

14" SD
3.50 T.O.P.

8" PIPE
S 1.5%

L.E. 261.00

MATCH LINE STA. 8+00 SEE SHT. 3

250

255

260

265

270

8" PIPE

L 2%

L 5%

INVERT OF PIPE

I.E. 248.94

I.E. 255.86

24" STEEL PIPE CASING

20.00' MICROTUNNELING OR JACKING

380.00'

342.5'

75.00'

120.04' TO MH NO. 4

STA. 2+40.00

STA. 2+60.00

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

NOTE:
EXISTING UTILITY CROSSINGS ARE NOT REPRESENTATIVE OF ACTUAL LENGTH OF CONFLICT AREA (SEE PLAN VIEW)

0 1 2 3 4 5 6 7 8

NORTH

MH. NO. 1
STA. 0+00
N 206665.12
E 1722544.15

4" LAT.
STA. 1+00

NIGHT WORK REQUIRED FOR THIS SHEET.

6" LAT.
STA. 2+20.50

10'X10' RECEIVING PIT

WTR.

MIN. 24" STEEL PIPE CASING

20'X10' JACKING PIT

TEL.

EX. BRIDGE ABUTMENT

SCALE: 1" = 40'

8" PIPE

12" CI WATER

S.D. M.H.
STA. 1+53

6" S.D. LAT.
STA. 1+53

24" STEEL PIPE CASING

STA. 2+40.00

STA. 2+60.00

BUILDING

MUSEUM OF MAN

WARNING:
(LOW CLEARANCE)

ABANDON EX SEWER MAIN AND MH

THE SEWER MAIN WAS MOVED FROM MH. NO. 1 TO MH. NO 3 15' TO THE SOUTH BECAUSE OF THE 18" RCP STORM DRAIN

CONCRETE ENCLOS.
1.80 T.O.P. STA. 1+45

8" PIPE INCLUDED IN THIS CONTRACT. SEE SHT. NO. 4

8" RCP
STA. 3+73

WATER
STA. 3+72

6" LAT.
STA. 3+78

WATER
STA. 3+02

GAS

SCULTURED GARDEN

MH. NO. 2
STA. 3+82.50
N 206663.26
E 1722926.65

4" LAT.
STA. 4+12

6" LAT.
STA. 4+34

EX. CONC. SIDEWALK

S89° 53'58"E

8" PIPE

6" ST. PIPE
STA. 3+75

COVERED WALKWAY

ABANDON EX. MH

CUT & PLUG UP STREAM

EX. 8" PVC TO REMAIN

ALCAZAR GARDEN

MUSEUM OF ART

4" LAT.
STA. 6+01

TEL.

6" LAT.
STA. 6+89

4" LAT.
STA. 6+70

4" LAT.
STA. 5+83

4" LAT.
STA. 5+45

HOUSE OF CHARM

ABANDON EX. MH

ABANDON EX. 6" CP SEWER

FOR PROPOSED WATER IN THIS AREA SEE SHT. 14

4" LAT.
STA. 7+07

4" LAT.
STA. 7+19

CROSSWALK

MATCH LINE STA. 8+00 SEE SHT. 3

ABANDONED 12" WATER MAIN

6" PVC W

154.43'

WATER MAIN

CROSSWALK

GAS

ABANDON EX. 8" CP SEWER

14" S.D.
3.50 T.O.P.

NOTES:
1. REPLACE SEWER LATERAL ⊕ ON THIS SHEET TO EDGE OF BUILDING.
2. CONTRACTOR TO DYE-TEST LATERALS PRIOR TO ABANDONMENT OF MAIN.

ARCHEOLOGICAL & PALEONTOLOGICAL MONITORING IS REQUIRED ON THIS SHEET.

REFERENCE:

BENCH MARK:
U.S. COASTAL GEODETIC SURVEY BRASS CAP ON STAIRS AT MUSEUM OF MAN
EL. = 287.860 (MSL)

FIELD NOTES:
U6615 BALBOA PARK AERIAL PER HOLT:
182251, 4-9-93, 204-1719

WATER: 27359-239-D, 16019-D, 11738-1-D, 5295-L
SEWER: 20961-D
STORM DRAIN: 16845-2-D
GAS: 15/489-L15/589K
ELECTRIC: 204-1722
CABLE TV:
TELEPHONE: 1026
IMPROVEMENTS: 9847-D, 16518-D, 20262-D
WATER GATE BOOK: G215
SEWER GATE BOOK: G215
100' SCALE: 206-1722
THOMAS BROS.: G. 1289, B-1, C-1

RETIREMENTS:
800' 8" PVC

SEWER & WATER GROUP 615

EL PRADO

STA. 0+00 TO STA. 8+00

CITY OF SAN DIEGO, CALIFORNIA
UTILITIES DEPARTMENT

WATER W.O. 182251
SEWER W.O. 172091

04-16-99

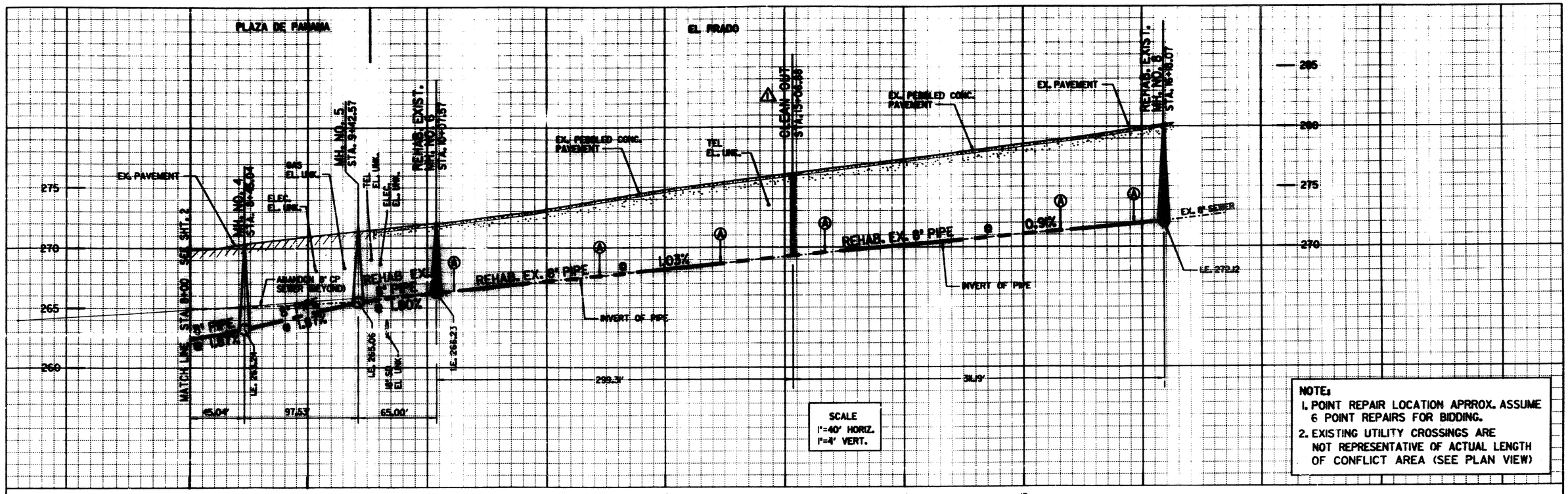
ORIGINAL	04-16-99	10-17-01
ADDENDUM	06-03-99	
REVISION ⚠	06-17-99	
⚠ AS-BUILT PER CITY INSPECTOR	10-17-01	

204-1722

28573-02-D

AS-BUILT

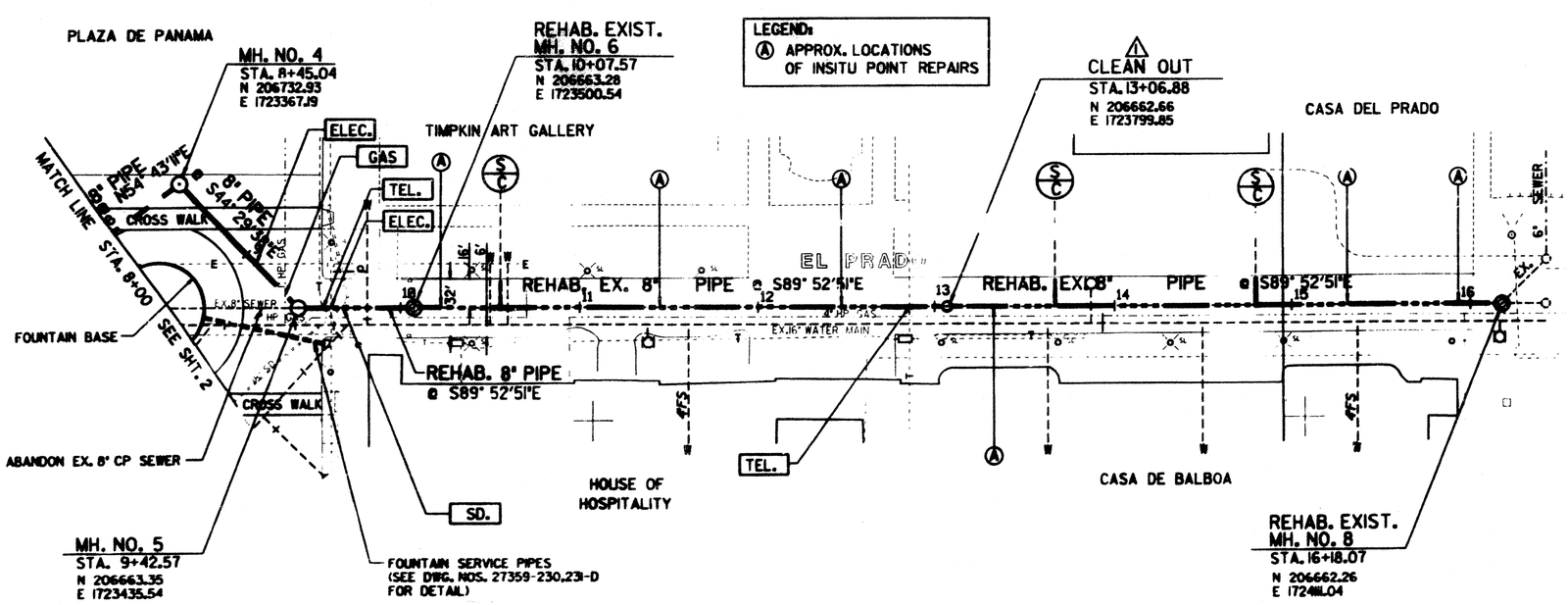
0 1 2 3 4 IN.



NOTE:
1. POINT REPAIR LOCATION APRROX. ASSUME 6 POINT REPAIRS FOR BIDDING.
2. EXISTING UTILITY CROSSINGS ARE NOT REPRESENTATIVE OF ACTUAL LENGTH OF CONFLICT AREA (SEE PLAN VIEW)

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

EL PRADO



LEGEND:
Ⓐ APPROX. LOCATIONS OF INSITU POINT REPAIRS

ARCHEOLOGICAL & PALEONTOLOGICAL MONITORING IS REQUIRED ON THIS SHEET.

NIGHT WORK REQUIRED FOR THIS SHEET.

REFERENCE:

BENCH MARK:
U.S. COASTAL GEODETIC SURVEY BRASS CAP ON STAIRS AT MUSEUM OF MAN
EL = 287.860 (MSL)

FIELD NOTES:
UG615 BALBOA PARK AERIAL PER HOLT: 18225I, 4-9-93, 204-1719

WATER: 27359-239-D, 11019-D, 11738-1-D, 5295-L
SEWER: 20961-D
STORM DRAIN: 16845-2-D
GAS: 15/469.L15/589K
ELECTRIC: 204-1722
CABLE TV:
TELEPHONE: 1026
IMPROVEMENTS: 9147-D, 16518-D, 20262-D
WATER GATE BOOK: G215
SEWER GATE BOOK: G215
100' SCALE: 206-1722
THOMAS BROS.: PG. 1289, B-1, C-1

RETIREMENTS:
700' 8" CP

SEWER & WATER GROUP 615

EL PRADO

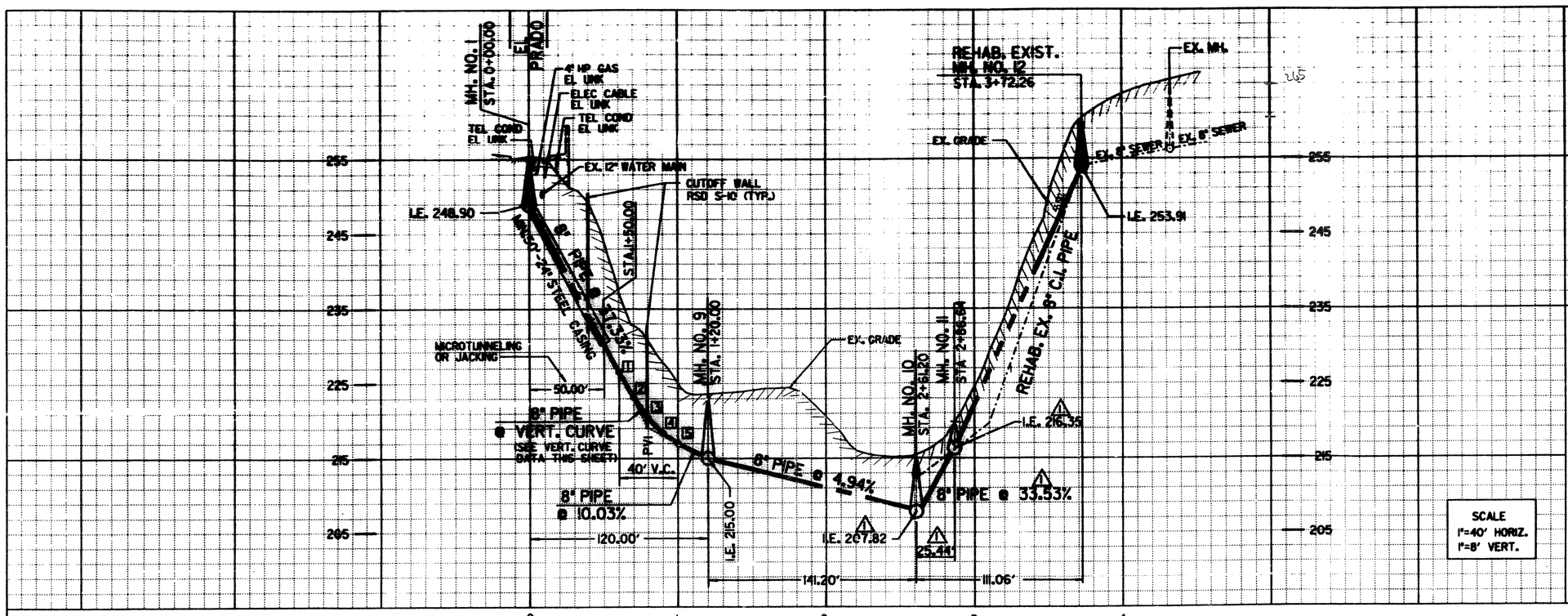
STA. 8+00 TO STA. 16+18.07

CITY OF SAN DIEGO, CALIFORNIA
UTILITIES DEPARTMENT
SHEET 3 OF 38 SHEETS

			04-16-93	
DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	JD/TE		04-16-93	10-17-03
AS-BUILT PER CITY REVISION	MM/VP		4-29-93	10-17-03

DRAWING NO.	18225I
SUPERSEDING DWG. NO.	17209I
ACCEPTED BY CITY ENGINEER	
PROJECT ENGINEER	
UNIT	
JOB ORDER NO.	204-1722
CONTRACTOR / INSPECTOR	DATE STARTED / DATE COMPLETED
	28573-03-D

AS-BUILT

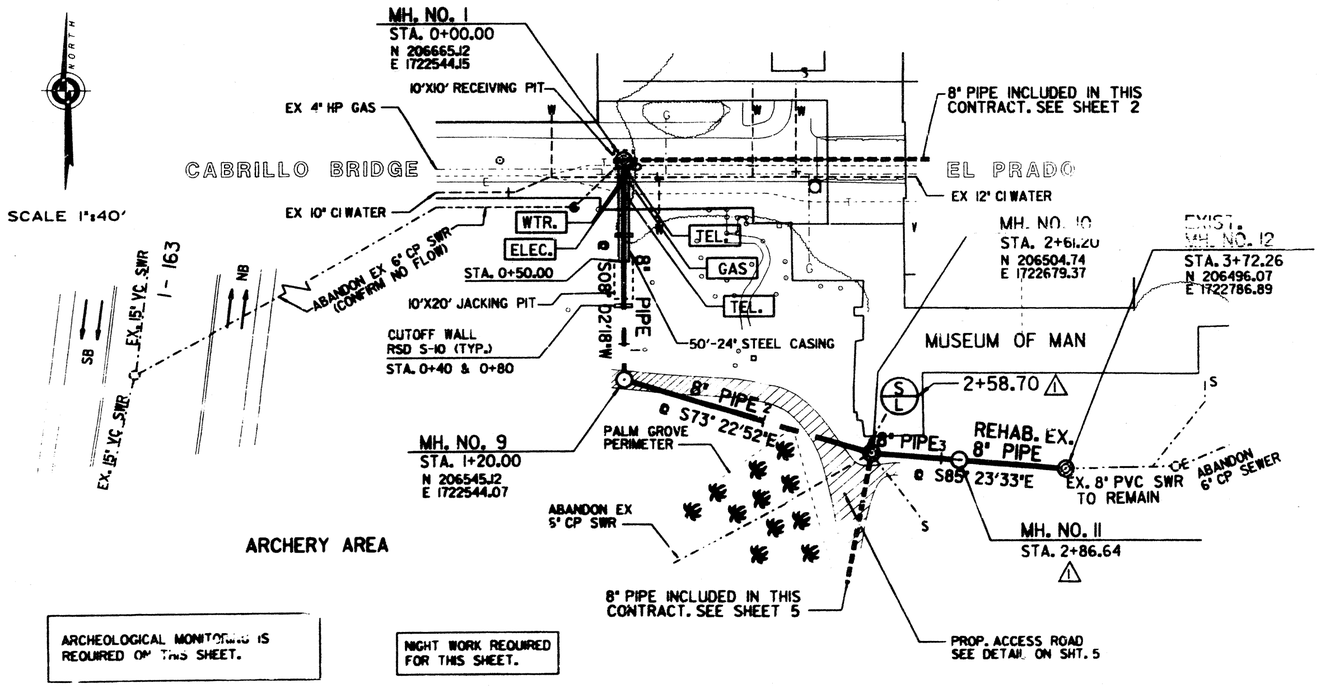


VERTICAL CURVE DATA			
NO.	STATION	INVERT ELEV.	DESCRIPTION
1	0+60	I.E. 226.5	BVC
2	0+70	I.E. 223.10	10' INTERVAL
3	0+80	I.E. 220.39	
4	0+90	I.E. 218.36	
5	1+00	I.E. 217.01	EVC
	0+80	I.E. 219.03	PVI

BVC - BEGINNING OF VERTICAL CURVE
EVC - END OF VERTICAL CURVE
PVI - POINT OF VERTICAL INTERSECTION

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

NOTE:
EXISTING UTILITY CROSSINGS ARE NOT REPRESENTATIVE OF ACTUAL LENGTH OF CONFLICT AREA (SEE PLAN VIEW)



ARCHEOLOGICAL MONITORING IS REQUIRED ON THIS SHEET.

NIGHT WORK REQUIRED FOR THIS SHEET.

HYDROSEEDING NOTES:

UNPAVED PORTIONS OF THE SEWER ALIGNMENT DISTURBED BY THE CONSTRUCTION ACTIVITY SHALL BE REVEGETATED BY HYDROSEEDING IN CONFORMANCE WITH SECTION 7.2-5 OF THE CITY OF SAN DIEGO'S LANDSCAPE TECHNICAL MANUAL.

THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES AS NECESSARY DURING AND AFTER CONSTRUCTION EXTENDING THROUGH THE 25-MONTH MONITORING PERIOD. EROSION CONTROL MATERIALS INCLUDE, BUT ARE NOT LIMITED TO, JUTE MATTING, SILT FENCING, AND SANDBAGS.

THE LIMITS, AND METHODS OF DELINEATION OF THE DISTURBED AREA TO BE REVEGETATED SHALL BE APPROVED IN ADVANCE BY THE PROJECT ENGINEER. THE DELENIATION SHALL CLEARLY INDICATE THE LIMITS OF REVEGETATION THROUGHOUT THE MONITORING PERIOD, AND BE FULLY REMOVED PRIOR TO ACCEPTANCE OF THE WORK.

IRRIGATION SHALL BE INSTALLED IN CONFORMANCE W/ SECTION 5.2-1 OF THE CITY OF S.D. LANDSCAPE TECHNICAL MANUAL AND REMOVED BY THE CONTRACTOR AT END OF THE MAINTENANCE PERIOD.

THE SEED MIX SHALL BE A GRASSLAND SUCH AS THAT LISTED BELOW OR APPROVED EQUAL.

COMMON NAME	SCIENTIFIC NAME	MIN.% PURITY	MIN.% GERMINATION	LBS/ ACRE
PURPLE NEEDLE GRASS	NASSELIA PULCHRA	15	15	5
BLUE-EYED GRASS	SISIRYNCHIUM BELLUM	15	15	1.25
GOLDFIELD	LASTHENIA CALIFORNIA	15	15	1.25
ARROYO LUPINE	LUPINUS SUCCULENTUS	15	15	1.25
DEER WEED	LOTUS SCOPARIUS	15	15	1.25
OWL'S CLOVER	CASTILLEJA EXSERTA	15	15	1.25
COMMON ENCELIA	ENCELIA CALIFORNIA	15	15	1.25
PLANTAIN	PLANTAGO INSULARIS	98	75	20
			TOTAL LBS/ACRE	32.5

HYDROSEED SLURRY MIX COMPONENTS:

- SEED MIX @ LBS/ACRE INDICATED ABOVE.
- NATURAL WOOD CELLULOSE FIBER MULCH (SILVA-FIBER OR APPROVED EQUAL) @ 2000 LBS/ACRE
- ORGANIC SOIL STABILIZER/BINDER (ECOLOGY CONTROL M-BINDER OR APPROVED EQUAL) @ 60 LBS/ACRE
- FERTILIZER (38-0-0) @ 60 LBS/ACRE
- FERTILIZER (38-0-0) TRIPLE SUPER PHOSPHATE, W/19% SOIL SULFUR @ 200 LBS/ACRE

CERTIFICATION OF SEED PURITY AND GERMINATION PERCENTAGES FROM THE SUPPLIER, AND CERTIFICATION OF SLURRY MIX COMPONENTS FROM THE APPLICATOR, SHALL BE PROVIDED TO ASSURE COMPLIANCE WITH PLAN SPECIFICATIONS.

REFERENCE:

BENCH MARK:
U.S. COASTAL GEODETIC SURVEY BRASS CAP ON STAIRS OF MUSEUM OF MAN
EL=287.860 (MSL)

FIELD NOTES:
UG615 BALBOA PARK AERIAL PER HOLT: 182251, 4-9-93, 204-1719

WATER: 9147-D, 14101-D, 20262-D, 22243-D
SEWER:
STORM DRAIN: 204-1722
GAS: 15/485,J15/589K
ELECTRIC: 204-1722
CABLE TV:
TELEPHONE: 1026
IMPROVEMENTS: 9147-D, 16518-D, 20262-D
WATER GATE BOOK: G21S
SEWER GATE BOOK: G21S
100' SCALE: 206-1722
THOMAS BROS.: PG. 1289, B-1

RETIREMENTS:

NONE

SEWER & WATER GROUP 615

MUSEUM OF MAN

STA. 0+00 TO STA. 3+72.98

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 4 OF 38 SHEETS

WATER I.A. 182251
SEWER I.A. 172091

FOR CITY ENGINEER — 04-16-99 DATE — ASSOCIATE ENGINEER

DESCRIPTION		APPROVED	DATE	FILMED
ORIGINAL	JD/EE		04-16-99	10-17-02
ADDENDUM	JD/EE		06-03-99	10-17-02
AS-BUILT PER CITY INSPECTOR	MM/VP		9-20-02	10-17-02

PROJECT ENGINEER

CONTROL CERTIFICATION

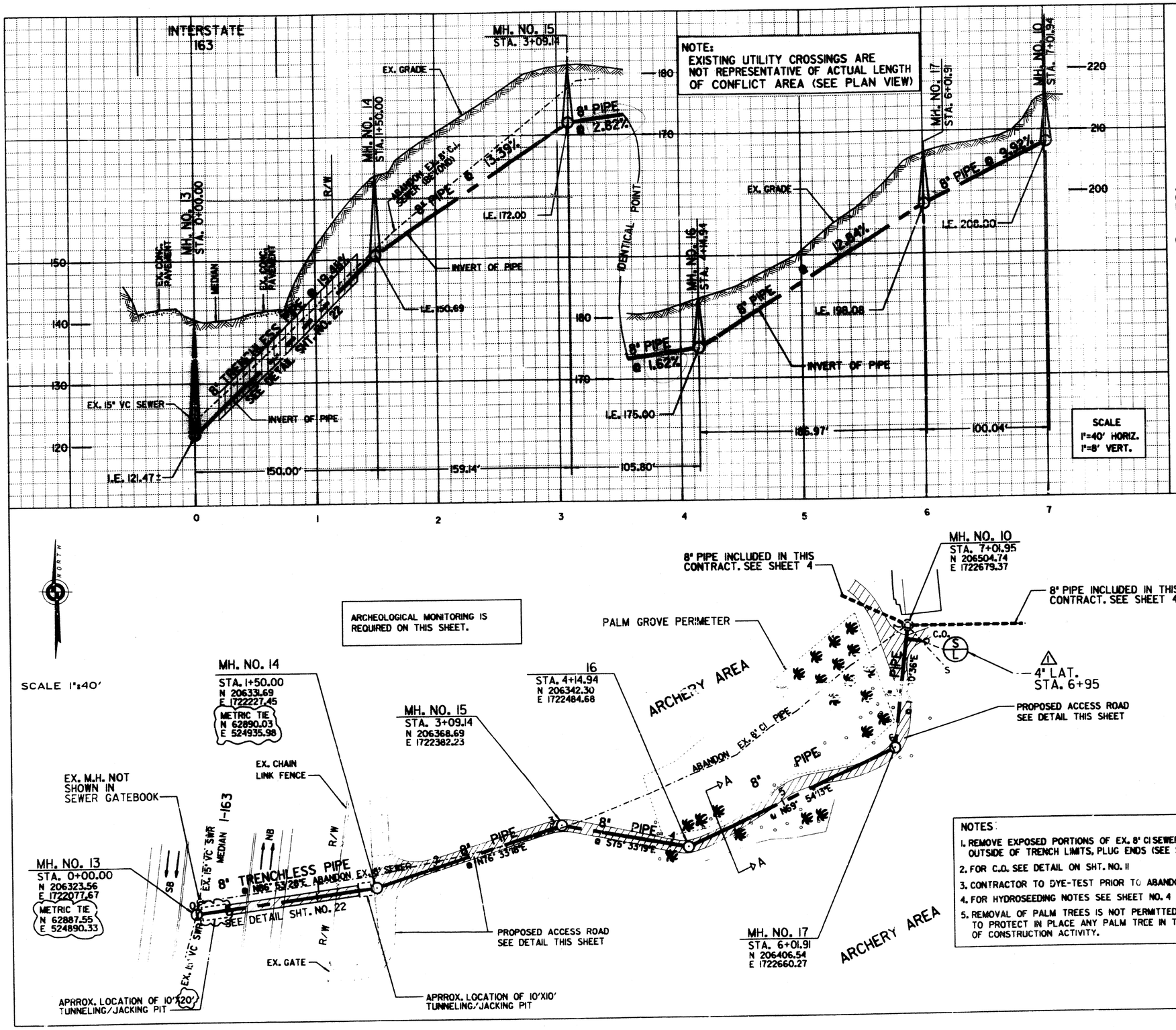
206-1722
LAMBERT COORDINATES

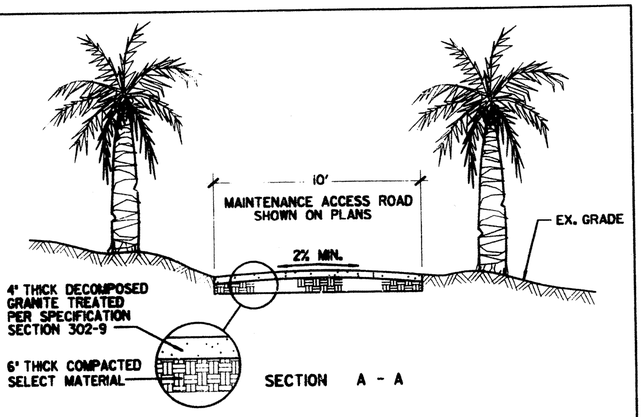
28573-04-D

CONTRACTOR: CAL SOUTHWEST — DATE STARTED: 05-24-99
INSPECTOR: MICHAEL KIRK — DATE COMPLETED: 02-02-01

AS-BUILT

0 1 2 3 4 IN.





ACCESS ROAD DETAIL
NOT TO SCALE

CONTRACTOR NOTE:

1. THE CONTRACTOR SHALL PROVIDE A STABILIZED SOIL MAINTENANCE ACCESS PER SECTION A-A. TO PROVIDE FUTURE VEHICULAR ACCESS. CONTRACTOR SHALL GRADE THE AREA PRIOR TO PLACEMENT OF THE STAVILIZED SOIL. THE SIDE OF THE STABILIZED SOIL SURFACE WILL BE FLUSH WITH EXITING GRADE. ALL COST FOR THIS WORK, INCLUDING SOIL SUBGRADE PREPARATION, SHALL BE INCLUDED IN THE COST BID FOR STABILIZED SOIL ACCESS.
2. CONTRACTOR TO REMOVE AND REPLACE ANY EXISTING FENCE AS NECESSARY TO INSTALL THE NEW SEWER MAIN. ALL COST FOR THIS WORK SHALL BE INCLUDED IN THE PRICE BID FOR 6' CHAIN LINK FENCE.

NOTES:

1. REMOVE EXPOSED PORTIONS OF EX. 8" CI SEWER MAIN OUTSIDE OF TRENCH LIMITS, PLUG ENDS (SEE SPECIFICATION)
2. FOR C.O. SEE DETAIL ON SHT. NO. 11
3. CONTRACTOR TO DYE-TEST PRIOR TO ABANDONMENT OF MAIN
4. FOR HYDROSEEDING NOTES SEE SHEET NO. 4
5. REMOVAL OF PALM TREES IS NOT PERMITTED. CONTRACTOR TO PROTECT IN PLACE ANY PALM TREE IN THE VICINITY OF CONSTRUCTION ACTIVITY.

REFERENCE:

BENCH MARK:
U.S. COASTAL GEODETIC SURVEY BRASS CAP ON STAIRS OF MUSEUM OF MAN
EL=287.860 (MSL)

FIELD NOTES:
UG615 BALBOA PARK AERIAL PER HOLT: 18225I, 4-9-93, 204-1719

WATER: 9147-D, 14101-D, 20262-D, 22243-D
SEWER:
STORM DRAIN: 204-1722
GAS: 15/489,J15/589K
ELECTRIC: 204-1722
CABLE TV:
TELEPHONE: 1026
IMPROVEMENTS: 9147-D, 16518-D, 20262-D
WATER GATE BOOK: G21S
SEWER GATE BOOK: G21S
100' SCALE: 206-1722
THOMAS BROS.: PG. 1289, B-1,C-1

RETIREMENTS:
600' 8" CI

SEWER & WATER GROUP 615

ACCESS ROAD, ARCHERY RANGE

STA. 0+00 TO STA. 7+01.94

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 5 OF 39 SHEETS

WATER I.A. 18225I
SEWER I.A. 17209I

ASSOCIATE ENGINEER

04-16-99
DATE

PROJECT ENGINEER

DESCRIPTION		APPROVED	DATE	FILMED
ORIGINAL	JS/EE		04-16-99	10-17-02
REVISION ⚠	EJD/EE		09-17-99	10-17-02
⚠ AS-BUILT PER CITY INSPECTOR	MM/WP		9-20-02	10-17-02

CONTROL CERTIFICATION
206-1722
LAMBERT COORDINATES

CONTRACTOR: CAL SOUTHWEST — DATE STARTED: 08-20-02
INSPECTOR: MICHAEL MIM — DATE COMPLETED: 09-20-02

28573-05-D

AS-BUILT

ARCHERY RANGE

PAN AMERICAN PLAZA

PAN AMERICAN ROAD WEST

MH. NO. 22
STA. 0+00.00

MH. NO. 23
STA. 2+79.33

MH. NO. 24
STA. 5+89.09

MH. NO. 24A
STA. 6+90.88

MATCH LINE STA. 8+00 SEE SHT. 9

ELEEC. COND. EL. UNK.
2" HP GAS EL. UNK.
TEL EL. UNK.
2" P.V.C. IRR. EL. UNK
6" CI WTR EL. UNK.
TEL. EL. UNK.
WATER EL. UNK
12" SD EL. UNK.
6" CP SWR EL. UNK.
EX. PAVEMENT
ST. LIGHT EL. UNK
ABANDON EX. 6" SWR (BEYOND)
ABANDON EX. SWR (BEYOND)
6" CI WTR EL. UNK.
1½" HP GAS EL. UNK.
1½" HP GAS EL. UNK.

8" PIPE @ 1.79%
8" PIPE @ 1.87%
8" PIPE @ 1.84%
8" PIPE @ 1.84%

I.E. 219.90
I.E. 224.91
I.E. 230.49
I.E. 232.36

INVERT OF PIPE
INVERT OF PIPE

279.33
309.76'
101.79'
109.12'
243.42' TO MH NO. 25

230
225
220
215
245
240
235
230

0 1 2 3 4 5 6 7 8

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

NOTE:
EXISTING UTILITY CROSSINGS ARE NOT REPRESENTATIVE OF ACTUAL LENGTH OF CONFLICT AREA (SEE PLAN VIEW)

8" PIPE INCLUDED IN THIS CONTRACT. SEE SHEET 7

EX. 8" C WATER
EX. 24" RCP
8" PIPE @ N39° 40'11"E
EX. 6" C WATER
PAN AMERICAN PLAZ

AUTOMOTIVE MUSEUM

2" P.V.C. IRR STA. 2+45
ELEC.
GAS
TEL
WTR.

TELE. STA. 2+68
WATER STA. 3+05

8" PIPE @ N15° 39'13"W

ABANDON EX. SWR M.H.
6' LAT. STA. 3+19
ABANDON EX. 6" SEWER
SWR.
SD.
GAS

PALISADES BUILDING

MH. NO. 24
STA. 5+89.09
N 205605.88
E 1722448.88

4" LAT. STA. 5+97
4" LAT.

ABANDON EX. SWR M.H.
4" PIPE INCLUDED IN THIS CONTRACT. SEE SHEET 6
4" LAT. STA. 6+18

BALBOA PARK CLUB

WTR.
6' LAT. STA. 6+59
@ N16° 29'33"E

MH. NO. 24A
STA. 6+90.88, 5' LT.
N 205705.29
E 1722469.67
@ N39° 29'03"E

ABANDON EX. 6" SEWER
ELEC.
6' LAT. STA. 7+34

EX. 6" C WATER
8" PIPE @ N00° 08'14"W
EX. 6" C WATER
8" HP GAS

MH. NO. 22
STA. 0+00.00
N 205082.14
E 1722279.96

MH. NO. 23
STA. 2+79.33
N 205297.15
E 1722458.28

BC STA. 2+88.84
N 205306.30
E 1722455.71

Δ = 15° 47'26"
R = 200'
L = 55.12'
RADIUS POINT
N 205360.26
E 1722648.29

STREET LIGHT STA. 5+31

8" PIPE INCLUDED IN THIS CONTRACT. SEE SHEET 11

ABANDON EX. 6" SEWER
BC STA. 5+89.09
EC STA. 6+47.37
GAS
BC STA. 7+38.76

Δ = 16° 21'20"
R = 204.18'
L = 58.28'
RADIUS POINT
N 205605.39
E 1722653.06

Δ = 11° 48'07"
R = 297.33'
L = 61.24'
RADIUS POINT
N 205556.46
E 1722732.33

MATCH LINE STA. 8+00 SEE SHT. 9

CAUTION !!
CONTRACTOR TO NOTIFY SDG&E TO RELOCATE ELECTRICAL CONDUIT AT M.H. NO. 23 MIN. 10 WORKING DAYS PRIOR TO CONSTRUCTION OF M.H.

SCALE: 1" = 40'

NOTES:
1. SEE SHT. 15 FOR WATER MAIN INSTALLATION
2. CONTRACTOR TO DYE-TEST LATERALS PRIOR TO ABANDONMENT

ARCHEOLOGICAL & PALEONTOLOGICAL MONITORING IS REQUIRED ON THIS SHEET.

REFERENCE:

BENCH MARK:
U.S. COASTAL GEODETIC SURVEY BRASS CAP ON STAIRS AT MUSEUM OF MAN
EL. = 287.860 (MSL)

FIELD NOTES:
UG615 BALBOA PARK AERIAL PER HOLT, 182251, 4-9-93, 204-1719

WATER: 9147-D, 14101-D, 20262-D, 22243-D
SEWER: 20961-D
STORM DRAIN:
GAS: 15/489.J,J5/589K
ELECTRIC: 204-1722
CABLE TV:
TELEPHONE: 1026
IMPROVEMENTS: 9147-D, 16518-D, 20262-D
WATER GATE BOOK: G25
SEWER GATE BOOK: G25
100' SCALE: 204-1722
THOMAS BROS.: PG. 1289, B-1, C-1

RETIREMENTS:
500' 6" CP

SEWER & WATER GROUP 615

PAN AMERICAN PLAZA & ROAD WEST

STA 0+00 TO STA 8+00

CITY OF SAN DIEGO, CALIFORNIA
UTILITIES DEPARTMENT
SHEET 8 OF 38 SHEETS

04-16-99

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			04-16-99	10-17-02
ADDENDUM			06-03-99	
REVISION 1			08-17-99	
REVISION 2			02-17-00	
AS-BUILT PER CITY INSPECTION	MW/VP		7-30-02	10-17-02

CONTRACTOR: C.A. SOUTHWEST — DATE STARTED: 08-30-99
INSPECTOR: MICHAEL RIPH — DATE COMPLETED: 09-09-99

WATER I.A. 182251
SEWER I.A. 172091

206-1722

28573-08-D

AS-BUILT

FILMED FROM THE ORIGINAL. BEST QUALITY OBTAINABLE. EXCESSIVE GRAY BACKGROUND MAY CAUSE A POOR QUALITY REPRODUCTION.

0 1 2 3 4IN.

PAN AMERICAN PLAZA & ROAD WEST

PAN AMERICAN ROAD WEST

MATCH LINE STA. 8+00 SEE SHT. 8

16" CMP EL. UNK.

MH. NO. 25
STA. 9+34.30

EX. PAVEMENT

2" GAS EL. UNK.

MH. NO. 26
STA. 11+31.44

EX. 16" WATER

EX. 6" SEWER

REMOVE EX. 8" SEWER

EX. 8" SEWER

ELECT. EL. UNK

8" PIPE @ 1.84%

8" PIPE @ 1.93%

8" PIPE @ 1.85%

INVERT OF PIPE

I.E. 236.91

I.E. 240.71

I.E. 246.59

MH. NO. 27
STA. 14+50.50

MH. NO. 28
STA. 14+59.5

16" CMP EL. UNK.

8" PIPE @ 50.89%

I.E. 245.59

I.E. 251.17

9'

134.30'

197.14'

365.51'

243.42' TO M.H. NO. 24A

260
255
250
245
240
235

8 9 10 11 12 13 14 14

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

NOTE:
EXISTING UTILITY CROSSINGS ARE NOT REPRESENTATIVE OF ACTUAL LENGTH OF CONFLICT AREA (SEE PLAN VIEW)

NORTH

SCALE: 1" = 40'

MH. NO. 25
STA. 9+34.30
N 205846.37
E 1722666.28

SD.

MATCH LINE STA. 8+00 SEE SHT. 8

8"

C.O.

2" HP GAS

8" WATER

Δ = 14° 19'52"
R = 788.18'
L = 197.14'
RADIUS POINT
N 206614.85
E 1722491.21

STA. 9+34.30

PAN AMERICAN ROAD WEST

ABANDON EX. CONC. SEWER

EC STA. 11+31.44

ELECT. STA. 11+50

ELECT. STA. 11+52

GAS

8" PIPE @ N56° 58'46E

VARIES

18'

4' LAT. STA. 13+90

PUBLIC REST ROOM

MH. NO. 27
STA. 14+50.50
7.45' LT
N 206040.15
E 1723139.87

8" PIPE

EX. 6" SWR TO BE ABANDONED

8" PIPE INCLUDED IN THIS CONTRACT. SEE SHEET 10

GAS

8" PIPE
@ S36° 06'58"E

WTR

EX. 6" SEWER TO REMAIN

MH. NO. 28
STA. 14+59.5

4" LAT. STA. 8+03

4" LAT. STA. 8+50

Δ = 25° 52'48"
R = 297.33'
L = 134.30
RADIUS POINT
N 205556.46
E 1722732.33

HOUSE OF PACIFIC RELATIONS

4" LAT. STA. 9+73

4" LAT. STA. 9+41

MH. NO. 26
STA. 11+31.44
N 205913.62
E 1722851.05

STUB OUT FOR FUTURE CONNECTION

4" LAT. STA. 11+50

EX. 16" CI WATER

4" LAT. STA. 11+68

HALL OF NATION

BC STA. 12+51.45
3.66' LT

4" LAT. STA. 12+44

Δ = 24° 42'14"
R = 364.04'
L = 156.96'
RADIUS POINT
N 205673.72
E 1723149.98

EC STA. 14+07.78
6.44' LT

ABANDON EX. 6" SEWER

NOTES:
1. SEE SHT. 16 FOR WATER MAIN INSTALLATION
2. CONTRACTOR TO DYE-TEST LATERALS PRIOR TO ABANDONMENT OF MAIN
3. FOR C.O. SEE DETAIL SHT. NO.11

ARCHEOLOGICAL & PALEONTOLOGICAL MONITORING IS REQUIRED ON THIS SHEET.

REFERENCE:

BENCH MARK:
U.S. COASTAL GEODETIC SURVEY BRASS CAP ON STAIRS AT MUSEUM OF MAN
EL = 287.860 (MSL)

FIELD NOTES:
UG615 BALBOA PARK AERIAL PER HOLT, I82251, 4-9-93, 204-1719

WATER: 14101-D, 20262-D, 22243-D, 14101-34-D1920-1-D
SEWER: 20961-D
STORM DRAIN:
GAS: 15/489.1, 15/589K
ELECTRIC: 204-1722
CABLE TV:
TELEPHONE: 1026
IMPROVEMENTS: 9147-D, 16518-D, 20262-D
WATER GATE BOOK: G21S
SEWER GATE BOOK: G21S
100' SCALE: 204.206-1722
THOMAS BROS.: PG. 1289, B-1, C-1

RETIREMENTS:
550' 8" PVC
150' 6" CP

SEWER & WATER GROUP 615

PAN AMERICAN ROAD WEST

STA 8+00 TO STA 14+54.97

CITY OF SAN DIEGO, CALIFORNIA
UTILITIES DEPARTMENT
SHEET 9 OF 38 SHEETS

WATER I.A. 182251
SEWER I.A. 172091

04-16-99

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			04-16-99	10-17-01
ADDENDUM			06-03-99	
REVISION			08-17-99	
REVISION			02-17-00	
AS-BUILT PER CONSTRUCTION	MW/MP	M. Pla	9-30-02	10-17-02

206-1722

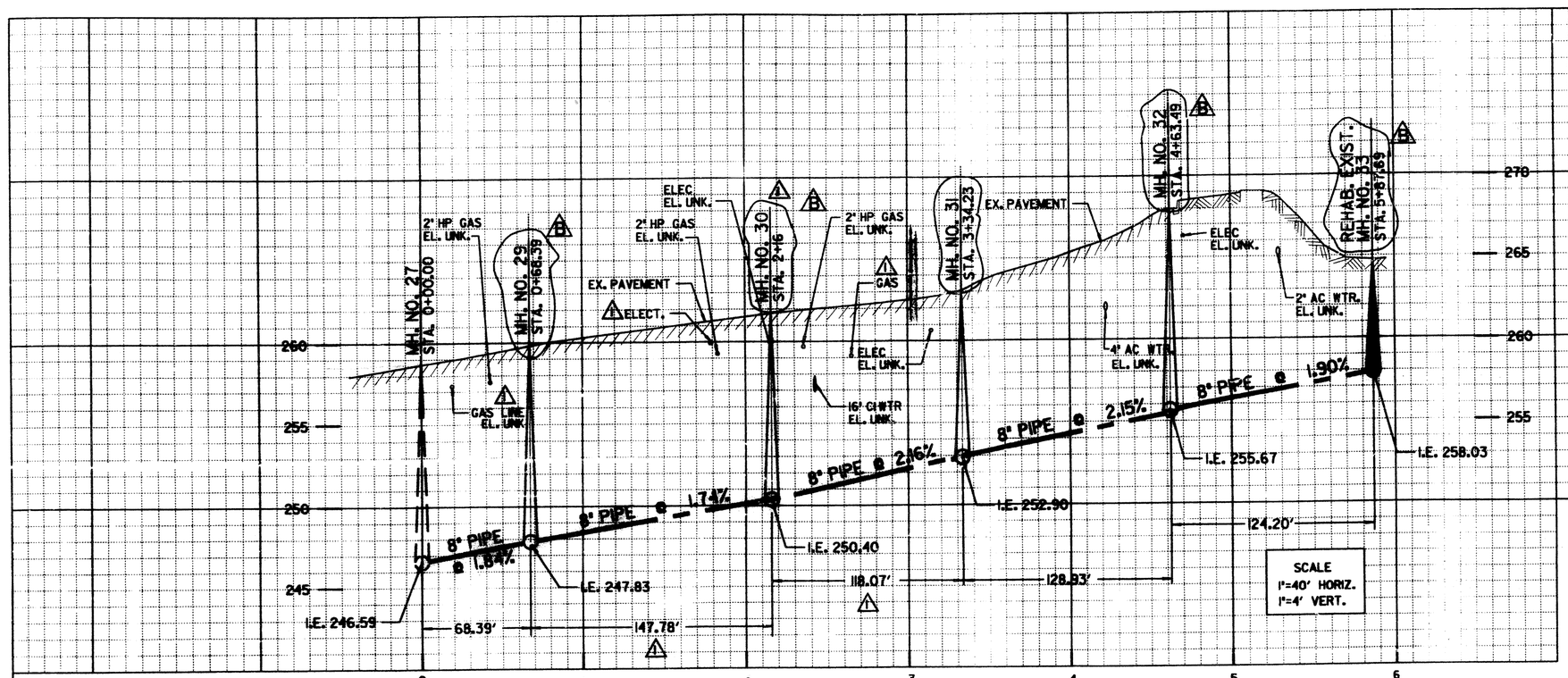
CONTRACTOR C.A. SOUTHWEST DATE STARTED 08-25-99
INSPECTOR MICHAEL REED DATE COMPLETED 09-08-99

28573-09-D

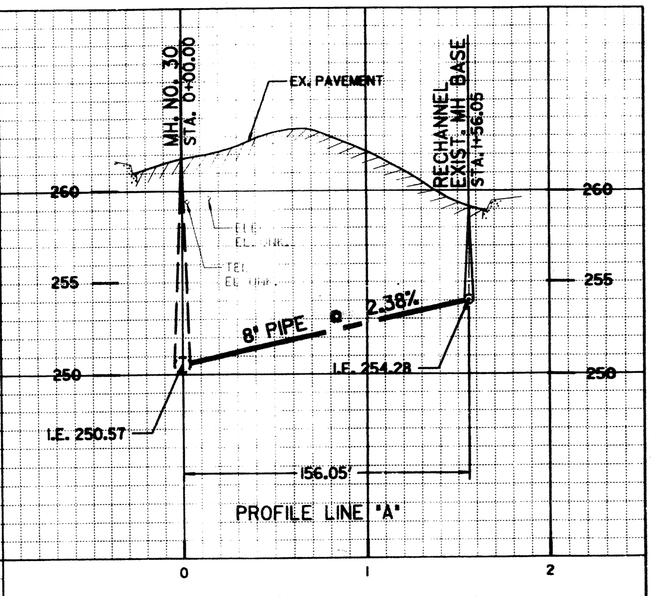
AS-BUILT

PAN AMERICAN ROAD WEST

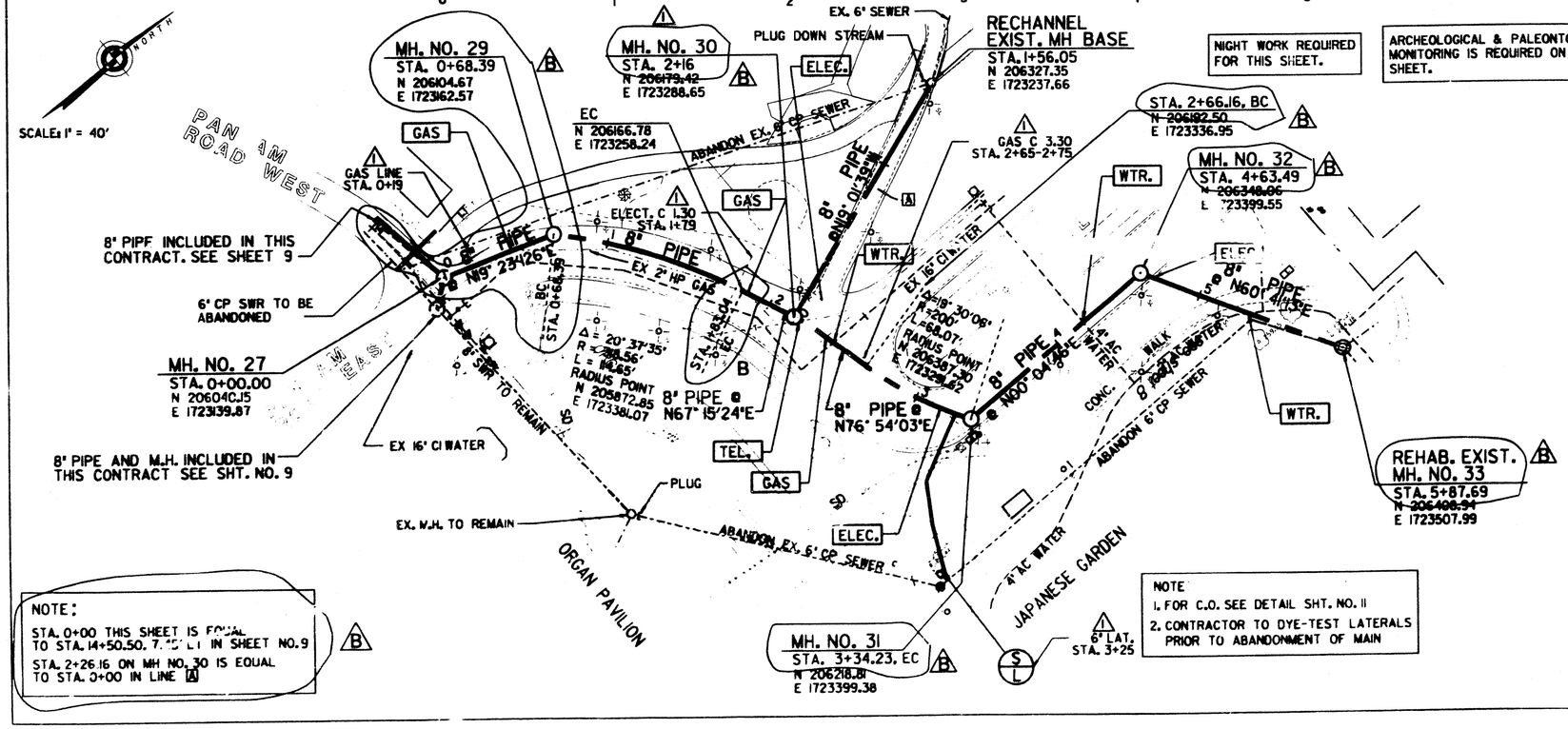
ORGAN PAVILION & JAPANESE GARDEN



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



NOTE:
EXISTING UTILITY CROSSINGS ARE NOT REPRESENTATIVE OF ACTUAL LENGTH OF CONFLICT AREA (SEE PLAN VIEW)



NOTE:
STA. 0+00 THIS SHEET IS EQUAL TO STA. 14+50.50. 7.45' LT IN SHEET NO. 9
STA. 2+26.16 ON MH NO. 30 IS EQUAL TO STA. 0+00 IN LINE [A]

NOTE
1. FOR C.O. SEE DETAIL SHT. NO. 11
2. CONTRACTOR TO DYE-TEST LATERALS PRIOR TO ABANDONMENT OF MAIN

REFERENCE:

BENCH MARK:
U.S. COASTAL GEODETIC SURVEY BRASS CAP ON STAIRS AT MUSEUM OF MAN
EL = 287.860 (MSL)

FIELD NOTES:
UG615 BALBOA PARK AERIAL PER HOLT, 18225I, 4-9-93, 204-1719

WATER:	9147-D, 14101-D, 20262-D, 22243-D
SEWER:	20961-D
STORM DRAIN:	
GAS:	15/489J,J15/589K
ELECTRIC:	204-1722
CABLE TV:	
TELEPHONE:	1026
IMPROVEMENTS:	9147-D, 16518-D, 20262-D
WATER GATE BOOK:	G21S
SEWER GATE BOOK:	G21S
100' SCALE:	204,206-1722
THOMAS BROS.:	PG. 1289, B-1, C-1

RETIREMENTS:
300' 6" CP

SEWER AND WATER GROUP JOB 615

ORGAN PAVILION & JAPANESE GARDEN

STA. 0+00 TO STA. 8+87.69

CITY OF SAN DIEGO, CALIFORNIA
UTILITIES DEPARTMENT
SHEET 10 OF 38 SHEETS

WATER I.A. 18225I
SEWER I.A. 17209I

FOR CITY ENGINEER — 04-16-99 DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL			04-16-99	10-17-02
ADDENDUM			06-03-99	
REVISION [A]			02-17-00	

[A] AS-BUILT PER CITY INSPECTOR — MW/VP — 9-30-02, 10-17-02

CONTRACTOR CAL SOUTHWEST — DATE STARTED 05-25-99
INSPECTOR MICHAEL KERN — DATE COMPLETED 08-05-99

204-1722

28573-10-D

AS-BUILT

0 1 2 3 4 IN.

PAN AMERICAN PLAZA & WAY

NOTE:
EXISTING UTILITY CROSSINGS ARE NOT REPRESENTATIVE OF ACTUAL LENGTH OF CONFLICT AREA (SEE PLAN VIEW)

PAN AMERICAN PLAZA

PAN AMERICAN WAY

MH. NO. 23
STA. 0+00.00
(SEE SHT. NO. 8)

MH. NO. 34
STA. 4+7.08

MH. NO. 35
STA. 4+95.40

MH. NO. 36
STA. 5+37.55

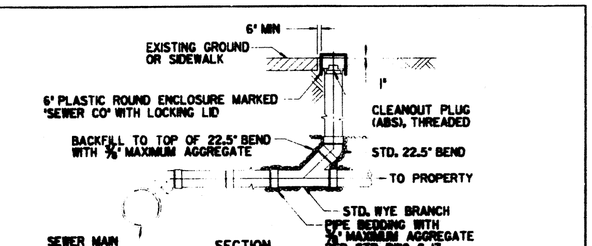
MH. NO. 37
STA. 6+91.13

ELEC. EL. UNK.
ST. LIGHT EL. UNK
6" C.I. WTR. EL. UNK.
3" WATER EL. UNK
8" WATER MAIN EL. UNK
EX. PAVEMENT
16" C.I. WTR. EL. UNK.
TEL. COND. EL. UNK.
REMOVE EX. 8" SEWER
ABANDON EX. 8" SEWER
8" PIPE @ 2.51%
8" PIPE @ 3.85%
8" PIPE @ 2.58%
I.E. 238.24
I.E. 237.14
I.E. 235.40
I.E. 224.91
INVERT OF PIPE (TYP)
88.29'
42.16'
153.58'
407.08'

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

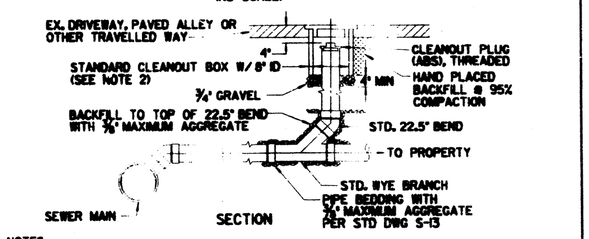
250
245
240
235
230
225
220

0 1 2 3 4 5 6 7



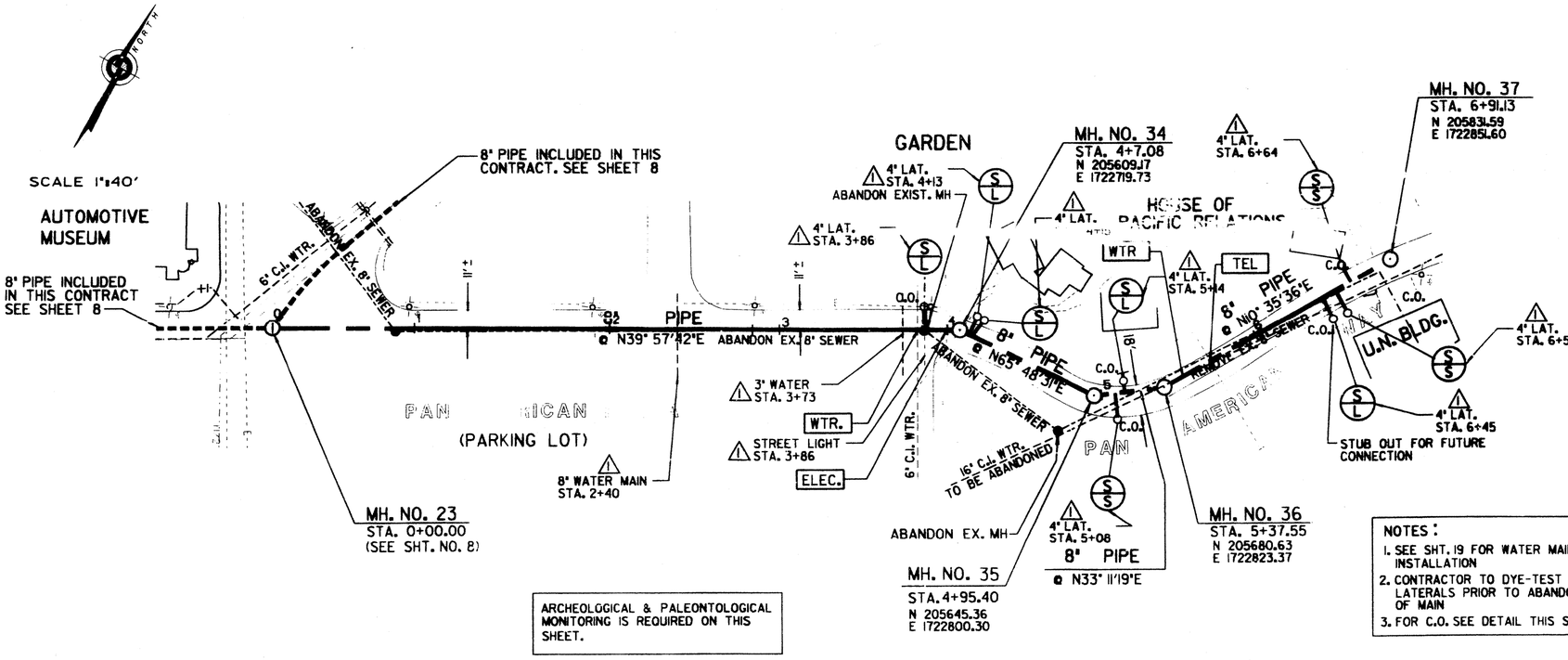
NOTES:
1. RISER AND CO PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.
2. CLEANOUT SHALL BE LOCATED WITHIN CITY RIGHT OF WAY, BEHIND THE SIDEWALK
3. NO CLEANOUT SHALL BE INSTALLED IN THE SIDEWALK OR CROSSWALK.

DETAIL - SEWER LATERAL CLEANOUT
OUTSIDE TRAVELLED WAY
(NO SCALE)



NOTES:
1. RISER AND CO PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.
2. CLEANOUT SHALL BE PLACED INSIDE A STANDARD CLEANOUT BOX. J.R.CONCRETE PRODUCTS MODEL V2-R WITH CAST IRON LID MARKED 'C.O.', OR EQUAL.
3. NO CLEANOUT SHALL BE INSTALLED IN THE SIDEWALK OR CROSSWALK.

DETAIL - SEWER LATERAL CLEANOUT
(IN DRIVEWAY, PAVED ALLEY, OR OTHER AREA SUBJECT TO TRAFFIC)
(NO SCALE)



NOTES:
1. SEE SHT. 19 FOR WATER MAIN INSTALLATION
2. CONTRACTOR TO DYE-TEST LATERALS PRIOR TO ABANDONMENT OF MAIN
3. FOR C.O. SEE DETAIL THIS SHT.

ARCHEOLOGICAL & PALEONTOLOGICAL MONITORING IS REQUIRED ON THIS SHEET.

REFERENCE:

BENCH MARK:
U.S. COASTAL GEODETIC SURVEY BRASS CAP ON STAIRS OF MUSEUM OF MAN
EL=287.860 (MSL)

FIELD NOTES:
UC615 BALBOA PARK AERIAL PER HOLT: 18225I, 4-9-93, 204-1719

WATER: 9147-D, 14101-D, 20262-D, 22243-D
SEWER:
STORM DRAIN: 204-1722
GAS: 15/489,J,15/589K
ELECTRIC: 204-1722
CABLE TV:
TELEPHONE: 1026
IMPROVEMENTS: 9147-D, 16518-D, 20262-D
WATER GATE BOOK: 621S
SEWER GATE BOOK: 621S
100' SCALE: 204-1722
THOMAS BROS.: PG. 1289, B-1, C-1

RETIREMENTS:
700' 8" CP

SEWER & WATER GROUP 615

PAN AMERICAN PLAZA & WAY

STA. 0+00 TO STA. 6+97.78

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS DEPARTMENT
SHEET 18 OF 38 SHEETS

WATER W.O. 18225I
SEWER W.O. 17209I

APPROVED FOR CITY ENGINEER — DATE 04-16-99

DESIGNED BY — ASSOCIATE ENGINEER

DESCRIPTION		APPROVED	DATE	FILMED
ORIGINAL	JD/EE		04-16-99	10-17-02
ADDENDUM	JD/EE		06-03-99	
AS-BUILT PER CITY INSPECTOR	MM/VP		9-30-02	10-17-02

PROJECT ENGINEER

CONTROL CERTIFICATION

204-1722
LAMBERT COORDINATES

28573-11-D

CONTRACTOR: CAL SOUTHWEST — DATE STARTED 08-25-99
INSPECTOR: MICHAEL KIRK — DATE COMPLETED 09-05-02

AS-BUILT

0 1 2 3 4 IN.

APPENDIX O

Waste Management Plan

WASTE MANAGEMENT PLAN FOR BALBOA PARK PLAZA DE PANAMA PROJECT SAN DIEGO, CALIFORNIA

City of San Diego Project #233958

December 8, 2011

Prepared for:
City of San Diego
Environmental Services Department
1222 First Avenue
San Diego, CA 92101

Prepared by:

Rick Engineering Company
5620 Friars Road
San Diego, CA 92110
P: 619-291-0707
REC J# 16325

and

KCM Group
1940 Garnet Ave, Suite 300
San Diego, CA 92109
P: 858-273-5400

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FIGURES

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TABLES

1.0 Introduction

The purpose of this Waste Management Plan (WMP) for the Balboa Park Plaza de Panama Project in the City of San Diego is to identify the tons of waste that will be generated by the project and to identify measures to reduce this impact. The threshold of significance for the City of San Diego is 60 tons for cumulatively significant projects and 1,500 tons for significant direct projects (City of San Diego 2007a).

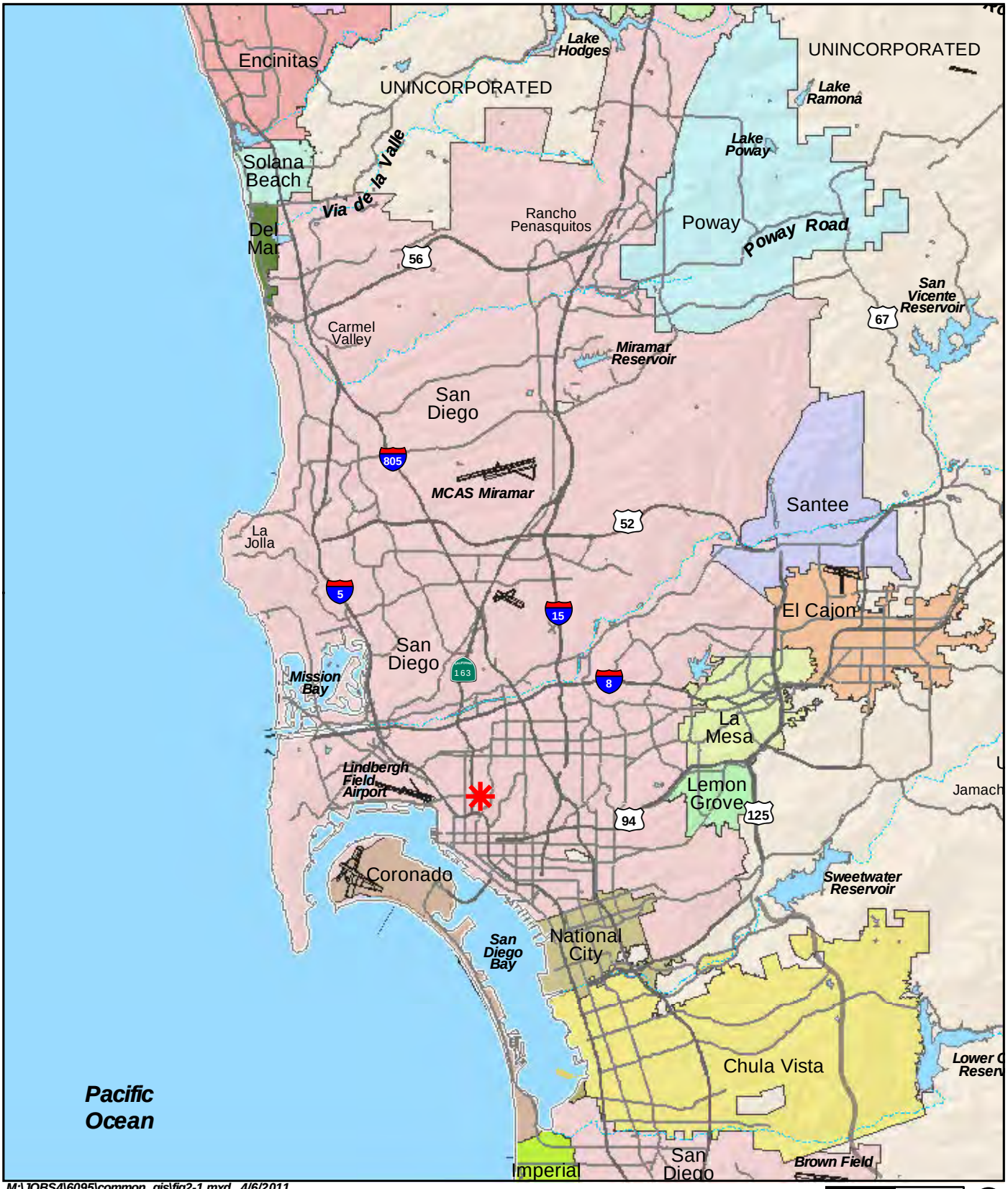
The proposed project is intended to restore pedestrian use and remove vehicular traffic and parking from the Plaza de California, West Prado, the Plaza de Panama, and Pan American Road, consistent with the original vision for the Central Mesa of Balboa Park. This will be accomplished through the construction of a new by-pass road and bridge, which will divert eastbound vehicular traffic from the Park's western entrance on Cabrillo Bridge south to a new 3-level, 265,242-square-foot underground parking structure with 799 parking spaces (net gain of 274 spaces) located in the area of an existing surface parking lot behind the Organ Pavilion. An additional 97,000 square feet of roof top park space will be created on top of the parking structure.

The WMP includes four sections corresponding to the progress of site development: Grading, Demolition, Construction, and Occupancy (post-construction) Phases. Each phase addresses the amount of waste that will be generated by project activities, waste reduction goals, and the recommended techniques to achieve the waste reduction goals. More specifically, for each phase, the WMP addresses:

- Tons of waste anticipated to be generated
- Material/type and amount of waste anticipated to be diverted
- Project features that will reduce the amount of waste generated
- Project features that will divert or limit the generation of waste
- Source separation techniques for waste generated
- How materials shall be reused on-site
- Name and location of recycling, reuse, or landfill facilities where waste shall be taken.

2.0 Background

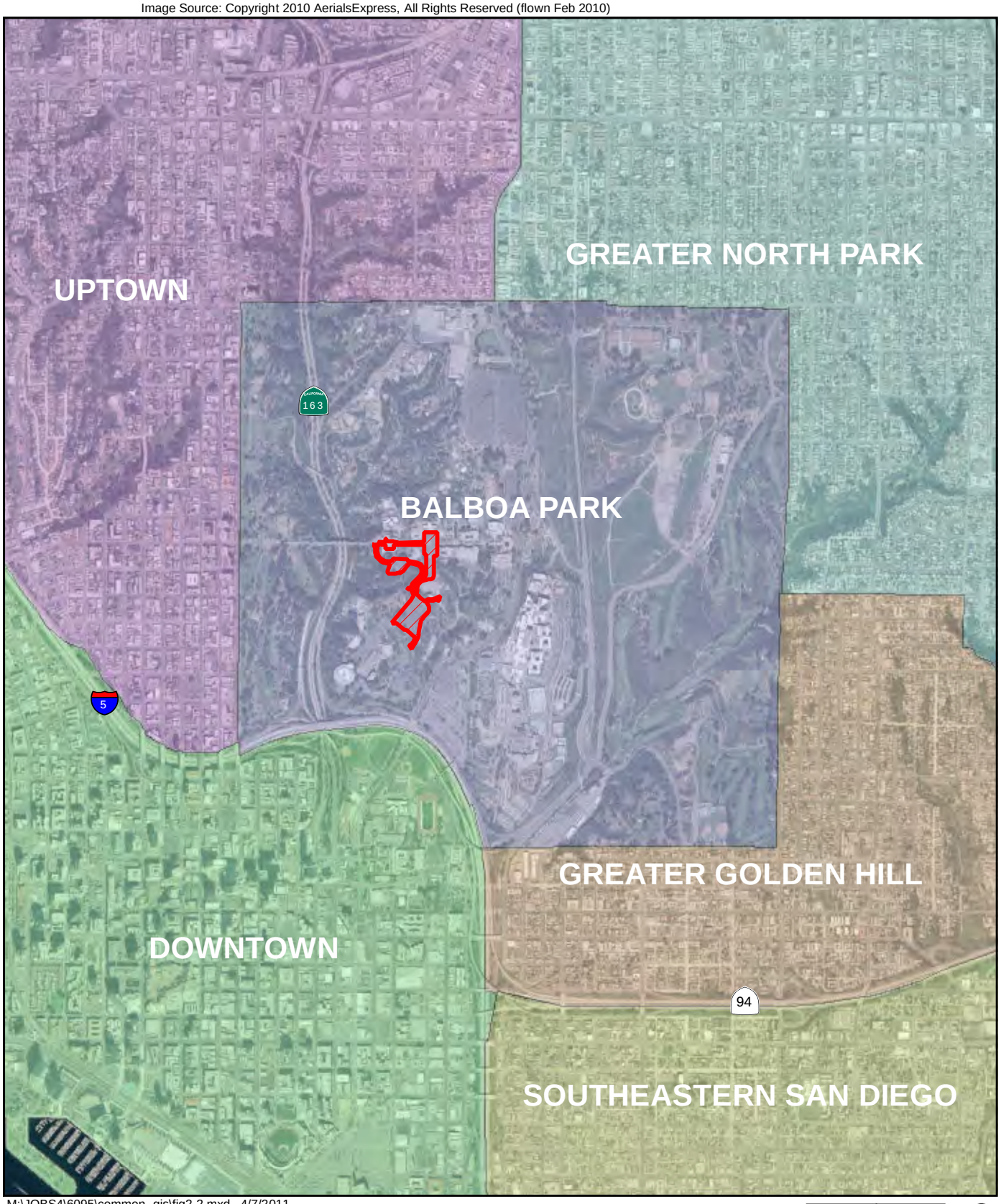
In 1989 the California Legislature passed Assembly Bill 939 (AB 939): Integrated Waste Management Act, which mandated that all cities reduce waste disposed in landfills from generators within their borders by 50 percent by the year 2000 (State of California 1989). Recently signed Assembly Bill 341 has set the new target at a 75% minimum diversion rate. In response, the City of San Diego Environmental Services Department (ESD)



Project Location

FIGURE 1

Regional Location



M:\JOBS4\6095\common_gis\fig2-2.mxd 4/7/2011

0 Feet 2,000

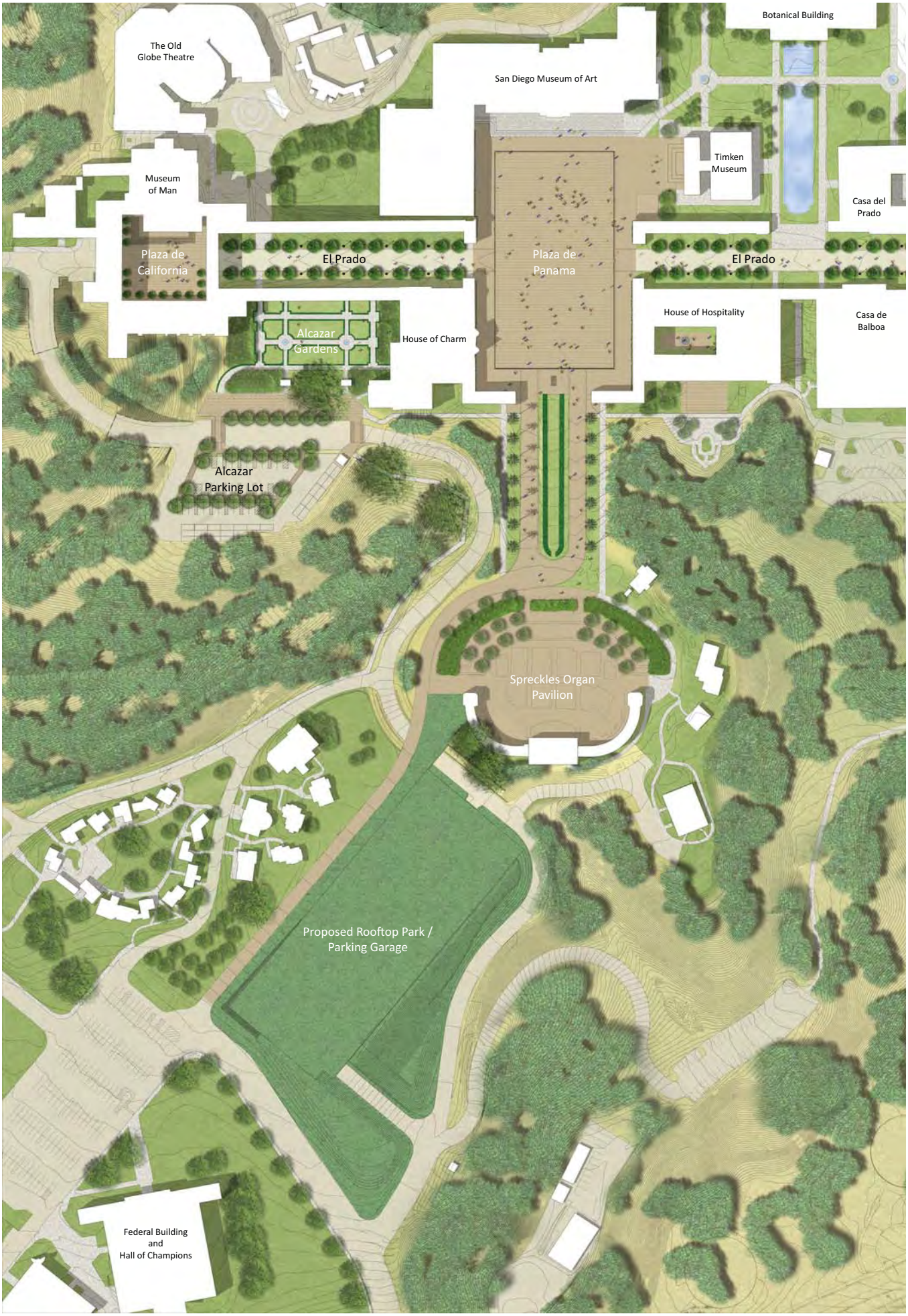
Project Area

Community Plan Area

- BALBOA PARK
- DOWNTOWN
- GREATER GOLDEN HILL
- GREATER NORTH PARK
- SOUTHEASTERN SAN DIEGO
- UPTOWN

FIGURE 2

Project Vicinity



PLAZA DE PANAMA | CONCEPTUAL MASTER PLAN

FIGURE 3

PLAZA DE PANAMA COMMITTEE | BALBOA PARK COMMITTEE | 01.08.11

developed the Source Reduction and Recycling Element, which incorporates waste management policies and programs to meet the City's long-term disposal needs and achieve the mandated waste reduction.

The City of San Diego considers projects that generate more than 60 tons of waste to have potentially cumulatively significant solid waste impacts, furthermore projects that generate more than 1,500 tons of waste have potentially direct significant solid waste impacts. The purpose of the WMP is to provide analysis of the project's solid waste impacts and how those impacts can be mitigated.

The City's Recycling Ordinance, adopted November 2007, requires on-site recyclables collection for all single- and multi-family residential and commercial uses (City of San Diego 2007b). The focus of the ordinance is on education, with responsibility shared between the ESD, haulers, and building owners/managers. ESD is to provide on-site technical assistance, educational materials, templates, and service provider lists. Property owners/managers are to provide on-site recycling services and educational materials annually and to new tenants.

On July 1, 2008, the Construction and Demolition (C&D) Debris Deposit Ordinance was adopted by the City (City of San Diego 2008). The ordinance requires that the majority of construction, demolition and remodeling projects requiring building, combination, and demolition permits pay a refundable C&D Debris Recycling Deposit and divert at least 50 percent of their debris by recycling, reusing, or donating usable materials. The ordinance is designed to keep C&D materials out of local landfills and ensure they get recycled.

In addition to the above, waste reduction ordinance Article 2: General Development Regualtions, Division 8, Refuse and Recyclable Materials Storage Regualtions has also been established by the City.

3.0 Existing Conditions

Balboa Park is generally located in the City of San Diego about 5.6 miles east of the Pacific Ocean; approximately 1.5 miles northeast of San Diego Bay; approximately 13 miles north of the United States/Mexico border; and immediately northeast of downtown San Diego (Figure 1.)

Balboa Park, which serves as its own Community Plan area, is bounded on the west and north by the Uptown Community Plan area, the Centre City Community Plan area to the southwest, the Greater Golden Hill Community Plan area to the southeast, and the Greater North Park Community Plan area to the east and northeast (Figure 2). The Park is generally bounded by 28th Street to the east; Sixth Avenue to the west; Upas Street to the north; and Russ Boulevard to the south.

The specific location of the project site is within a 15.4-acre area centrally located within Balboa Park within the Central Mesa area of the park.

Balboa Park is characterized by a variety of landforms including natural areas, with steep, vegetated canyons; gardens; open spaces including the golf course and Morley field, and

developed areas, such as most of the Central Mesa. The Central Mesa is located at the heart of the Park and was the site of the 1915 and 1935 Expositions. The Central Mesa is a designated National Historic Landmark and is home to a significant number of the cultural amenities and attractions found within the Park.

El Prado, the Plaza de Panama, and Pan American Road, along with the existing Alcazar and Organ Pavilion parking lots, were previously graded and are paved. The Alcazar Garden and the Esplanade, though remaining as green spaces, have both been previously disturbed as well.

Land uses surrounding the project site generally consist of other Park amenities and some limited open space. Located to the north of the project site are the Old Globe Theater, the Sculpture Garden, and the Museum of Art. The Prado continues through the project site to the east towards Plaza de Panama. East of Plaza de Panama is the East Prado, which was converted to pedestrian use in 1974 and is the location of Casa de Balboa. Plaza de Balboa, along which several other museums are located. Southeast of the project site, next to the Esplanade and Organ Pavilion, are the Tea Pavilion, Japanese Friendship Garden, and a canyon sometimes referred to as "Gold Gulch," which contains a vacant building previously used as San Diego Police Department stables. Along the eastern edge of Gold Gulch, adjacent to Park Boulevard, are two water tanks which have been converted to park uses – one houses the World Beat Center and the other contains the Centro Cultural de la Raza. To the southwest of the project area, near the proposed parking structure, the Pan American Plaza and the International Cottages are located.

4.0 Proposed Conditions

The proposed land use of the project will consist of parkland, pedestrian plazas/walkways, public restrooms, park maintenance facilites, roadways and a parking structure. (Figure 3).

TABLE 1
LAND USE SUMMARY

Area	Land Use	Land Area (acres)	Area (sf)
Parking Structure	3-Level, Subterranean Parking Structure, 798 proposed spaces	2.23	265,242
Pedestrian Plazas and Parkland	Plazas and Open Space Parkland	10.07	--
Streets and Surface Parking	Roadways, parking	3.10	--
TOTAL		15.4	265,242 sf

sf = square feet.

5.0 Construction Phases

Construction and demolition waste constituted the largest single component of disposed waste in San Diego in 2000. With almost 590,000 tons of waste being disposed, construction/demolition waste composed 34 percent of the total mass of waste disposed that year (City of San Diego 2000a). The Integrated Waste Management Act (AB 939) requires the diversion of 50 percent of all solid waste, including construction and demolition waste. Recently enacted Assembly Bill 341has set the new target at a 75% minimum diversion rate. The City of San Diego goal is to exceed State requirements consistent with City policies regarding waste reduction, recycling, and product procurement.

The project would be constructed in four contiguous phases (Table 2) while maintaining two way vehicular traffic through the park at all times. The project is also phased to allow full pedestrian access to all non-construction zone areas of the park. Phasing boundaries will be subject to adjustment during construction based on coordination input from Park and Rec, Institutions, and may be in response to unforeseen project conditions. The project is scheduled for a 24-month period and completion no later than December 2014.

TABLE 2
PHASING PLAN

Phase	Components	Duration
Phase I	Utility relocation and restroom demolition	2 months
Phase II	Centennial Bridge and Parking Structure with Rooftop Park	14 Months
Phase III	Pedestrian Tram/Promenade and Alcazar Lot Construction	4 Months
Phase IV	Esplanade and Plaza Improvements	4 Months

Phase I: Utility Relocation and Restroom Demolition

Phase I entails as part of the preparatory work for subsequent phases, underground wet and dry utility relocation with emphasis on maintaining required services and access. The establishment of a new temporary public restroom facility will be followed by the demolition of the existing facility as required for installation of new, rerouted utilities and partial grading of a portion of the new Centennial roadway just west of Organ Pavilion within Phase I. This requires the closing of Pan American Road West from the Organ Pavilion intersection to its intersection with Pan American Place for realignment of wet utilities and natural gas. The primary thoroughfare of Pan American Road East (between the Organ Pavilion lot and the International Cottages) remains open during this phase;

subject to isolated after-hours shutdowns for utility tie-ins. Phase I construction duration is anticipated to be 2 months.

Phase II: Bridge and Parking Structure Construction

This phase involves demolition, excavation and grading the existing Organ Pavilion Parking Lot, constructing a new parking structure in its place with a rooftop park. In addition, excavation and grading to the south of the California Buildings with construction of a new bypass bridge in this area connected to the existing Alcazar parking lot. Phase II construction duration is anticipated to be 14 months.

Phase III: Pedestrian Bridge/Promenade and Alcazar Lot Construction

Phase III would begin once the new parking structure is operational. This phase of the project would involve demolition, re-grading/leveling for ADA requirements, and replacement of the existing Alcazar parking lot, including tie-in to the new Centennial Bridge roadway; realignment of the connector road from the Alcazar lot to Pan American Road; associated retaining walls to allow grade separation between the vehicular roadway and pedestrian/tram promenade; and improvements to Pan American Road East fronting the new parking structure. Phase III construction duration is anticipated to be 4 months.

Phase IV: Esplanade and Plaza Improvements

This final phase of the project would consist of staged demolition of existing pavement, hardscape, landscape, and fixtures; finish grading; site utilities, and site improvements including hardscape and landscape to rehabilitate the Plaza de California, West El Prado, Plaza de Panama, and the Esplanade. Phase IV construction duration is anticipated to be 4 months.

Appendix A estimates the total anticipated amount of construction waste to be generated.

During the construction phase, waste debris dumpsters will be situated on site for collection of general construction debris, i.e. cardboard, lunch trash, misc. scrap lumber, misc. scrap wiring, packaging, dunnage, misc. debris, etc. Source separation strategies outlined below will be implemented during project construction and materials listed will be separated and taken to source-separated recycling facilities. Materials such as trees, asphalt concrete, cardboard, scrap metal, clean wood, scrap wiring, etc. will be source separated onsite and taken to facilities that recycle at a 100 percent diversion rate. Non-source separated materials (mixed construction and demolition debris) and construction phase dumpsters will be removed from site and sorted at EDCO's Lemon Grove facility at a minimum of 60% recycled content. Appendix A-4 summarizes the anticipated waste materials and respective diversion and disposal locations.

At this time, the specific quantity of each material listed below is not known, however the types of construction waste anticipated to be generated will include materials such as:

- Inert granule products (asphalt and concrete)
- Wood waste products
- Ferrous metals
- Cardboard
- Dirt
- Glass
- Plaster
- Plastics
- Roofing and insulation materials
- Tile
- Wallboard
- Landscaping materials
- Miscellaneous trash

Proposed site locations where the following construction debris will be taken

1. Existing structure demolition debris to be hauled to EDCO, Lemon Grove. Recycling resources available.
2. Asphalt paving demolition debris (100% diversion) to be hauled to Hanson, Mission Valley. Recycling resources available.
3. Site concrete demolition debris to be hauled to Hanson, Mission Valley. Recycling resources available.
4. Landscape demolition debris, i.e., green waste such as ground cover, trees, schrubs, etc. will be taken to the Miramar Greenery for recycling. Recycling resources available.
5. Earthwork export to be hauled to the Arizona Street Landfill. Recycling resources available.

Spoils exported to the Arizona Street Landfill will be deposited by bottom dump trucks and compacted in place by repeat truck passes and a rubber tired compactor during subsequent dumps, with moisture for proper compaction and dust control provided as necessary. Spoils at the Arizona Street Landfill will be utilized for fill and grade contouring on top of the existing soil cap (previously placed to prevent rainwater infiltration).

Fill and grade contouring is anticipated in (3) areas of the Arizona Street Landfill; Site 1: Southwest of the Park and Recreation Operations Yard is anticipated to take approximately 116,000 cubic yards of export, with fills ranging from 2 feet to 11 feet in height, Site 2: the existing East Mesa archery range, is anticipated to take approximately 11,000 cubic yards of export with fills ranging from 2 to 4 feet in height. Site 3: the former “casting ponds”, is anticipated to take approximately 15,000 cubic yards of export with fills ranging from 2 to 8 feet.

Fill areas will be landscaped with non–irrigated plantings that are consistent with “passive” park uses and Park and Recreation land use goals for the Arizona Street Landfill. Erosion control, management of construction activities for the Project,

management of export soil, placement and grading of spoils, and monitoring of haul route and Arizona Street Landfill during export operation is included, as well as, preparation and approvals of the necessary protection and reconfiguration of the existing active landfill gas collection system with the required Health and Safety Plan.

5.1 Waste Diversion

The following strategies will be implemented to ensure that construction waste is diverted to at least the extent summarized in Apendix A. These strategies will be discussed at the mandatory pre-construction meeting. ESD staff will be invited by the Applicant (or Applicant's successor in interest) to attend any Development Services Department (DSD) required pre-construction meetings.

5.1.1 Source Separation

Source separation of demolition/construction debris on the project site will facilitate reuse and recycling of materials. Recycling, salvage, reuse, and disposal options will be determined before the job begins. Inert granule products (asphalt and concrete), wood waste products, cardboard, and ferrous materials are categories of recyclable construction and demolition materials that will be source separated. These items have higher diversion rates at specialized recycling facilities than other materials.

Containers of various sizes will be provided for source separation. Materials that will be collected in source separated containers include, but are not limited to, metals, clean wood, concrete, asphalt mixed inerts (i.e., dirt, rock, brick, etc.), corrugated cardboard and green waste and land-clearing debris. Materials collected as source separated materials will be taken to specialized source separated facilities that achieve a 100 percent diversion rate.

The contractors will be responsible for evaluating the materials during the demolition and construction phases for reuse on-site. Materials that are determined not suitable for reuse will be deposited into separate source bins to be taken to the appropriate facilities for recycling.

5.1.2 Recycling

Recycling areas will be clearly identified with large signs. Lists of acceptable/ unacceptable materials will be posted on recycling bins and throughout the project site and all recycled material signage will be visible on at least two sides of haul containers. Recycling bins will be placed in areas that will be readily accessible and will minimize misuse or contamination. The Solid Waste Management Coordinator (discussed below) will be responsible for these efforts and will be reviewed at the pre-construction meeting. Materials for recycling will be redirected to appropriate recipients selected from ESD's directory of facilities that recycle demolition and construction materials, scrap metal and yard waste.

5.1.3 Contractor Education and Responsibilities

Contractors will be educated regarding the solid waste management plan. Solid waste management plans will be distributed to all entities when they first begin work on-site and when training workers, subcontractors, and suppliers on proper waste management procedures applicable to the project.

5.1.4 Solid Waste Management Coordinator

A Solid Waste Management Coordinator (SWMC) for the project shall be designated to ensure that the contractors and subcontractors are educated and that procedures for waste reduction and recycling efforts are implemented. Specific responsibilities of the SWMC include:

- Review the Solid Waste Management Plan, including the SWMC responsibilities.
- Work with the contractors to estimate the quantities of each type of material that will be salvaged, recycled, or disposed of as waste then assist in documentation.
- Review and enforce procedures for materials separation and verify availability and signage of containers.
- Coordinate solid waste mitigation implementation with other requirements such as stormwater requirements, which may specify related measures, such as the placement of bins to minimize the possibility of runoff contamination.
- Review and enforce procedures for transportation of materials to recycling and disposal facilities.
- Return or reuse excess materials and packaging.

5.1.5 Total Diversion

Appendix A summarizes the amount of waste generated and diverted by material during the demolition and construction phases. As shown, a total of approximately 6,257.5 tons of material will be generated and 5,902.6 tons of material will be diverted through recycling in the demolition and construction phases. This amounts to a 94.3 percent reduction in solid waste which will be diverted from the landfill.

6.0 Occupancy Phase

Unlike demolition/construction waste generation, post construction conditions are very dynamic and depending heavily on the day to day activities that occur within the park. Therefore, it will require an ongoing plan to manage and reduce waste in order to meet the waste reduction goals established by local and state policy.

6.1 Waste Generation

The expected annual waste to be generated during the completion of this project will be consistent with the annual waste that is generated today, which varies day to day. For the majority of the project, proposed uses will be consistent with existing, excluding the new

rooftop parkland and parking structure. Coordination with Park and Recreation to establish baseline criteria for annual impacts is on-going.

6.2 Waste Reduction Measures

The City of San Diego Park and Recreation department currently maintains the area within the project limits. Unless pre-existing agreements exist, it is anticipated that Park and Rec will be responsible for implementing a long-term solid waste management program that will ensure that the development complies with City policies regarding waste reduction, recycling and product procurement. This program will include providing sufficient interior and exterior storage space for refuse and recyclable materials and a means of handling landscaping and green waste materials.

Specific program measures will include the following:

- Park and Rec will provide recycling services which include all of the following provisions:
    1. Collection of recyclable materials required by and in accordance with applicable City Ordinances
    2. Provide dedicated recycling collection and storage areas required by and in accordance with applicable City Ordinances
    3. Provide signage required by and in accordance with applicable City Ordinances.
- Park and Rec shall educate tenants about the recycling services as follows:
    1. Information, including the types of recyclable materials accepted, the location of recycling containers, and the tenants responsibility to recycle shall be distributed to all tenants annually
    2. All new tenants shall be given information and instructions upon occupancy
    3. All tenants shall be given information and instructions upon any change in recycling service to the facility.

6.3 Exterior Storage

Exterior storage area requirements for the parkland and pedestrian plazas is a dynamic scenario for the Park and Recreation department. Among others, there are (3) existing trash dumpsters located within the Alcazar Lot that serve the institutions and maintenance facilities within and adjacent to the West Prado. These refuse storage facilities will remain and will continue to serve the existing entities. Additional trash collection facilities will be necessary for the parking structure and roof top park. Minimum refuse requirements will be coordinated with Park and Rec to ensure their existing operations are maintained and/or enhanced.

Program measures to manage solid waste disposal in order to meet State and City waste reduction goals, as outlined in Section 6.2, will be implemented by the Balboa Park Park and Rec managers through a solid waste management program. Included in this program will be the provision of an exterior refuse storage area and exterior recyclable material storage area, as required by the Municipal Code.

6.4 Landscaping and Green Waste Recycling

The Balboa Park Plaza de Panama Project will require landscaping and landscape maintenance. Drought-tolerant plants will be used, as required by and in accordance with the 2011 Park and Recreation Design Guidelines Manual to reduce the amount of green waste produced. Green waste will be collected and disposed of at recycling centers that accept green waste or as programmed by the Park and Recreation Department.

7.0 Conclusion

The Balboa Park Plaza de Panama project will recycle or reuse approximately 5,902.6 tons of demolition and construction debris, resulting in a 94.3 percent diversion of waste to the landfill. Post construction, plans for a solid waste management program will include providing sufficient interior and exterior storage space for refuse and recyclable materials, approved by Park and Rec and a means of handling landscaping and green waste materials. By incorporating these and other solid waste management strategies, the Balboa Park Plaza project will meet or exceed the City's goals and requirements for waste diversion between 75% and 85%. This preliminary WMP is being submitted in compliance with a mandate from the City of San Diego's ESD. This WMP is preliminary and may not necessarily represent the final design. Once the project reaches final design status, a final WMP will be submitted to the ESD for review and approval.

8.0 References Cited

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1998 Characterization of Building-Related Construction and Demolition Debris in the United States. Municipal and Industrial Solid Waste Division. Office of Solid Waste. Report No. EPA530-R-98-010. June.

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APPENDIX A -1

11/21/2011

Balboa Park Plaza de Panama Renovation
Construction Waste Analysis

Item	Description	Quantity	Units	20' Flatbed Truck (10 Ton Capacity)	Semi End Dump Truck (25 Ton Capacity)	Pickup Truck (1/2 Ton Capacity)	TOTAL Tons
D.	**Parking Structure**						
D.1	**Parking Structure**						
1	Demo Street Light in Organ Pavilion Parking Lot	3	EA	0	0	1	1
2	Demo Street Light South of Organ Pavilion Parking Lot	1	EA	0	0	1	0
3	Demo Tree South of Organ Pavilion Parking Lot	27	EA	34	0	0	34
4	Demo Curb at Organ Pavilion Parking Lot	3,351	LF	0	91	0	91
5	Demo AC Paving & Base South of Organ Pavillion	124,976	SF	0	1815	0	1815
6	Demo Hardscape at Organ Pavillion Parking Lot	14,115	SF	0	128	0	128
7	Demo Landscaping at Organ Pavillion Parking Lot	47,767	SF	0	130	0	130
8	Demo Existing Storm Drain Inlet at Parking Structure	1	EA	0	1	0	1
9	Shoring Support for Grading/Excavation	1	LS	10	0	1	11
10	Misc Formwork	1	LS	20	0	0	20
11	Misc Construction Debris	1	EA	0	81	0	81
D.2	**Rooftop Park**						
1	Misc Construction Debris	1	EA	0	28	0	28
	Subtotal Parking Structure / Rooftop Park:			64	2,274	3	2,340

Item	Description	Quantity	Units	20' Flatbed Truck (10 Ton Capacity)	Semi End Dump Truck (25 Ton Capacity)	Pickup Truck (1/2 Ton Capacity)	TOTAL Tons
B.	**Bridge:**						
1	Misc Demo (includes curb/railings/hardscape/monument stairs/etc)	1	LS	0	63	0	63
2	Temporary Pedestiran Barricades	1	LS	0	0	1	1
3	Electrical Salvage and Safe-off	1	LS	0	0	1	1
4	Misc Formwork	1	LS	0	0	3	3
5	Misc Construction Debris	1	LS	0	33	0	33
	Subtotal Bridge:			0	95	4	99

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APPENDIX A-2

11/21/2011

Balboa Park Plaza de Panama Renovation
Construction Waste Analysis

Item	Description	Quantity	Units	20' Flatbed Truck (10 Ton Capacity)	Semi End Dump Truck (25 Ton Capacity)	Pickup Truck (1/2 Ton Capacity)	TOTAL Tons
E.	**Roadway/Utility Improvements**						
E.1	**Pan American Road East**						
1	Demo Street Light in Palisades Parking Lot	1	EA	0	0	0	0
2	Demo Street Light West of Organ Pavilion	7	EA	0	0	2	2
3	Demo Street Light West of Organ Pavilion Parking Lot	11	EA	0	0	2	2
4	Demo Tree in Landscape Area west of Organ Pavilion	4	EA	4	0	0	4
5	Demo Tree North of Palisades Parking Lot	10	EA	8	0	0	8
6	Demo Curb at Palisades Lot	231	LF	0	6	0	6
7	Demo Curb at West Organ Pavilion	559	LF	0	15	0	15
8	Demo AC Paving & Base in Palisades Lot	20,400	SF	0	296	0	296
9	Demo AC Paving & Base in West of Organ Pavilion	28,335	SF	0	412	0	412
10	Demo Landscaping at Palisades Lot	3,203	SF	0	9	0	9
11	Demo Landscaping West of Organ Pavilion	4,239	SF	0	12	0	12
12	Demo Organ Pavillion Restroom	1,609	SF	0	28	0	28
13	Demo Existing 8" Sewer Main at Organ Pavilion	221	LF	0	4	0	4
14	Demo Existing Storm Drain Inlet at Organ Pavilion	1	EA	0	2	0	2
15	Demo Existing 16" Water Main at Pan American Rd.	329	LF	0	6	0	6
16	Demo Gas Main at Pan American Rd.	222	LF	0	3	0	3
17	Misc Construction Debris	1	LS	0	30	0	30
E.2	**Presidents Court**						
1	Demo Tree East of Organ Pavilion Parking Lot	26	EA	42	0	0	42
2	Demo Hardscape South of Organ Pavillion	2,290	SF	0	31	0	31
3	Demo Landscaping South of Organ Pavillion	10,638	SF	0	48	0	48
4	Demo Maintenance Shack South of Organ Pavillion	435	SF	0	3	0	3
5	Demo Existing Storm Drain Inlet SE of Parking Structure	1	EA	0	4	0	4
6	Demo UG Electrical at Parking Structure By Pass Rd.	610	LF	0	4	0	4
7	Misc Construction Debris	1	LS	0	15	0	15
E.3	**Gold Gulch Entry**						
1	Demo Landscaping SE of Organ Pavillion Parking Lot	8,121	SF	0	29	0	29
2	Demo Curb SE of Organ Pavilion Lot	681	LF	0	19	0	19
3	Demo AC Paving & Base SE of Organ Pavilion Lot	8,139	SF	0	118	0	118
4	Demo Structure SE of Organ Pavilion Parking Lot	157	SF	0	2	0	2
5	Misc Construction Debris	1	LS	0	10	0	10
	Subtotal Roadway/Utility Improvements:			54	1,104	4	1,163
	PHASE II TOTAL			118	3,474	10	3,601

Item	Description	Quantity	Units	20' Flatbed Truck (10 Ton Capacity)	Semi End Dump Truck (25 Ton Capacity)	Pickup Truck (1/2 Ton Capacity)	TOTAL Tons
C.	**Alcazar Lot & Drop Off**						
C.1	**Alcazar Lot**						
1	Demo Street Light in Alcazar Lot	4	EA	0	0	1	1
2	Demo Tree in Landscape Area in Alcazar Lot	12	EA	15	0	0	15
3	Demo Curbs in Alcazar Lot	1,452	LF	0	43	0	43
4	Demo AC Paving & Base in Alcazar Lot	51,281	SF	0	745	0	745
5	Demo Alcazar Lot RR	748	SF	0	8	0	8
6	Demo Existing Structure in Alcazar Lot	160	SF	0	3	0	3
7	Demo Hardscape at Alcazar Lot	165	SF	0	5	0	5
8	Demo Landscaping at Alcazar Lot	12,141	SF	0	17	0	17
9	Demo Landscaping West of Alcazar Lot	15,651	SF	0	28	0	28
10	Misc Construction Debris	1	LS	0	15	0	15
C.2	**Alcazar Lot Access Rd**						
1	Demo Tree in Landscape Area west of Esplanade	11	EA	15	0	0	15
2	Demo Curbs at Alcazar Lot Access Road	1,016	LF	0	30	0	30
3	Demo AC Paving & Base at Alcazar Lot Access Roads	7,749	SF	0	113	0	113
4	Misc Construction Debris	1	LS	0	8	0	8
	Subtotal Alcazar Lot & Drop Off:			30	1,014	1	1,045
	PHASE III TOTAL			30	1,014	1	1,045

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APPENDIX A-3

11/21/2011

Balboa Park Plaza de Panama Renovation
Construction Waste Analysis

Item	Description	Quantity	Units	20' Flatbed Truck (10 Ton Capacity)	Semi End Dump Truck (25 Ton Capacity)	Pickup Truck (1/2 Ton Capacity)	TOTAL Tons
A	**Plazas, West El Prado, & Esplanade**						
A.1	**Plaza de Panama**						
1	Demo/Salvage Planter in Plaza de Panama	44	EA	35	0	0	35
2	Demo Existing Storm Drain Inlet at Plaza de Panama	2	EA	0	5	0	5
3	Demo/Salvage Street Light in Plaza de Panama	33	EA	0	0	8	8
4	Demo/Relocate Tree in Landscape Area in Plaza de Panama	12	EA	6	0	0	6
5	Demo/Relocate Tree in Hardscape Area in Plaza de Panama	33	EA	0	5	0	5
6	Demo Curbs in Plaza de Panama	897	LF	0	22	0	22
7	Demo AC Paving & Base at Plaza de Panama	59,182	SF	0	860	0	860
8	Demo Hardscape & Base at Fountain Walkpath NE of Plaza de Panama	2,852	SF	0	10	0	10
9	Demo Hardscape & Base in Plaza de Panama	26,726	SF	0	73	0	73
10	Demo Landscaping at Fountain Walkpath NE of Plaza de Panama	729	SF	0	3	0	3
11	Demo Landscaping at Plaza de Panama	11,484	SF	0	31	0	31
12	Demo Monument Stairs in Plaza de Panama	2,411	SF	0	22	0	22
13	Demo Planter Wall at Plaza de Panama	157	LF	0	4	0	4
14	Misc Construction Debris	1	LS	0	15	0	15
A.2	**West El Prado & Plaza de California**						
1	Demo/Salvage Street Light in West El Prado	13	EA	0	0	2	2
2	Demo/Relocate Tree in Landscape Area in West El Prado	12	EA	9	0	0	9
3	Demo Curbs in West El Prado	770	LF	0	19	0	19
4	Demo AC Paving and Base at West El Prado	12,429	SF	0	181	0	181
5	Demo Hardscape at Plaza de California	12,611	SF	0	46	0	46
6	Demo Hardscape at West El Prado	1,458	SF	0	9	0	9
7	Demo Landscaping at West El Prado	16,034	SF	0	15	0	15
8	Misc Construction Debris	1	LS	0	13	0	13
A.3	**Esplanade**						
1	Demo Street Light in Esplanade	11	EA	0	0	1	1
2	Demo Curbs at Esplanade	1,301	LF	0	32	0	32
3	Demo AC Paving and Base in Esplanade	18,802	SF	0	273	0	273
4	Demo Concrete from Esplanade	1,724	SF	0	13	0	13
5	Demo Hardscape at Esplanade	13,549	SF	0	61	0	61
6	Demo Landscaping at Esplanade	34,769	SF	0	32	0	32
7	Demo Existing UG Electrical at Esplanade	291	LF	0	0	1	1
8	Misc Construction Debris	1	LS	0	13	0	13
	Subtotal Plazas, West El Prado, & Esplanade:			50	1,755	12	1,816

Item	Description	Quantity	Units	20' Flatbed Truck (10 Ton Capacity)	Semi End Dump Truck (25 Ton Capacity)	Pickup Truck (1/2 Ton Capacity)	TOTAL Tons
F.	**Palm Canyon Improvements**						
1	Demo Tree in Palm Canyon	21	EA	20	0	0	20.00
2	Misc Construction Debris	1	LS	0	13	0	12.50
	Subtotal Palm Canyon Improvements:			20	13	0	32.50

	PHASE IV TOTAL			70	1,767	12	1,849

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APPENDIX A -1

11/21/2011

Balboa Park Plaza de Panama Renovation
Construction Waste Analysis

Item	Description	Quantity	Units	20' Flatbed Truck (10 Ton Capacity)	Semi End Dump Truck (25 Ton Capacity)	Pickup Truck (1/2 Ton Capacity)	TOTAL Tons
D.	**Parking Structure**						
D.1	**Parking Structure**						
1	Demo Street Light in Organ Pavilion Parking Lot	3	EA	0	0	1	1
2	Demo Street Light South of Organ Pavilion Parking Lot	1	EA	0	0	1	0
3	Demo Tree South of Organ Pavilion Parking Lot	27	EA	34	0	0	34
4	Demo Curb at Organ Pavilion Parking Lot	3,351	LF	0	91	0	91
5	Demo AC Paving & Base South of Organ Pavillion	124,976	SF	0	1815	0	1815
6	Demo Hardscape at Organ Pavillion Parking Lot	14,115	SF	0	128	0	128
7	Demo Landscaping at Organ Pavillion Parking Lot	47,767	SF	0	130	0	130
8	Demo Existing Storm Drain Inlet at Parking Structure	1	EA	0	1	0	1
9	Shoring Support for Grading/Excavation	1	LS	10	0	1	11
10	Misc Formwork	1	LS	20	0	0	20
11	Misc Construction Debris	1	EA	0	81	0	81
D.2	**Rooftop Park**						
1	Misc Construction Debris	1	EA	0	28	0	28
	Subtotal Parking Structure / Rooftop Park:			64	2,274	3	2,340

Item	Description	Quantity	Units	20' Flatbed Truck (10 Ton Capacity)	Semi End Dump Truck (25 Ton Capacity)	Pickup Truck (1/2 Ton Capacity)	TOTAL Tons
B.	**Bridge:**						
1	Misc Demo (includes curb/railings/hardscape/monument stairs/etc)	1	LS	0	63	0	63
2	Temporary Pedestiran Barricades	1	LS	0	0	1	1
3	Electrical Salvage and Safe-off	1	LS	0	0	1	1
4	Misc Formwork	1	LS	0	0	3	3
5	Misc Construction Debris	1	LS	0	33	0	33
	Subtotal Bridge:			0	95	4	99

APPENDIX P

Water Quality Technical Report

WATER QUALITY TECHNICAL REPORT
FOR
BALBOA PARK PLAZA

(SITE DEVELOPMENT PERMIT)

Job Number 16325
April 18, 2011
Revised: October 5, 2011
Revised: December 21, 2011

PTS # 233958

RICK
ENGINEERING COMPANY

WATER QUALITY TECHNICAL REPORT

FOR

BALBOA PARK PLAZA

(SITE DEVELOPMENT PERMIT)

Job Number 16325

PTS # 233958

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April 18, 2011
Revised: October 5, 2011
Revised: December 21, 2011

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WATER QUALITY TECHNICAL REPORT
FOR
BALBOA PARK PLAZA

REVISION PAGE
December 21, 2011

This water quality technical report presents a revision to the October 5, 2011 report pursuant to the City of San Diego Cycle 21 EIR Screen Check comments (LDR-Engineering (Env)).

12. The preliminary drainage study and the WQTR need to include a section of the landfill where the 140,000 cubic yard of soil will be exported to. The technical reports should address and discuss the drainage and BMPs for the landfill site. Additionally, the drainage at all fill areas at the landfill needs to be shown on the plans including the discharge points of all site drains. (New Issue)

The preliminary drainage study and the WQTR have been updated to discuss the drainage characteristics and water quality requirements for the fill disposal site. For water quality purposes, fill areas will be landscaped with non-irrigated plantings that are consistent with "passive" park uses and Park and Recreation land use goals for the Arizona Street Landfill and there will be no impervious area; therefore, permanent best management practices (BMPs) for treatment control and hydromodification management will not be required for the fill disposal site. The following sections of the WQTR have been updated:

- Page 2 (Section 1.1 Project Description) – a new bullet point has been added to describe the fill disposal site.
- Page 3 (Section 1.3 Drainage Characteristics) – a new paragraph has been added to discuss the drainage characteristics of the fill disposal site and identifies that there are no proposed impervious surfaces. Therefore, there are no additional

requirements for treatment control BMPs and hydromodification management for the fill disposal site.

WATER QUALITY TECHNICAL REPORT
FOR
BALBOA PARK PLAZA

REVISION PAGE
October 5, 2011

This water quality technical report presents a revision to the April 18, 2011 report pursuant to the City of San Diego Cycle 11 plan check comments (LDR-Engineering Review) and a revised site plan layout.

9. The WQTR page 22 explains the exemption from HMP for drainage basins 200, 300, 400 and 500. Please submit the technical data and analysis that resulted to the exemption for review with the next submittal. (New Issue)

Due to updated drainage basin boundaries based on more available storm drain as-built plans, the Basin 100 has been divided to Basin 100 and Basin 150. While Basin 100 will maintain similar drainage characteristics, Basin 100 is expected to increase the impervious area due to the proposed vehicular bypass bridge; therefore, it is subject to hydromodification management plan (HMP) requirements. Pursuant to the HMP requirements outlined in Section 4.5 of the City of San Diego Storm Water Standards Manual, dated January 14, 2011, HMP analyses have been performed using the San Diego BMP Sizing Calculator to determine required HMP volume and mitigate for the increased impervious area and/or peak flow rates. HMP results have been included in Appendix E of this report.

Pursuant to Section 4.5.1 – Bullet 2 (Page 4-18) of the City of San Diego Storm Water Standards Manual, dated January 14, 2011, the project may be exempt from HMP criteria if the proposed project does not increase the impervious area or peak flows to any discharge location. Based on the updated hydrologic analyses (i.e., backup weighted

runoff coefficient calculations and AES Rational Method) in the Drainage Study, Basin 150, Basin 200, the combination of Basins 300 and 400, and Basin 500 are not expected to increase the impervious area or peak flow rates. Basins 300 and 400 have been analyzed as one system since they confluence within the same storm drain system. For reference purposes, a summary table has been included in Appendix E of this report that provides the technical backup data used to summarize the Hydromodification Management Plan (HMP) requirements for each drainage basin. The summary table shows that Basin 150, Basin 200, the combination of Basins 300 and 400, and Basin 500 are exempt from HMP criteria.

For Basin 100, the impervious area has increased, however, the peak flow rates have decreased primarily due to a longer flow path in the post-project condition. If it is determined that a BMP is therefore not necessary, it can be replaced with a BMP sized for Treatment Control only, however, the project includes the BMP sized for hydromodification management at this time.

Revisions pursuant to the plan check comments and the revised site plan are included within this revised WQTR.

1.0 INTRODUCTION

1.1 Project Description

This water quality technical report (WQTR) summarizes storm water protection requirements for the Balboa Park Plaza project (herein referred to as "the project"). The project is located in the City of San Diego and is bounded by State Route (SR) 163 to the west, Interstate 5 to the south, and Park Blvd to the east. See Figure 1, Vicinity Map, located at the end of Section 1.0.

The proposed project is intended to restore pedestrian use and remove vehicular traffic and parking from the Plaza de California, West Prado, the Plaza de Panama, and Pan American Road, consistent with the original vision for the Central Mesa. This would be accomplished through the construction of a new bypass road and bridge, which would divert eastbound vehicular traffic from the Park's western entrance on Cabrillo Bridge south to a new 265,242-square-foot underground parking structure with 785 parking spaces (net gain of 261 spaces) located in the area of an existing surface parking lot behind the Organ Pavilion. An additional 97,000 square feet of park space would be created on top of the parking structure.

The Balboa Park Plaza de Panama, Circulation and Parking Structure Project consists of several interrelated components, all intended to achieve the following goals and benefits:

- Remove cars from the Plaza de Panama, West El Prado, Plaza de California, Esplanade and Pan American Road while still providing easy public access to the institutions which are vital to the park's success and longevity.
- Restore pedestrian and park uses to El Prado, Plaza de Panama, Plaza de California, Esplanade and California Gardens behind the Organ Pavilion, reclaiming 6.31 acres in the Central Mesa.
- Improve access to the Central Mesa through additional parking, improved drop-off, disabled access, valet, and a new tram system.

- Improve the link between Balboa Park's two National Historic Landmark Districts; El Prado and the Palisades.
- Complete all work by January 2015 for the 1915 Exposition's centennial celebration.
- Export approximately 142,000 cubic yard of soil from the project to a fill disposal site at the Arizona Street Landfill on the East Mesa.

This WQTR describes the permanent storm water Best Management Practices (BMPs) that will be incorporated into the project in order to mitigate the impacts of pollutants in storm water runoff from the proposed project. For the purposes of post-construction storm water quality management, the project will follow the guidelines and requirements set forth in the City of San Diego's "Storm Water Standards," dated January 14, 2011 (herein "Storm Water Standards") adopted by the City of San Diego.

1.2 Determination for Permanent BMP Requirements

Requirements for permanent BMPs are determined based on criteria set forth in the City of San Diego's Storm Water Requirements Applicability Checklist. Projects are identified by three categories:

- Priority Development Project
- Standard Development Project
- Exempted Project

The project is a "Priority Development Project," based on the Storm Water Standards. The project applies to the following priority development project categories based on the City of San Diego's Storm Water Requirements Applicability Checklist: Commercial development and similar non-residential development greater than one acre; Restaurant; Hillside development greater than 5,000 square feet, Parking lot with a minimum area of 5,000 square feet or a minimum of 15 parking spaces; Street, road, highways or freeway; and Significant

Redevelopment. A copy of the Storm Water Requirements Applicability Checklist for the project is located in Appendix A of this WQTR.

1.3 Drainage Characteristics

The project is defined by six (6) major drainage basins. Of these major drainage basins, three (3) of them are located in the western portions of the project (i.e. Basins 100, 150 and 200) and drain in westerly directions to canyons and eventually to an existing storm drain system along State Route (SR) 163. The remaining three (3) major drainage basins (i.e. Basin 300, 400 and 500) convey runoff southeasterly towards an existing storm drain system that eventually connects with the existing storm drain system along SR 163. The existing storm drain system extends all the way to the San Diego Bay Shoreline in the vicinity of B Street.

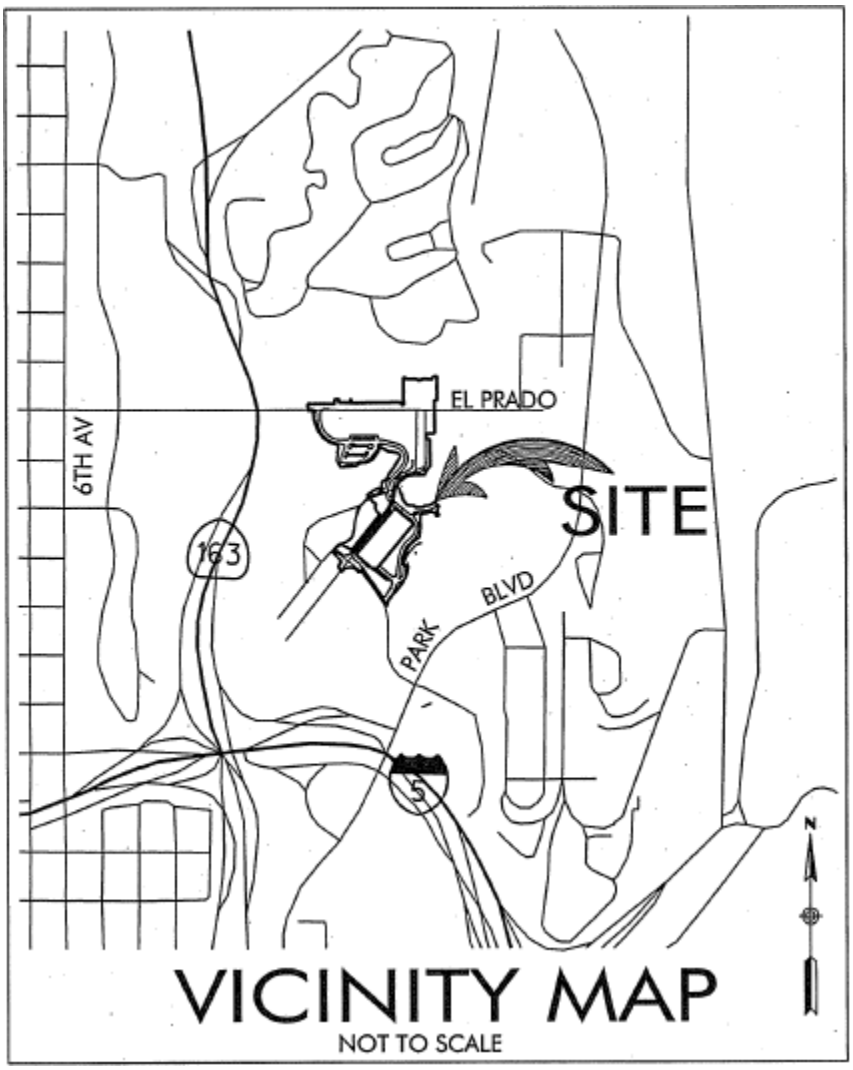
The project also consists of a fill disposal site located at the Arizona Street Landfill on the East Mesa. This consists of placing the fill and grade contouring in three (3) areas of the Arizona Street Landfill. Site 1, southwest of the Park and Recreation Operations Yard, is anticipated to take approximately 116,000 cubic yards of export, with fills ranging from 2 feet to 11 feet in height. In Site 2, the existing East Mesa archery range is anticipated to take approximately 11,000 cubic yards of export with fills ranging from 2 to 4 feet in height. In Site 3, the former "casting ponds" is anticipated to take approximately 15,000 cubic yards of export with fills ranging from 2 to 8 feet.

The post-project drainage characteristics of the fill disposal site such as tributary area, flow paths, impervious area, and time of concentration to each outlet point will mimic the pre-project condition drainage characteristics. Furthermore, the project does not propose impervious surfaces within the fill disposal site. For water quality purposes, fill areas will be landscaped with non-irrigated plantings that are consistent with "passive" park uses and Park and Recreation land use goals for the Arizona Street Landfill. Since there are no proposed impervious surfaces there are no additional permanent BMPs required for the fill disposal site related to water quality or hydromodification management.

For more information with regards to drainage characteristics, refer to the report, titled "Drainage Study for Balboa Park Plaza," dated December 21, 2011, prepared by Rick Engineering Company (Job Number 16325).

The following sections of this WQTR describe the pollutants of concern for the project (Section 2.0), the permanent BMPs to be implemented for the project (Section 3.0), and the operation and maintenance plan for permanent BMPs (Section 4.0). Hydromodification management requirements are addressed within Section 3.4 of this WQTR.

Figure 1: Vicinity Map



2.0 IDENTIFICATION OF POLLUTANTS OF CONCERN

The project is a "Priority Development Project," based on the Storm Water Standards. Section 4 of the Storm Water Standards outlines the procedure for the selection of permanent storm water BMPs. The procedure begins with identification of pollutants of concern, a two-step process described in Section 4.1.5 and 4.1.6 of the Storm Water Standards. This section of the WQTR addresses each step to identify pollutants and of concern.

2.1 Identification of Anticipated Project Pollutants

Table 4-1 of the Storm Water Standards, "Anticipated and Potential Pollutants Generated by Land Use Type," identifies general pollutant categories that are either anticipated or potential pollutants for general project categories. The following general project categories listed in Table 4-1 apply to the project: "Commercial Development," "Restaurants," "Steep Hillside Developments," "Parking Lots," and "Streets, Highways & Freeways." Table 4-1 of the Storm Water Standards is renamed as Table 2.1 and reproduced on the following page, with the Priority Development Project categories applicable to the project highlighted.

Table 2.1: Anticipated and Potential Pollutants Generated by Land Use Type

	General Pollutant Categories								
General Project Categories	**Sediments**	**Nutrients**	**Heavy Metals**	**Organic Compounds**	**Trash & Debris**	**Oxygen Demanding Substances**	**Oil & Grease**	**Bacteria & Viruses**	**Pesticides**
Detached Residential Housing Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P(1)	X
Commercial Development	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Industrial Development	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	P(1)
Steep Hillside Developments	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X	X	P(1)
Retail Gasoline Outlets (RGO)			X	X	X	X	X		

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

Source: City of San Diego "Storm Water Standards," dated January 14, 2011.

Based on the highlighted rows, the anticipated pollutants generated from the project include sediments, nutrients, heavy metals, organic compounds, trash & debris, oxygen demanding substances, oil & grease, bacteria & viruses, and pesticides. The nutrients and pesticides are mainly anticipated in the vicinity of on-site landscaping areas. The bacteria and viruses are only anticipated in the vicinity of restaurants.

2.2 Identification of Pollutants of Concern for the Receiving Water

Based on Section 4.1.5 and 4.1.6 of the Storm Water Standards, to identify pollutants of concern in receiving waters, the following analysis shall be conducted and reported in the project's WQTR: (1) for each of the proposed project discharge points, identify the receiving water(s), including hydrologic unit basin number(s), as identified in the most recent version of the "Water Quality Control Plan for the San Diego Basin," prepared by the SDRWQCB; (2) identify any receiving waters included in the 2006 CWA Section 303(d) List of Water Quality Limited Segments, approved by the State Water Resources Control Board on October 25, 2006. List all pollutants for which the receiving waters are impaired; and (3) Identify any receiving waters for which Total Maximum Daily Loads (TMDL) have been developed. List all pollutants for which the TMDL was developed.

2.2.1 Identification of Receiving Waters

According to the "Water Quality Control Plan for the San Diego Basin (9)," adopted by the California Regional Water Quality Control Board San Diego Region on September 8, 1994 approved by the SWRCB on December 13, 1994 (Basin Plan), the proposed project is located in the following hydrologic basin planning area:

Hydrologic Unit – Pueblo San Diego (908)
Hydrologic Area – San Diego Mesa (.2)
Hydrologic Subarea – Lindbergh (.21)

The corresponding number designation is 908.21 (Region '9', Hydrologic Unit '08', Hydrologic Area '2', Hydrologic Subarea '1'). An exhibit has been provided in Appendix B of this report titled "Hydrologic Unit for Balboa Park Plaza," which shows the project location in reference to the hydrologic basin.

2.2.2 Identification of Receiving Water Impairments

On October 25, 2006, the SWRCB approved the 2006 CWA Section 303(d) List of Water Quality Limited Segments (303(d) List). Subsequently on November 30, 2006, the United States Environmental Protection Agency (USEPA) approved the SWRCB's inclusion of all waters and pollutants identified for the San Diego region in its 2006 List of Water Quality Limited Segments. The receiving waters for the project that are currently listed as impaired based on the 2006 303(d) List are the San Diego Bay Shoreline (Vicinity of B Street and Broadway Piers) and the San Diego Bay. The pollutants/stressors causing impairment are Benthic Community Effects (heavy metals and organic compounds), Indicator Bacteria (bacteria & viruses), and Sediment Toxicity (heavy metals and organic compounds) for the San Diego Bay Shoreline (Vicinity of B Street and Broadway Piers) and PCBs (Polychlorinated biphenyls) (organic compounds) for the San Diego Bay.

2.2.3 Pollutants of Concern for the Project

Based on the Anticipated Project Pollutants and those of the Receiving Waters, the most significant pollutants of concern for the project are those that both are anticipated, and are a concern for the receiving water (as described by Section 4.4.1 of the Storm Water Standards). Based on Table 2.1 and the 2006 CWA Section 303(d) List of Water Quality Limited Segments, the following are the project's pollutants of concern: sediments, nutrients, heavy metals, organic compounds, trash & debris, oxygen demanding substances, oil & grease, bacteria & viruses and pesticides. This information will be utilized in the selection procedure for Treatment BMPs, described in the following section of this WQTR.

3.0 PERMANENT STORM WATER BEST MANAGEMENT PRACTICES (BMPS)

The project is the Priority Development Project. The following discussion addresses requirements of Section 4 of the Storm Water Standards, to establish permanent BMPs. Projects subject to Priority Development Project requirements shall implement all applicable source control BMPs and low impact development (LID) design practices described in Sections 4.2 and 4.3, respectively, of the Storm Water Standards

Sections 3.1 through 3.4 of this WQTR will discuss the permanent storm water BMPs proposed for the project.

3.1 Source Control BMPs

The term "source control BMP" refers to land use or site planning practices, or structures that aim to prevent urban runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff. The following text discusses the source control BMPs from Section 4.2 of the Storm Water Standards with respect to the project. Italicized text is taken directly from the Storm Water Standards, and reproduced for this report. Portions of the italicized text are condensed from the Storm Water Standards. Immediately following and written in regular text, will be the response as it applies to the project.

a. Maintenance Bays

- *Maintenance bays shall include at least one of the following:*
    1. *Repair/maintenance bays shall be indoors; or,*
    2. *Drainage system designed to preclude urban run-on and runoff.*

Maintenance bays shall include a repair/maintenance bay drainage system to capture all wash water, leaks and spills. Drains shall be connected to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm water conveyance system is prohibited

The project does not propose any Maintenance Bays.

b. Vehicle and Equipment Wash Areas

- *Areas for washing/steam cleaning of vehicles and areas for outdoor equipment/accessory washing and steam cleaning shall be:*
    1. *Self-contained to preclude run-on and run-off, covered with a roof or overhang, and equipped with a clarifier or other pretreatment facility; and*
    2. *Properly connected to a sanitary sewer.*

The project does not propose any Vehicle and Equipment Wash Areas.

c. Outdoor Processing Areas

- *Outdoor processing areas shall:*
    1. *Cover and enclose areas that would be the most significant source of pollutants;*
    2. *Slope the area toward a dead-end sump; or*
    3. *Discharge to the sanitary sewer system*

Berms or site grading shall be utilized to prevent run-on from surrounding areas. Installation of storm drains in areas of equipment repair is prohibited.

The project does not propose Outdoor Processing Areas.

d. Retail and Non-Retail Fueling Areas

- *Retail and non-retail fueling areas shall be:*
    1. *Paved with Portland cement concrete or equivalent smooth impervious surface (asphalt concrete is prohibited);*
    2. *Designed to extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less;*

3. *Sloped to prevent ponding*
4. *Separated from the rest of the site by a grade break that prevents run-on of adjacent urban runoff; and*
5. *Designed to drain to the project's treatment control BMP(s) prior to discharging to the storm water conveyance system.*

- *The overhanging roof structure or canopy shall be:*
  1. *Equal to or greater than the area within the fuel dispensing area's grade break; and*
  2. *Designed to drain away from the fuel dispensing area.*

The project does not propose Retail and Non-Retail Fueling Areas.

e. Steep Hillside Landscaping

- *Steep hillside areas disturbed by project development shall be landscaped with deep-rooted, drought tolerant and/or native plans species selected for erosion control, in accordance with the Landscape Technical Manual.*

Proposed steep hillside and other proposed slopes will be landscaped with native plants selected for erosion control.

f. Use Efficient Irrigation Systems and Landscape Design

- *Implement rain shutoff devices to prevent irrigation during and after precipitation events in accordance with section 2.3-4 of the City of San Diego's Landscape Standards (See Suggested Resources in Appendix A)*
- *Reduce irrigation contribution to dry-weather runoff by avoiding spray irrigation patterns where overspray to paved surfaces or drain inlets will occur.*
- *To avoid overwatering and potential irrigation runoff, design the irrigation systems to each landscape area's specific water requirement*

- *Implement flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines*
- *Avoid locating drain inlets in lawn areas, since such inlets tend to be sources of irrigation runoff and the transport mechanism for lawn care products. Design the grading and drainage systems such that drain inlets can be located outside of the lawn area or include a non-turf buffer around the inlet.*

Irrigation systems for the project will be designed pursuant to the guidelines shown above.

g. Design Trash Storage Areas to Reduce Pollution Contribution

- *Trash storage areas shall:*
  1. *Be paved with an impervious surface designed to prevent run-on from adjoining areas and screened or walled to prevent off-site transport of trash.*
  2. *Contain attached lids on all trash containers to prevent rainfall intrusion.*
  3. *Contain a roof or awning, at the discretion of the City, for high usage trash areas such as those for fast food establishments, convenience stores, and high density residential developments.*

Trash storage areas for the project will be designed pursuant to the guidelines shown above.

h. Design Outdoor Material Storage Areas to Reduce Pollution Contribution

- *Materials with the potential to contaminate urban runoff shall be:*
  1. *Placed in an enclosure such as a cabinet, shed, or other structure that prevents contact with rainfall or runoff and prevents spillage to the storm water conveyance system, and*
  2. *Protected by secondary containment structures such as berms, dikes or curbs when the material storage area includes hazardous materials. The storage areas shall be paved and sufficiently impervious to contain leaks and spills and to be*

covered by a roof or awning to minimize direct precipitation within the secondary containment area.

Proposed Outdoor Material Storage Areas will be designed pursuant to the guidelines shown above.

i. Design Loading Docks to Reduce Pollution Contribution

- *Loading dock areas shall:*
  1. *Provide overhead cover where appropriate to prevent precipitation contact with debris and potential spills, and*
  2. *Isolate drainage in the loading dock areas through the use of paved berms and/or grade breaks to prevent adjacent runoff from entering the loading area and to prevent liquid spills from discharging from the loading area.*
  3. *Include an acceptable method of spill containment such as a shut-off valve and containment areas.*

The project does not propose Loading Docks.

j. Employ Integrated Pest Management Principles

- *Integrated pest management (IPM) is an ecosystem-based pollution prevention strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as:*
  1. *Biological Control*
  2. *Habitat Manipulation*
  3. *Use of resistant plant varieties*

Pesticides are used only after monitoring indicates they are needed according to established guidelines. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the

surrounding environment. More information regarding pesticide application may be obtained at the following University of California-Davis website: http://www.ipm.cdavis.edu/WATER/U/index.html.

- *To eliminate or reduce the need for pesticide use, the following strategies can be used:*
  1. *Plant pest-resistant or well-adapted plant varieties*
  2. *Discourage pests by modifying the site and landscape design*

- *IPM educational materials should be distributed to future site residents and tenants. These materials should address the following:*
  1. *Use of barriers, screens, and caulking to keep pests out of buildings and landscaping*
  2. *Physical pest elimination techniques, such as weeding, washing, or trapping pests*
  3. *Relying on natural enemies to eliminate pests*
  4. *Proper use of pesticides as a last line of defense*

Pest Management will be carried out pursuant to the guidelines shown above.

k. Provide Storm Water Conveyance System Stamping and Signage

- *Concrete stamping, or approved equivalent method, shall be provided for all storm water conveyance system inlets and catch basins within the project area.*
- *Language associated with the stamping (e.g., "No Dumping- I Live in San Diego Bay") must be satisfactory to the City Engineer. Stamping may also be required in Spanish.*
- *Post signs and prohibitive language (with graphical icons) which prohibit illegal dumping at trailheads, parks, building entrances and public access points along channels and creeks within the project area.*

All storm water conveyance system inlets and catch basins with the project area shall be signed and stamped pursuant to the guidelines shown above.

l. Manage Fire Sprinkler System Discharges

- *For new buildings with fire sprinkler systems, design fire sprinkler system as follows:*
    1. *Contain discharged from sprinkler systems' operational maintenance and testing and convey discharges to the sanitary sewer system*

The project does not propose new buildings or Fire Sprinkler Systems.

m. Manage Air Conditioning Condensate

- *Air conditioning condensate is a source of dry-weather runoff and elevated copper levels. Include design features to manage this pollutant source, including the following:*
    1. *Direct air conditioning condensate to the sanitary sewer system*
    2. *Direct air conditioning condensate to landscaping areas*

The project does not propose Air Conditioning.

n. Use Non-Toxic Roofing Materials Where Feasible

- *Avoid the use of galvanized steel or copper for roofs, gutters, and downspouts*
- *If using such materials, reduce the potential for leaching of metals by applying a coating or patina*
- *Avoid composite roofing materials that contain copper*

The project does not propose the use of Roofing Materials

o. Other Source Control Requirements

- *Require implementation of post-construction soil stabilization practices, such as the re-vegetation of construction sites, in conformance with the approved Landscaping Plan and Grading Plans*
- *Provide for pet waste and collection dispensers where applicable*
- *Restrict the use of galvanized and copper roofing materials*

The project will meet all applicable Source Control guidelines above.

3.2 Low Impact Development (LID) BMPs

The term LID means a storm water management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. The following text discusses the low impact development BMPs from Section 4.3 of the Storm Water Standards with respect to the project. Italicized text is taken directly from the Storm Water Standards, and reproduced for this report. Portions of the italicized text are condensed from the Storm Water Standards. Immediately following and written in regular text, will be the response as it applies to the project.

3.2.1 Suitable Facilities

Suitable LID facilities are those facilities that retain, reuse or promote evapotranspiration of storm water. This project proposes the use of new bioretention areas, new BioClean Curb and Grate Inlet Baskets with BioMedia Green in the Central portion of the project. As an alternative to bioretention area, the project may utilize pavers or flow-through planters in a few locations.

3.2.2 Additional Guidance on Low-Impact Development Design

1. *Optimize the site layout.*

The project will minimize storm water related impacts by avoiding excessive grading and disturbance of vegetation and soils. The project will preserve significant trees, especially native trees and shrubs while also avoiding development of the steep canyons located easterly west of the project.

2. *Minimize Impervious Footprint*

Streets, sidewalks and parking lot aisles will be constructed to the minimum widths necessary. Landscaped areas will be provided throughout the project to help minimize overall impervious footprint. Impervious surfaces will be directed to pervious areas to the maximum extent practicable (MEP) to help reduce the "effective" percent imperviousness for the project.

3. *Disperse Runoff to Adjacent Landscaping and IMPs*

Runoff from majority of the project will be directed and dispersed towards bioretention areas via curb openings in the median. Where feasible, rooftop downspouts will be directed to landscaped areas and parking runoff will be directed to inverting curb islands (zero-inch curb and wheel stops or using curb cuts).

4. *Design and Implementation of Pervious Surfaces*

As an alternative to or in addition to proposed bioretention areas, pervious surfaces (i.e. pavers) may be utilized in plaza area to minimize the proposed impervious footprint.

5. *Construction Considerations*

Majority of project requires soil compaction for the roadway, slopes and retaining walls. However, amended soil will be utilized for bioretention facilities.

6. *Additional Consideration*

Disturbed soils and slopes will be vegetated to stabilize the site with drought tolerant vegetation. Runoff will be conveyed away from tops of slopes throughout the project. Additionally, riprap will be placed at all outlets to reduce the potential for erosion and minimize impacts to receiving waters.

3.3 Treatment Control BMPs

Pursuant to Section 4.4 of the Storm Water Standards, after source control BMPs and LID have been incorporated into the project, applicants of Priority Development Projects shall design a single or combination of treatment control BMPs designed to infiltrate, filter, and/or treat runoff from the project footprint. The required LID BMPs may be applied towards the numeric sizing treatment standards satisfactory to the City Engineer.

Pursuant to Section 4.4.1, *selection of treatment control BMPs shall be based on the following criteria, in conjunction with the performance ratings provided in Table 4-3:*

- *For the anticipated project pollutants identified in section 4.1.5, the highest performing BMPs available shall be considered. Site constraints that limit the selection shall be described in the WQTR*
- *The most significant pollutants of concern for the project are those that both are anticipated, according to section 4.1.5, and are a concern for the receiving water, according to section 4.1.6. The minimum performance for the most significant pollutants of concern is "medium removal efficiency."*

Priority Development Projects shall select a single or combination of treatment BMPs from the categories in Table 4-3 of the Storm Water Standards that maximize pollutant removal for the particular pollutants of concern. This means that the selected treatment control BMPs must collectively provide minimum pollutant removal efficiencies of "medium" or "high" for all pollutants of concern.

Table 4-3 of the Storm Water Standards, "Structural Treatment Control BMP Selection Matrix," provides a guide for treatment control BMP selection. Table 4-3 is renamed as Table 3.1 and reproduced below. The anticipated pollutants applicable to the project are highlighted.

Table 3.1: Structural BMP Treatment Control Selection Matrix

BMP	LID	HMP Control	Sediment	Nutrients	Trash	Metals	Bacteria	Oils and Grease	Organics
Infiltration Basin	Y	Y	H	H	H	H	H	H	H
Bioretention Basin	Y	Y	H	M	H	H	H	H	H
Cistern Plus Bioretention	Y	Y	H	M	H	H	H	H	H
Vault plus Bioretention	Y	Y	H	M	H	H	H	H	H
Self-retaining Area	Y	Y	H	H	H	H	H	H	H
Dry Wells	Y	Y	H	H	H	H	H	H	H
Constructed Wetlands	Y	Y	H	M	H	H	H	H	H
Extended Detention Basin	Y	N	M	L	H	M	M	M	M
Vegetated Swale	Y	N	M	L	L	M	L	M	M
Vegetated Buffer Strips	Y	N	H	L	M	H	L	H	M
Flow-Through Planter Boxes	Y	Y	H	M	H	H	H	H	H
Vortex Seperator or Wet Vault	N	N	M	L	M	L	L	L	L
Media Filter	N	N	H	L	H	H	M	H	H

H High removal efficiency
M Medium removal efficiency
L Low removal efficiency

The following discussion identifies the treatment control BMPs proposed for the project.

As discussed in Section 2, the project can be expected to generate the following pollutants: sediments, nutrients, heavy metals, organic compounds, trash & debris, oxygen demanding substances, oil & grease, bacteria & viruses, and pesticides. As discussed in Section 2.0, the most significant pollutants of concern for the project are those that both are anticipated, and are a concern for the receiving water (as described by Section 4.4.1 of the Storm Water Standards). The Storm Water Standards states that the minimum performance for the most significant pollutants of concern is "medium removal efficiency."

All of the BMPs listed in the Storm Water Standards – Table 4-3 were evaluated. It was determined that the most practicable treatment BMP would be:

- Bioretention Basins
- High-rate Media Filters – Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green (or equivalent)

Bioretention basins were selected primarily based on the following considerations:

- A bioretention basin will treat for sediments, trash & debris, heavy metals, bacteria & viruses, oil & grease, and organics at a high level of removal efficiency and treat for nutrients at a medium level of efficiency.
- A bioretention basin provides a higher level of treatment for several pollutants of concern in comparison to alternative treatment control BMPs.

Bioclean Curb Inlet and Grate Inlet Baskets with BioMedia Green were selected for the Central location (El Prado, Plaza de Panama, Plaza de California, Esplanade and California Gardens behind the Organ Pavilion) of the project based on the following considerations:

- The project is intended to restore historical pedestrian and park uses to the Central location of the project (El Prado, Plaza de Panama, Plaza de California, Esplanade and California Gardens behind the Organ Pavilion). The remaining areas of the project will utilize bioretention basins, unless specifically restricted by constraints.

- The use of these BMPs in these areas to retrofit the existing drainage systems will help minimize grading impacts while maximizing space for active pedestrian use.
- The Media Filter will treat for sediments, trash & debris, heavy metals, oils & grease, and organics at a high level of removal efficiency and treat for bacteria & viruses at a medium level of efficiency.

3.3.1 Numeric Sizing Requirements for Treatment Control BMPs

For flow-based treatment control BMPs, the treatment flow rates were calculated based on the following equation:

- Rational method equation: Q = CIA
- 'Q' is the treatment flow rate in cubic feet per second (cfs),
- 'C' is the weighted runoff factor,
- 'I' is the rainfall intensity in inches per hour (in/hr) [0.2 in/hr per flow-based numeric sizing criteria], and
- 'A' is the drainage area is acres (ac).

More specifically, bioretention basins (LID and treatment control BMPs) were sized using the "Low Impact Development Design Guide" located in Appendix I of the Storm Water Standards. The water quality treatment calculations are included in Appendix C of this report. Typical details of the selected Treatment Control BMPs are included in Appendix D. The locations of all storm water management features are shown on the exhibit titled "Water Quality Technical Report Exhibit for Balboa Park Plaza," located in Map Pocket 1.

3.4 Hydromodification Management Requirements

Conditions of concern for the project are related to any relevant hydrologic and environmental factors that are to be protected specific to the project area's watershed. A change to a Priority Development Project site's hydrologic regime would be considered a condition of concern if the change would impact downstream channels and habitat integrity. Section 4.5 of the Storm Water

Standards states that Priority Development Projects must be designed so that runoff rates and durations are controlled to maintain or reduce pre-project downstream erosion conditions and protect stream habitat. Potential impacts to downstream channels and habitat are evaluated and addressed in this Section of the WQTR. The following discussion summarizes the factors that were evaluated and design measures that were incorporated to mitigate impacts to downstream channels and habitat.

The post-project condition would maintain similar drainage patterns for each drainage basin compared to pre-project conditions and result in similar post-project peak flow rates towards Drainage Basin 150, Basin 200, the combination of Basins 300 and 400 (since they confluence within the same storm drain system), and Basin 500. Based on Section 4.5.1 of the Storm Water Standards and Figure 4-1 – HMP Applicability Determination, Drainage Basin 150, Basin 200, the combination of Basins 300 and 400, and Basin 500 would be exempt from Hydromodification Management Plan (HMP) criteria (i.e. Figure 4-1, Node 3 and 4), given that it would not increase the impervious area to the outfall location (i.e. existing canyon). In addition, Drainage Basins 300, 400, and 500 would be exempt from the HMP criteria (i.e. Figure 4-1, Node 7 and 8) since they discharge to a stabilized conveyance system that extends to the San Diego Bay Shoreline in the vicinity of B Street. While HMP criteria would not apply to these drainage basins, a combination of storm water management features (i.e. LID and treatment control BMPs) will be sized for water quality treatment as discussed in this section of the WQTR.

A summary table has been included in Appendix E of this report that provides the technical backup data used to summarize the Hydromodification Management Plan (HMP) requirements for each drainage basin. The summary table shows that Basin 150, Basin 200, the combination of Basins 300 and 400, and Basin 500 are exempt from HMP criteria.

For Drainage Basin 100, while drainage patterns will remain similar; there is a slight increase to impervious cover. Despite the increase in the impervious surface, the post-project condition will result in a slight reduction to the peak flow rate. The primary reason for the reduction in the peak flow rate is a result of a longer flow path based on the proposed routing for storm water

runoff through Basin 100 to the existing canyon. As a result of the increase to impervious surface within Basin 100, the project includes a hydromodification management plan (HMP) to manage, detain, and attenuate post-project runoff rates and duration to maintain or reduce pre-project downstream erosion conditions and protect stream habitat (pursuant to the Hydromodification Management Requirements outlined in Section 4.5 of the City of San Diego Storm Water Standards Manual, January 2011).

The following sub-sections discuss the Hydromodification Management Plan (HMP) requirements for Drainage Basin 100.

3.4.1 HMP Background

The intent of this section is to meet requirements of Provision D.1.g of the California Regional Water Quality Control Board San Diego Region Order R9-2007-0001, which requires the San Diego Stormwater Copermittees to implement a Hydromodification Management Plan (HMP). Hydromodification refers to changes in a watershed's runoff characteristics resulting from development, together with associated morphological changes to channels receiving the runoff, such as changes in sediment transport characteristics and the hydraulic geometry (width, depth, and slope) of channels. These changes can result in stream bank erosion and sedimentation, leading to habitat degradation due to loss of overhead cover and loss of in-stream habitat structures. As required by Permit Order No. R9-2007-0001, each Copermittees was required to incorporate the approved Hydromodification Management Plan (HMP) into its local Standard Urban Storm Water Mitigation Plan (SUSMP) and implement the HMP for all applicable Priority Development Projects (PDP) by January 14, 2011.

The project is subject to the Final Hydromodification Management Criteria. Therefore, a hydromodification management strategy has been developed for the project based on the Final Hydromodification Management Plan (HMP), dated March 2011. A HMP sizing tool, titled "San Diego BMP Sizing Calculator" in association with the Final HMP (accessible on the "Project Clean Water" website) was utilized to determine a required HMP volume. More details are discussed in the following sections of this report.

3.4.2 Modeling Methodology

Based on the Final HMP, dated March 2011, a range of runoff flow rates was required to be determined to identify the range for which Priority Development Project (PDP) post-project runoff flows and durations shall not exceed pre-project runoff flows and durations. In order to meet these criteria, results of a hydromodification management analysis must meet the following criteria:

- For flow rates between the pre-project lower flow threshold and the pre-project 10-year event, the post-project discharge rates and durations may not deviate above the pre-project rates and durations by more than 10% over more than 10% of the length of the flow duration curve.
- Lower flow thresholds may be determined using the HMP Decision Matrix along with a critical flow calculator and channel screening tools developed by the Southern California Coastal Water Research Project (SCCWRP). These methods identify lower flow thresholds for a range of channel conditions. The critical flow calculator recommends a lower flow value of 0.1Q2, 0.3Q2, or 0.5Q2 dependent on the receiving channel material and dimensions. This value will be compared to the channel susceptibility rating (High, Medium, or Low) as determined from the SCCWRP screening tools to determine the final lower flow threshold.
- The lower flow threshold may alternately be determined as 10 percent of the pre-project 2-year runoff event, or 0.1Q2. This approach, which is outlined in the HMP Decision Matrix, is available if the project applicant chooses not to complete the channel screening analysis.

While the channel screening analysis may be performed to determine the lower flow threshold, we have elected to perform the HMP analyses assuming lower flow threshold of 0.1Q2.

The HMP analyses for this project was performed using the automated sizing calculator, titled "San Diego BMP Sizing Calculator" (herein referred to as the "BMP Sizing Calculator"), created by Brown and Caldwell, provided on the "Project Clean Water" website (www.projectcleanwater.org). The BMP Sizing Calculator is the "recommended" tool to analyze

the proposed project for compliance with final hydromodification management requirements. The BMP Sizing Calculator is capable of modeling hydromodification management facilities to mitigate the effects of increased runoff from the post-project land use changes that may cause negative impacts (i.e. erosions) to downstream channels. The BMP Sizing Calculator includes sizing factors for sizing LID facilities and includes a pond sizing algorithm for sizing flow control ponds. The version of the BMP Sizing Calculator, utilized for the project, is Version 3.0 and dated April 2011.

The bioretention basin in Drainage Basin 100 will be sized to provide the required HMP volume. In order to determine the required HMP volume, a tool within the BMP Sizing Calculator, called "Bioretention + Cistern" was utilized to calculate the required HMP volumes. This HMP volume will be provided in the final configuration of the bioretention basin, and the low-flow orifice will be manually resized to accommodate for any difference in head between the modeling and the geometry provided. This information specific to detailed outlet works will be provided during final engineering. The bioretention basin will be configured to provide the required water quality surface area using the 4% sizing factor for water quality treatment.

Map Layers in the BMP Sizing Calculator includes "Rain gauges," "Mean Annual Rainfall," "Rain Basins," and "Soil Type." "Rain Gauges" refers to the location of the gauges while "Rain Basins" refers to the regions of influence for the three (3) gages that are part of the BMP Sizing Calculator. The BMP Sizing Calculator includes three Rain Basins: Oceanside, Lake Wohlford, and Lindbergh Field. The Rain Basin selected for this project was Lindbergh Field, based on the location of the project site. "Soil Type" is viewable at smaller scales. Based on the "Soil Type" layer, the project lies on Type D soils.

Partial Duration

The peak flow frequency statistics (i.e. Q_2 and Q_{10}) estimates how often flow rates will exceed a given threshold. There are two common methods to determine the frequency of recurrence of flood data: annual maximum series or partial duration series. The annual maximum series selects the highest peak discharge in one year. The partial duration series considers multiple

storm events in a given year. According to the Final HMP, the need for partial duration statistics is more pronounced for control standards based on more frequent return intervals (such as the 2-year runoff event) since the peak annual series does not perform as well in the estimation of such events. The use of a partial duration series is recommended for semi-arid climates similar to San Diego County, where prolonged dry periods can skew peak flow frequency results determined by a peak annual series for more frequent runoff events. The partial duration series provides better resolution for assigning recurrence intervals to events that occur more frequently than once per 10 years, which are the events that are most important for the HMP. BMP Sizing Calculator (Version 3.0) defaults to compute peak flow frequency statistics by constructing a partial duration series. For the statistical analysis of the rainfall record, partial duration series events have been separated into discrete rainfall events assuming the following criteria:

- To determine a discrete rainfall event, a lower flow limit was set to a very small value, equal to 0.002 cfs per acre of contributing drainage area.
- A new discrete event is designated when the flow falls below 0.002 cfs per acre for a time period of 24 hours.

For more information related to the BMP Sizing Calculator, refer to the Project Clean Water website.

3.4.3 Drainage Characteristics and HMP Strategies

A drainage study titled, "Drainage Study for Balboa Park Plaza," dated December 21, 2011, prepared by Rick Engineering Company (Job No. 16325), presents hydrologic analyses for the project. A detailed description of drainage characteristics is discussed in the drainage study. Watershed boundaries, Rational Method node numbers, flow patterns, and areas can be found on the maps titled, "Drainage Study Map for Balboa Park Plaza [Pre-project]," and "Drainage Study Map for Balboa Park Plaza [Post-project]," located in Map Pockets 1 and 2 and of the Drainage Study, respectively.

In Basin 100, the development of the site will create more impervious surface tributary to the existing canyon within Basin 100. Therefore, the implementation and design of a hydromodification management BMP will comply with the requirements in the City of San Diego Storm Water Standards, dated January 14, 2011.

The following provides a description of the drainage characteristics and hydromodification management strategy for Basin 100:

Pre-Project Condition

As stated above, the project lies on Type D soils. Land use in the pre-project condition is comprised of existing canyon (pervious) and parking area (impervious). Slope for the existing canyon is mainly "steep" (greater than 10%) with an exception of a few "flat" (0 to 5% slopes) areas. Slope for the existing parking area is "flat" (0 to 5% slopes).

Post-Project Condition

In the post-project condition, runoff from the parking and vehicular bypass bridge will be conveyed towards a low point at the northern end of the bridge to a storm drain. The runoff from the storm drain will be directed to a proposed bioretention basin for water quality treatment and hydromodification management prior to discharging to the existing canyon. The outfall location to the existing canyon will be protected with an energy dissipater.

In the post-project condition, peak flow and duration controls will be provided not to exceed pre-project peak flows and durations. In order to accomplish this, the bioretention basin has been sized using a tool named "Bioretention + Cistern," in the BMP Sizing Calculator, to obtain the required HMP volumes. The following is the breakdown of the post-project surface types and associated areas for each Basin.

The total area of the vehicular bypass bridge and the portion of the parking lot that drains to the bridge is 0.50 acres. The analyzed area (i.e., vehicular bypass bridge and portion of the parking lot) was sub divided into three drainage management areas (DMAs) based on the existing land uses and slopes: 1. paved / concrete or asphalt on an existing "flat" paved area (0.08 acres), 2. paved / concrete or asphalt on an existing "steep" pervious area (0.35 acres), and 3. paved / concrete or asphalt on existing "flat" pervious area (0.07 acres).

Summary of Results and BMP Sizing Calculator Output

The sizing for required HMP volume is included in the BMP Sizing Calculator result, located in Appendix E of this report. Based on the result, the required HMP volume (Volume 1 from the BMP Sizing Calculator results) for Basin 100 is 3,476 cubic feet (ft^3). As described in Section 3.4.2 of this report, the "plan area" (surface area) in the BMP Sizing Calculator result is not applicable since a separate water quality treatment calculation was performed using the 4% sizing criteria for the bioretention basin. Based on the results above, the bioretention basin will be reconfigured to provide the required HMP volume and meet the 4% sizing criteria for water quality. Since the geometry of each basin will differ from the BMP Sizing Calculator results, the low flow orifice will be resized during finial engineering to reflect the actual head provided, measured from the storage volume to the low flow orifice elevation.

A compact disc (CD) is also provided at the end of this report that includes the electronic files (i.e., Project and LID Output files) for the BMP Sizing Calculator.

Details regarding water quality calculations and depiction of each storm water management BMP were discussed in Section 3.1, 3.2 and 3.3 of this report.

3.4.4 Conclusion – HMP Analyses

In addition to complying with the water quality requirements, the HMP analyses using BMP Sizing Calculator (version 3.0) has been prepared for the bioretention basin in Basin 100 to meet the water quality and flow control requirements. The results demonstrate that the post-project peak flows and durations do not exceed the pre-project peak flows and durations, thus complying with the Final Hydromodification Management Criteria (HMC).

4.0 OPERATION AND MAINTENANCE PLAN (OMP)

As the owner of the project, the City of San Diego will be responsible for the maintenance of permanent BMPs for the project.

4.1 Maintenance Responsibility

The owner of the project is the site operator and will be the party responsible to ensure implementation and funding of maintenance of permanent BMPs.

It is anticipated that the City of San Diego will manage multiple separate maintenance contracts for different types of maintenance (e.g., landscape maintenance vs. maintenance of the BMPs). Throughout this section, the City of San Diego is the "party responsible to ensure implementation and funding of maintenance of permanent BMPs." The party who actually performs the activities is the "inspector," "maintenance contractor," or "maintenance operator."

4.2 Inspection and Maintenance Activities

4.2.1 Inspection and Maintenance Activities for LID and Source Control BMPs

The following LID and source control BMPs for the project requires permanent maintenance: concrete stamping, landscaped areas, and irrigation systems within the landscaped areas. The discussions below provide inspection criteria, maintenance indicators, and maintenance activities for the above-listed LID and source control BMPs that require permanent maintenance.

Landscaped Areas

Inspection and maintenance of the vegetated areas may be performed by the landscape maintenance contractor.

During inspection, the inspector shall check for the maintenance indicators given below:

- Erosion in the form of rills or gullies
- Ponding water
- Bare areas or less than 70% vegetation cover
- Animal burrows, holes, or mounds
- Trash

Routine maintenance of vegetated areas shall include mowing and trimming vegetation, and removal and proper disposal of trash.

If erosion, ponding water, bare areas, poor vegetation establishment, or disturbance by animals are identified during the inspection, additional (non-routine) maintenance will be required to correct the problem. For ponding water or erosion, see also inspection and maintenance measures for irrigation systems. In the event that any non-routine maintenance issues are persistently encountered such as poor vegetation establishment, erosion in the form of rills or gullies, or ponding water, the party responsible to ensure that maintenance is performed in perpetuity shall consult a licensed landscape architect or engineer as applicable.

As applicable, IPM procedures must be incorporated in any corrective measures that are implemented in response to damage by pests. This may include using physical barriers to keep pests out of landscaping; physical pest elimination techniques, such as, weeding, squashing, trapping, washing, or pruning out pests; relying on natural enemies to eat pests; or proper use of pesticides as a last line of defense. More information can be obtained at the UC Davis website (http://www.ipm.ucdavis.edu/WATER/U/index.html).

Outlet Protection

Routine maintenance of outlet protection shall include removing trash, debris, and leaves. For outlet protection, immediately reposition all displaced energy dissipaters. If soil erosion is

found, extend energy dissipater (i.e. landscape rocks and/or splash pads); reposition or increase limits of energy dissipater to fully cover eroded area.

Concrete Stamping

Inspection/maintenance of the concrete stamping may be performed by the building/facilities maintenance contractor or other employees of the owner, as applicable. In addition, there may be storm drain maintenance contractors who will perform this service for a fee.

During inspection, the inspector(s) shall check for the maintenance indicators given below:

- Faded, vandalized, or otherwise unreadable concrete stamping

There are no routine maintenance activities for the concrete stamping. If inspection indicates the concrete stamping is intact, no action is required. If inspection indicates the concrete stamping is not legible, the concrete stamping shall be repaired or replaced as applicable.

Irrigation Systems

Inspection and maintenance of the irrigation system may be performed by the landscape maintenance contractor.

During inspection, the inspector shall check for the maintenance indicators given below:

- Eroded areas due to concentrated flow
- Ponding water
- Refer to proprietary product information for the irrigation system for other maintenance indicators, as applicable

Refer to proprietary product information for the irrigation system for routine maintenance activities for the irrigation system, as applicable. If none of the maintenance indicators listed above is identified during inspection of the irrigation system, no other action is required.

If any of the maintenance indicators listed above is identified during the inspection, additional (non-routine) maintenance will be required to restore the irrigation system to an operable condition. If inspection indicates breaks or leaks in the irrigation lines or individual sprinkler heads, the affected portion of the irrigation system shall be repaired. If inspection indicates eroded areas due to concentrated flow from the irrigation system, the eroded areas shall be repaired and the irrigation system shall be adjusted or repaired as applicable to prevent further erosion. If inspection indicates ponding water resulting from the irrigation system, the irrigation system operator shall identify the cause of the ponded water and adjust or repair the irrigation system as applicable to prevent ponding water. Refer to proprietary product information for the irrigation system for other non-routine maintenance activities as applicable.

4.2.2 Inspection and Maintenance Activities for Treatment Control BMPs

Bioretention Basin

During inspection, the inspector shall check for the maintenance indicators given below:

- Accumulation of sediment, litter and/or debris at the inlets/outlets
- Standing water in the storage and draining layer indicating clogging in the underdrains

Routine maintenance of the Bioretention Basins shall include removal and proper disposal of accumulated materials (e.g., sediment, litter).

If inspection indicates that the underdrains for the Bioretention Basins are clogged, the additional non-routine maintenance will be required to backwash and clear the underdrains. The party responsible to ensure implementation and funding of maintenance of permanent BMPs shall contract for additional cleaning and disposal services as necessary if non-routine cleaning and disposal is required.

Media Filter - Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green

Inspection/maintenance of the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green must be performed by properly trained personnel. Maintenance of the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green may involve handling of potentially hazardous material. Therefore the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green maintenance operator may need to be trained in handling and disposal of hazardous waste. The party responsible to ensure implementation and funding of maintenance of permanent BMPs will be responsible to select a maintenance contractor for maintenance of the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green who meets this requirement, and to contract for additional cleaning and disposal services as necessary if non-routine cleaning and disposal is required. There are several storm drain cleaning service providers who are able to inspect and/or maintain this product.

During inspection, the inspector shall check for the maintenance indicators given below:

- Accumulation of sediment, litter and/or debris in the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green
- Spent filter media cartridges. When the media is spent it is typically indicated by a change in color of the material.
- Damage to internal components within the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green.

Routine maintenance of the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green shall include removal and proper disposal of accumulated materials (e.g., sediment, litter) from the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green, and replacement of the media cartridges.

If inspection indicates that internal components within the Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green are damaged, additional non-routine maintenance will be

required to repair or replace the damaged parts as applicable. The party responsible to ensure implementation and funding of maintenance of permanent BMPs shall contract for additional cleaning and disposal services as necessary if non-routine cleaning and disposal is required.

4.3 Inspection and Maintenance Frequency

The Table below lists the BMPs to be inspected and maintained and the minimum frequency of inspection and maintenance activities.

Table 4.1: Summary Table of Inspection and Maintenance Frequency

BMP	Inspection Frequency	Maintenance Frequency
Landscaped Areas	Monthly	Routine mowing and trimming and trash removal: monthly Non-routine maintenance as-needed based on maintenance indicators in Section 4.2.1
Outlet Protection	Monthly	Routine maintenance to remove trash, debris, and leaves. Repair any damage to roof drains. Immediately reposition all displaced energy dissipaters. If soil erosion is found, reposition or increase limits of energy dissipater to fully cover eroded area. Non-routine maintenance as-needed
Concrete Stamping (or equivalent)	Annual	As-needed based on maintenance indicators in Section 4.2.1
Irrigation Systems	Monthly	As-needed based on maintenance indicators in Section 4.2.1
Bioretention Basins (LID and treatment control BMP)	Annual, and after major storm events	Routine maintenance to remove accumulated materials at the inlets and outlets: annually, on or before September 30th As-needed maintenance based on maintenance indicators in Section 4.2.2
Bioclean Curb Inlet Basket and Grate Inlet Baskets with BioMedia Green (treatment control BMP)	Annual, and after major storm events	Routine maintenance to remove accumulated materials and replace media cartridges: annually, on or before September 30th As-needed maintenance based on maintenance indicators in Section 4.2.2

The frequencies given in the Summary Table of Inspection and Maintenance Frequency are minimum recommended frequencies for inspection and maintenance activities for the project. Typically, the frequency of maintenance required for permanent BMPs is site and drainage area specific. If it is determined during the regularly scheduled inspection and/or routine maintenance

that a BMP requires more frequent maintenance (e.g., to remove accumulated trash) it may be necessary to increase the frequency of inspection and/or routine maintenance.

4.4 Recordkeeping Requirements

The party responsible to ensure implementation and funding of maintenance of permanent BMPs shall maintain records documenting the inspection and maintenance activities. The records must be kept a minimum of 5 years and shall be made available to the City of San Diego for inspection upon request at any time.

5.0 SUMMARY

This water quality technical report (WQTR) summarizes permanent storm water management features proposed for the project that will collectively meet the requirements for LID, water quality treatment BMPs, and hydromodification management criteria.

The project is a "Priority Development Project," based on the Storm Water Standards. The project applies to the following priority development project categories based on the City of San Diego's Storm Water Requirements Applicability Checklist: Commercial development and similar non-residential development greater than one acre; Restaurant; Hillside development greater than 5,000 square feet, Parking lot with a minimum area of 5,000 square feet or a minimum of 15 parking spaces; Street, road, highways or freeway; and Significant Redevelopment.

Based on the anticipated pollutants of concern that may be generated on-site and identification of receiving waters that are listed as impaired on the 2006 CWA Section 303(d) List of Water Quality Limited Segments, the following are the project's pollutants of concern: sediments, nutrients, heavy metals, organic compounds, trash & debris, oxygen demanding substances, oil & grease, bacteria & viruses and pesticides.

In addition to treatment control BMPs, the project will incorporate source control BMPs and Low Impact Development (LID), which are described in detail in Section 3 of this report.

The project includes a proposed network of storm water management features dispersed throughout the site that will utilize bioretention and high-rate media filters to meet the requirements for treatment control BMPs. The following list provides a summary of treatment control BMPs selected for the project:

- Bioretention Basins
- High-rate Media Filters – Bioclean Curb Inlet Basket and Grate Inlet Basket with BioMedia Green (or equivalent)

The above BMPs were selected for the project and provide "Medium" to "High" removal efficiencies for all targeted pollutants of concern, except nutrients related to landscaped areas will be managed with source controls, which are considered more effective and help prevent off-site transport of nutrients by runoff. Source controls will include designing the landscape and irrigation system in accordance with the City of San Diego's Landscape Technical Manual, and ensuring on-going maintenance of the landscape and irrigation system.

The following BMPs for the project require permanent maintenance: landscaped areas, outlet protection, concrete stamping, irrigation system, bioretention basins and high-rate media filters. The operation and maintenance information provided in Section 4.0 of this WQTR provides inspection criteria, maintenance indicators, and maintenance activities for the above-listed BMPs that require permanent maintenance.

The project has incorporated storm water management features to provide LID site design, source control, treatment control, and hydromodification management BMPs (where applicable) in accordance with the City of San Diego Storm Water Standards.

APPENDIX A

Storm Water Requirements Applicability Checklist

City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

THE CITY OF SAN DIEGO

Storm Water Requirements Applicability Checklist

FORM DS-560 JANUARY 2011

Project Address: Plaza De Panama, Balboa Park, San Diego, CA	Project Number *(for City Use Only)*:

SECTION 1. Permanent Storm Water BMP Requirements:

Additional information for determining the requirements is found in the Storm Water Standards Manual.

Part A: Determine if Exempt from Permanent Storm Water BMP Requirements.

Projects that are considered maintenance, or are otherwise not categorized as "development projects" or "redevelopment projects" according to the Storm Water Standards manual are not required to install permanent storm water BMPs. **If "Yes" is checked for any line in Part A, proceed to Part C and check the box labeled "Exempt Project." If "No" is checked for all of the lines, continue to Part B.**

1.	The project is not a Development Project as defined in the Storm Water Standards Manual: for example habitat restoration projects, and construction inside an existing building.	☐ Yes ☑ No
2.	The project is only the construction of underground or overhead linear utilities.	☐ Yes ☑ No
3.	The project qualifies as routine maintenance (replaces or renews existing surface materials because of failed or deteriorating condition). This includes roof replacement, pavement spot repairs and resurfacing treatments such as asphalt overlay or slurry seal, and replacement of damaged pavement.	☐ Yes ☑ No
4.	The project only installs sidewalks, bike lanes, or pedestrian ramps on an existing road, and does not change sheet flow condition to a concentrated flow condition.	☐ Yes ☑ No

Part B: Determine if Subject to Priority Development Project Requirements.

Projects that match one of the definitions below are subject to additional requirements including preparation of a Water Quality Technical Report.

If "Yes" is checked for any line in Part B, proceed to Part C and check the box labeled "Priority Development Project." If "No" is checked for all of the lines, continue to Part C and check the box labeled "Standard Development Project."

1.	**Residential development of 10 or more units.**	☐ Yes ☑ No
2.	**Commercial development and similar non-residential development greater than one acre.** Hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; and other light industrial facilities.	☑ Yes ☐ No
3.	**Heavy industrial development greater than one acre.** Manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas.	☐ Yes ☑ No
4.	**Automotive repair shop.** Facilities categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	☐ Yes ☑ No
5.	**Restaurant.** Facilities that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), and where the land area for development is greater than 5,000 square feet.	☑ Yes ☐ No
6.	**Hillside development greater than 5,000 square feet.** Development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions and where the development will grade on any natural slope that is twenty-five percent or greater.	☑ Yes ☐ No
7.	**Water Quality Sensitive Area.** Development located within, directly adjacent to, or discharging directly to a Water Quality Sensitive Area (as depicted in Appendix C) in which the project either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" is defined as being situated within 200 feet of the Water Quality Sensitive Area. "Discharging directly to" is defined as outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.	☐ Yes ☑ No
8.	**Parking lot with a minimum area of 5,000 square feet or a minimum of 15 parking spaces** and potential exposure to urban runoff (unless it meets the exclusion for parking lot reconfiguration on line 11).	☑ Yes ☐ No

9.	**Street, road, highway, or freeway.** New paved surface in excess of 5,000 square feet used for the transportation of automobiles, trucks, motorcycles, and other vehicles (unless it meets the exclusion for road reconfiguration on line 11).	☑ Yes ☐ No
10.	**Retail Gasoline Outlet (RGO)** that is: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.	☐ Yes ☑ No
11.	**Significant Redevelopment;** project installs and/or replaces 5,000 square feet or more of impervious surface and the existing site meets at least one of the categories above. The project is not considered Significant Redevelopment if reconfiguring an existing road or parking lot without a change to the footprint of an existing developed road or parking lot. The existing footprint is defined as the outside curb or the outside edge of pavement when there is no curb.	☑ Yes ☐ No
12.	**Other Pollutant Generating Project.** Any other project not covered in the categories above, that disturbs one acre or more and is not excluded by the criteria below.	☐ Yes ☑ No

Projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces.

Part C: Select the appropriate category based on the outcome of Parts A & B.

1.	If "Yes" is checked for any line in Part A, then check this box. Continue to Section 2.	☐ Exempt Project
2.	If "No" is checked for all lines in Part A, and Part B, then check this box. Continue to Section 2.	☐ Standard Development Project
3.	If "No" is checked for all lines in Part A, and "Yes" is checked for at least one of the lines in Part B, then check this box. Continue to Section 2. See the Storm Water Standards Manual for guidance on determining if Hydromodification Management Plan requirements apply.	☑ Priority Development Project

SECTION 2. Construction Storm Water BMP Requirements:
For all projects, complete Part D. If "Yes" is checked for any line in Part D, then continue to Part E.

Part D: Determine Construction Phase Storm Water Requirements.

1.	Is the project subject to California's statewide General NPDES Permit for Storm Water Discharges Associated with Construction Activities? (See State Water Resources Control Board Order No. 2009-0009-DWQ for rules on enrollment)	☑ Yes ☐ No
2.	Does the project propose grading or soil disturbance?	☑ Yes ☐ No
3.	Would storm water or urban runoff have the potential to contact any portion of the construction area, including washing and staging areas?	☑ Yes ☐ No
4.	Would the project use any construction materials that could negatively affect water quality if discharged from the site (such as, paints, solvents, concrete, and stucco)?	☑ Yes ☐ No
5.	Check this box if "Yes" is checked for line 1. Continue to Part E.	☑ SWPPP Required
6.	Check this box if "No" is checked for line 1, and "Yes is checked for any line 2-4. Continue to Part E.	☐ WPCP Required
7.	Check this box if "No" is checked for all lines 1-4. Part E does not apply.	☐ No Document Required

Part E: Determine Construction Site Priority
This prioritization must be completed with this form, noted on the plans, and included in the SWPPP or WPCP. The City reserves the right to adjust the priority of the projects both before and during construction. [Note: The construction priority does NOT change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by City staff.]

☑ **1. High Priority**
a) Projects where the site is 50 acres or more and grading will occur during the wet season
b) Projects 1 acre or more and tributary to an impaired water body for sediment (e.g., Peñasquitos watershed)
c) Projects 1 acre or more within or directly adjacent to or discharging directly to a coastal lagoon or other receiving water within a Water Quality Sensitive Area.
d) Projects subject to phased grading or advanced treatment requirements.

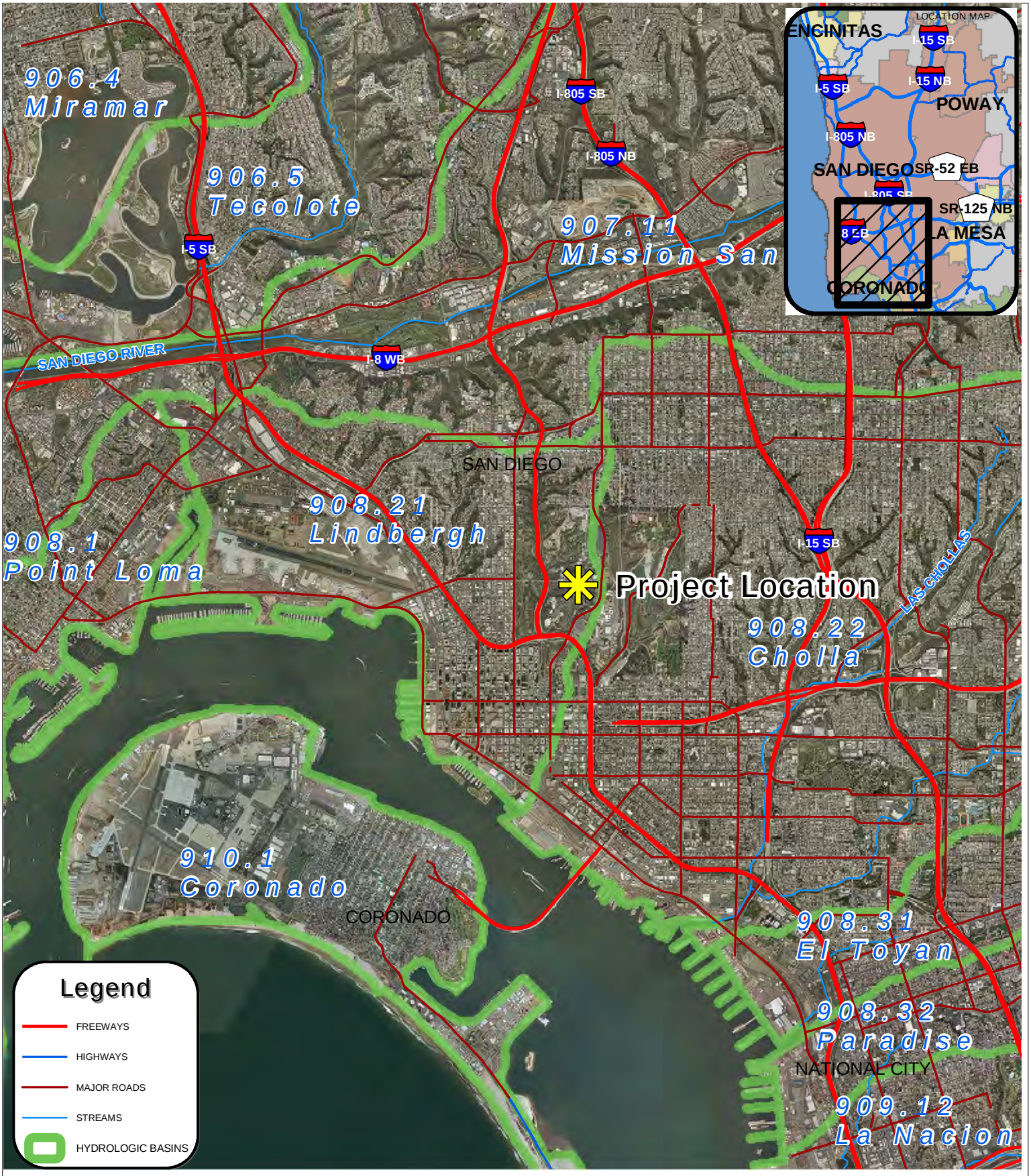
☐ **2 Medium Priority.** Projects 1 acre or more but not subject to a high priority designation.

☐ **3 Low Priority.** Projects requiring a Water Pollution Control Plan but not subject to a medium or high priority designation.

Name of Owner or Agent *(Please Print)*: Michael S. While	Title: Associate
Signature: Michael S While	Date: 03/11/2011

APPENDIX B

Hydrologic Unit Map, Exhibit for Downstream Storm Drain to San Diego Bay and 2006 CWA Section 303 (d) List



RICK ENGINEERING COMPANY

PREPARED BY GIS SERVICES DIVISION

1 inch = 6,000 feet

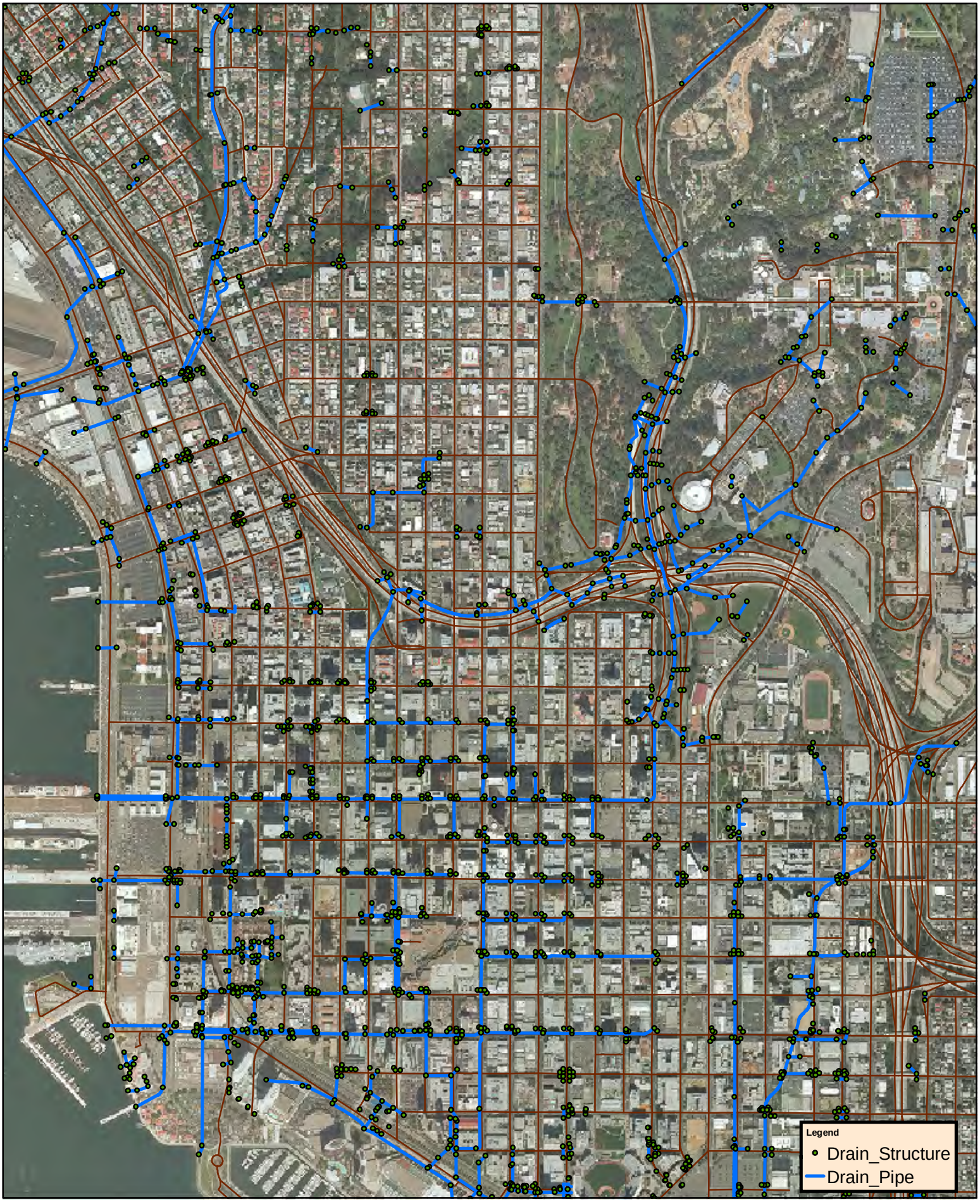
0 3,000 6,000 12,000 Feet

EXHIBIT DATE: 4/18/2011 REC JN: 16325

J:\BalboaParkPlaza\GIS\x16325_HydrologicUnitBaseMap.mxd

HYDROLOGIC UNIT FOR BALBOA PARK PLAZA

THIS PROJECT LOCATED WITHIN THE CITY OF SAN DIEGO



Balboa Park Plaza - Downstream Conditions of Concern

Filepath: J:\BalboaParkPlaza\GIS
Exhibit Date: April 14, 2011
REC JN: 16325

0 600 1,200 2,400 Feet

Data Sources:
Landiscor Aerial Photo: March 2009

RICK ENGINEERING COMPANY

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED	PROPOSED TMDL COMPLETION
				Sulfates		5 Miles	2019
					Source Unknown		
				Total Dissolved Solids		5 Miles	2019
					Source Unknown		
9	R	Reidy Canyon Creek	90462000				
				Phosphorus		3.9 Miles	2019
					Source Unknown		
9	B	San Diego Bay	91010000				
				PCBs (Polychlorinated biphenyls)		10783 Acres	2019
					Source Unknown		
9	B	San Diego Bay Shoreline, 32nd St San Diego Naval Station	90822000				
				Benthic Community Effects		103 Acres	2019
					Nonpoint/Point Source		
				Sediment Toxicity		103 Acres	2019
					Nonpoint/Point Source		
9	B	San Diego Bay Shoreline, at Americas Cup Harbor	90810000				
				Copper		88 Acres	2019
					Source Unknown		
9	B	San Diego Bay Shoreline, at Bayside Park (J Street)	90911000				
				Indicator bacteria		50 Acres	2019
				This listing was made by USEPA for 2006.			
					Source Unknown		
9	B	San Diego Bay Shoreline, at Coronado Cays	91010000				
				Copper		47 Acres	2019
					Source Unknown		

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS REQUIRING TMDLS

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	ESTIMATED SIZE AFFECTED	PROPOSED TMDL COMPLETION
9	B	San Diego Bay Shoreline, Vicinity of B St and Broadway Piers	90821000				
				Benthic Community Effects		9.9 Acres	2019
					Nonpoint/Point Source		
				Indicator bacteria		9.9 Acres	2006
				Estimated size of impairment is 0.4 miles around the shoreline of the bay.			
					Urban Runoff/Storm Sewers		
					Unknown Nonpoint Source		
					Unknown point source		
				Sediment Toxicity		9.9 Acres	2019
					Nonpoint/Point Source		
9	R	San Diego River (Lower)	90711000				
				Fecal Coliform		16 Miles	2005
				Lower 6 miles.			
					Urban Runoff/Storm Sewers		
					Wastewater		
					Nonpoint/Point Source		
				Low Dissolved Oxygen		16 Miles	2019
				Impairment transcends adjacent Calwater wtareshed 90712.			
					Urban Runoff/Storm Sewers		
					Unknown Nonpoint Source		
					Unknown point source		
				Phosphorus		16 Miles	2019
				Impairment transcends adjacent Calwater watershed 90712.			
					Urban Runoff/Storm Sewers		
					Unknown Nonpoint Source		
					Unknown point source		
				Total Dissolved Solids		16 Miles	2019
				Impairment transcends adjacent Calwater watershed 90712.			
					Urban Runoff/Storm Sewers		
					Flow Regulation/Modification		
					Natural Sources		
					Unknown Nonpoint Source		
					Unknown point source		

APPENDIX C

Water Quality Treatment Calculations

J-16325
Balboa Park Plaza
September 30, 2011

IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP A - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
A-1	21878	Paved (Concrete / Asphalt)	1.0	21878
A-2	0	Landscaping	0.1	0
Total	21878			21878

IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
0.04	875	875

J-16325
Balboa Park Plaza
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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP B - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
B-1	10506	Paved (Concrete / Asphalt)	1.0	10506
B-2	0	Landscaping	0.1	0
Total	10506			10506

IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
0.04	420	420

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP C(1) - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
C(1)-1	6400	Paved (Concrete / Asphalt)	1.0	6400			
C(1)-2	2354	Landscaping	0.1	235			
Total	8754			6635	0.20	0.03	0.14

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP C(2) - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
C(2)-1	5997	Paved (Concrete / Asphalt)	1.0	5997			
C(2)-2	2002	Landscaping	0.1	200			
Total	7999			6197	0.20	0.03	0.14

J-16325
Balboa Park Plaza
September 30, 2011

IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP C(3) - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
C(3)-1	4882	Paved (Concrete / Asphalt)	1.0	4882
C(3)-2	1860	Landscaping	0.1	186
Total	6742			5068

Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
0.20	0.02	0.14

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP C(4) - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
C(4)-1	2910	Paved (Concrete / Asphalt)	1.0	2910
C(4)-2	0	Landscaping	0.1	0
Total	2910			2910

Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
0.20	0.01	0.14

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP D(1) -High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
D(1)-1	12103	Paved (Concrete / Asphalt)	1.0	12103
D(1)-2	1798	Landscaping	0.1	180
Total	13901			12283

Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
0.20	0.06	0.14

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP D(2) -High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
D(2)-1	10836	Paved (Concrete / Asphalt)	1.0	10836
D(2)-2	1739	Landscaping	0.1	174
Total	12575			11010

Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
0.20	0.05	0.14

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Balboa Park Plaza
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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP D(3) -High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
D(3)-1	6742	Paved (Concrete / Asphalt)	1.0	6742			
D(3)-2	1230	Landscaping	0.1	123			
Total	7972			6865	0.20	0.03	0.14

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Balboa Park Plaza
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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP D(4) -High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
D(4)-1	3612	Paved (Concrete / Asphalt)	1.0	3612			
D(4)-2	0	Landscaping	0.1	0			
Total	3612			3612	0.20	0.02	0.14

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP E - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
E-1	26172	Paved (Concrete / Asphalt)	1.0	26172			
E-2	0	Landscaping	0.1	0			
Total	26172			26172	0.04	1047	1047

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP F - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
F-1	8038	Paved (Concrete / Asphalt)	1.0	8038			
F-2	13018	Landscaping	0.1	1302			
Total	21056			9340	0.04	374	374

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP G - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
G-1	16048	Paved (Concrete / Asphalt)	1.0	16048			
G-2	8771	Landscaping	0.1	877			
Total	24819			16925	0.20	0.08	0.14

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP H - High-rate Media Filter - BioClean Curb Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
H-1	15291	Paved (Concrete / Asphalt)	1.0	15291
H-2	689	Landscaping	0.1	69
Total	15980			15360

Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
0.20	0.07	0.21

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP I - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
I-1	3322	Paved (Concrete / Asphalt)	1.0	3322			
I-2	2723	Landscaping	0.1	272			
Total	6045			3594	0.04	144	144

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP J(1) - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
J(1)-1	14128	Paved (Concrete / Asphalt)	1.0	14128
J(1)-2	3126	Landscaping	0.1	313
Total	17254			14441

Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
0.20	0.07	0.14

Note:
As an alternative to biorention basin, following design options may be feasible:
Option 1 - Disperse across pervious surfaces (i.e. pavers)
Option 2 - Flow-through Planter

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP J(2) - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green - HIGH FLOW (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
J(2)-1	31898	Paved (Concrete / Asphalt)	1.0	31898			
J(2)-2	3009	Landscaping	0.1	301			
Total	34907			32199	0.20	0.15	0.17

Note:
As an alternative to biorention basin, following design options may be feasible:
Option 1 - Disperse across pervious surfaces (i.e. pavers)
Option 2 - Flow-through Planter

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP K - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
K-1	7324	Paved (Concrete / Asphalt)	1.0	7324			
K-2	12827	Landscaping	0.1	1283			
Total	20151			8607	0.20	0.04	0.14

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP L - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
L-1	7633	Paved (Concrete / Asphalt)	1.0	7633
L-2	10046	Landscaping	0.1	1005
Total	17679			8638

Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
0.20	0.04	0.14

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP M - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
M-1	9862	Paved (Concrete / Asphalt)	1.0	9862			
M-2	10881	Landscaping	0.1	1088			
Total	20743			10950	0.04	438	438

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP N(1) - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
N(1)-1	10230	Paved (Concrete / Asphalt)	1.0	10230			
N(1)-2	0	Landscaping	0.1	0			
Total	10230			10230	0.20	0.05	0.14

Note:
As an alternative to biorention basin, following design options may be feasible:
Option 1 - Disperse across pervious surfaces (i.e. pavers)
Option 2 - Flow-through Planter

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP N(2) - High-rate Media Filter - BioClean Grate Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
N(2)-1	26734	Paved (Concrete / Asphalt)	1.0	26734			
N(2)-2	0	Landscaping	0.1	0			
Total	26734			26734	0.20	0.12	0.14

Note:
As an alternative to biorention basin, following design options may be feasible:
Option 1 - Disperse across pervious surfaces (i.e. pavers)
Option 2 - Flow-through Planter

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP O - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
O-1	10182	Paved (Concrete / Asphalt)	1.0	10182			
O-2	9069	Landscaping	0.1	907			
Total	19251			11089	0.04	444	444

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP P - High-rate Media Filter - BioClean Curb Inlet Basket w/ BioMedia Green (or equivalent)

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Flow-based Rainfall Intensity (in/hr)	Required Treatment Flow Rate (cfs)	Provided Treatment Flow Rate (cfs)
P-1	14025	Paved (Concrete / Asphalt)	1.0	14025			
P-2	34247	Landscaping	0.1	3425			
Total	48272			17450	0.20	0.08	0.21

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP Q - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
Q-1	14524	Paved (Concrete / Asphalt)	1.0	14524			
Q-2	96008	Landscaping	0.1	9601			
Total	110532			24125	0.04	965	965

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP R - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
R-1	19628	Paved (Concrete / Asphalt)	1.0	19628			
R-2	39569	Landscaping	0.1	3957			
Total	59197			23585	0.04	943	943

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP S - Bioretention

DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
S-1	8054	Paved (Concrete / Asphalt)	1.0	8054
S-2	0	Landscaping	0.1	0
Total	8054			8054

IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
0.04	322	322

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IMP/BMP Sizing Calculations

Soil Type	IMP/BMP Name
D	BMP T - Bioretention

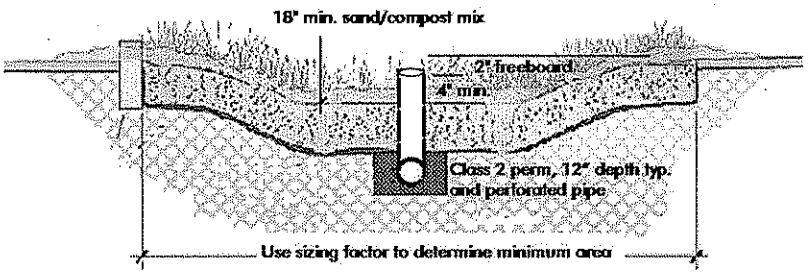
DMA Name	DMA Area (ft^2)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
T-1	14230	Paved (Concrete / Asphalt)	1.0	14230
T-2	31793	Landscaping	0.1	3179
Total	46023			17409

IMP Sizing Factor	Minimum Area (ft^2)	Proposed Area (ft^2)
0.04	696	696

APPENDIX D

Details for
Treatment Control Best Management Practices (BMPs)

Bioretention Facilities



Bioretention facility configured for treatment-only requirements. Bioretention facilities can rectangular, linear, or nearly any shape.

Bioretention detains runoff in a surface reservoir, filters it through plant roots and a biologically active soil mix, and then infiltrates it into the ground. Where native soils are less permeable, an underdrain conveys treated runoff to storm drain or surface drainage.

Bioretention facilities can be configured in nearly any shape. When configured as linear **swales**, they can convey high flows while percolating and treating lower flows.

Bioretention facilities can be configured as in-ground or above-ground planter boxes, with the bottom open to allow infiltration to native soils underneath. If infiltration cannot be allowed, use the sizing factors and criteria for the Flow-Through Planter.

▶ CRITERIA

For development projects subject only to runoff treatment requirements, the following criteria apply:

Parameter	Criterion
Soil mix depth	18 inches minimum
Soil mix minimum percolation rate	5 inches per hour minimum sustained (10 inches per hour initial rate recommended)
Soil mix surface area	0.04 times tributary impervious area (or equivalent)

Best Uses

- Commercial areas
- Residential subdivisions
- Industrial developments
- Roadways
- Parking lots
- Fit in setbacks, medians, and other landscaped areas

Advantages

- Can be any shape
- Low maintenance
- Can be landscaped

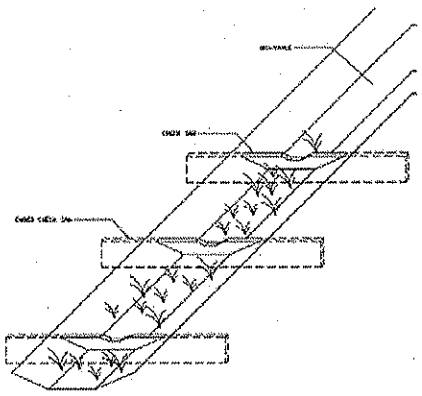
Limitations

- Require 4% of tributary impervious square footage
- Typically requires 3-4 feet of head
- Irrigation typically required

Parameter	Criterion
Surface reservoir depth	6 inches minimum; may be sloped to 4 inches where adjoining walkways.
Underdrain	Required in Group "C" and "D" soils. Perforated pipe embedded in gravel ("Class 2 permeable" recommended), connected to storm drain or other accepted discharge point.

► DETAILS

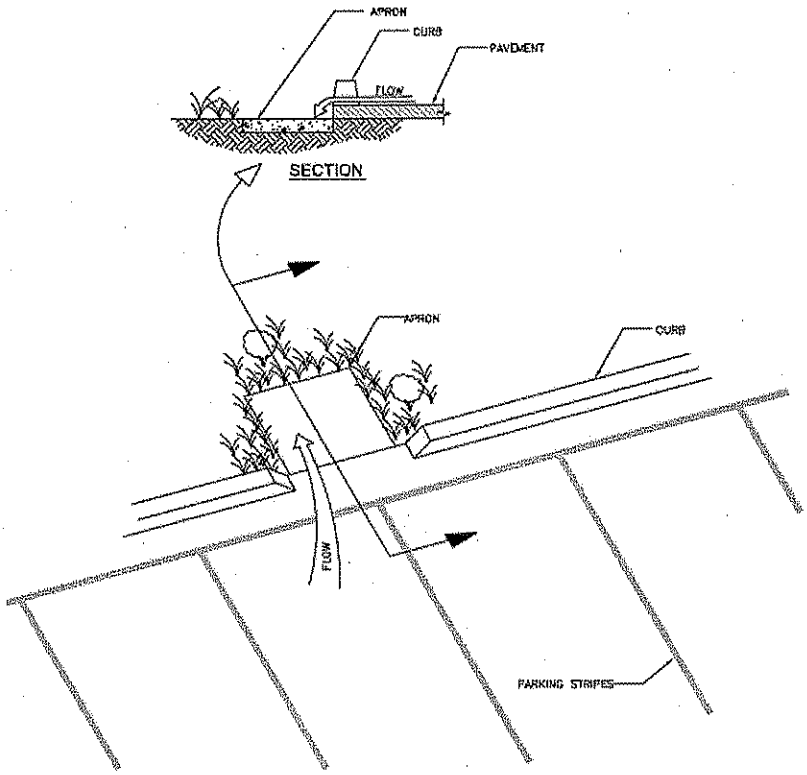
Plan. On the surface, a bioretention facility should be one level, shallow basin—or a series of basins. As runoff enters each basin, it should flood and fill throughout before runoff overflows to the outlet or to the next downstream basin. This will help prevent movement of surface mulch and soil mix.



Use check dams for linear bioretention facilities (swales) on a slope.

In a linear swale, check dams should be placed so that the lip of each dam is at least as high as the toe of the next upstream dam. A similar principle applies to bioretention facilities built as terraced roadway shoulders.

Inlets. Paved areas draining to the facility should be graded, and inlets should be placed, so that runoff remains as sheet flow or as dispersed as possible. Curb cuts should be wide (12" is recommended) to avoid clogging with leaves or debris. Allow for a minimum reveal of 4"-6" between the inlet and soil mix elevations to ensure turf or mulch buildup does not block the inlet. In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet.



Recommended design details for bioretention facility inlets (see text).

Where runoff is collected in pipes or gutters and conveyed to the facility, protect the landscaping from high-velocity flows with energy-dissipating rocks. In larger installations, provide cobble-lined channels to better distribute flows throughout the facility.

Upturned pipe outlets can be used to dissipate energy when runoff is piped from roofs and upgradient paved areas.

Soil mix. The required soil mix is similar to a loamy sand. It must maintain a minimum percolation rate of 5" per hour throughout the life of the facility, and it must be suitable for maintaining plant life. Typically, on-site soils will not be suitable due to clay content.

Storage and drainage layer. "Class 2 permeable," Caltrans specification 68-1.025, is recommended. Open-graded crushed rock, washed, may be used, but requires 4"-6" washed pea gravel be substituted at the top of the crushed rock gravel layers. **Do not use filter fabric** to separate the soil mix from the gravel drainage layer or the gravel drainage layer from the native soil.

Underdrains. No underdrain is required where native soils beneath the facility are Hydrologic Soil Group A or B. For treatment-only facilities where native soils are Group C or D, a perforated pipe must be bedded in the gravel layer and must terminate at a storm drain or other approved discharge point.

Outlets. In treatment-only facilities, outlets must be set high enough to ensure the surface reservoir fills and the entire surface area of soil mix is flooded before the outlet elevation is reached. In swales, this can be achieved with appropriately placed check dams.

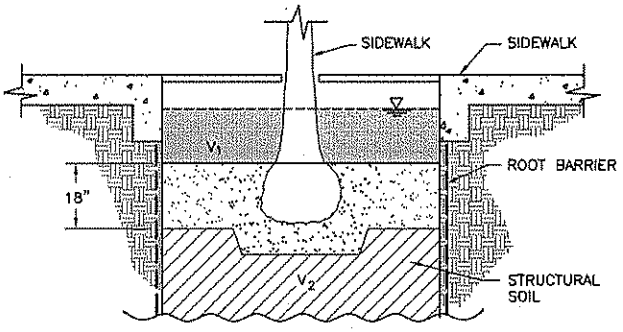
The outlet should be designed to exclude floating mulch and debris.

Vaults, utility boxes and light standards. It is best to locate utilities outside the bioretention facility—in adjacent walkways or in a separate area set aside for this purpose. If utility structures are to be placed within the facility, the locations should be anticipated and adjustments made to ensure the minimum bioretention surface area and volumes are achieved. Leaving the final locations to each individual utility can produce a haphazard, unaesthetic appearance and make the bioretention facility more difficult to maintain.

Emergency overflow. The site grading plan should anticipate extreme events and potential clogging of the overflow and route emergency overflows safely.

Trees. Bioretention areas can accommodate small or large trees. There is no need to subtract the area taken up by roots from the effective area of the facility. Extensive tree roots maintain soil permeability and help retain runoff. Normal maintenance of a bioretention facility should not affect tree lifespan.

The bioretention facility can be integrated with a tree pit of the required depth and filled with structural soil. If a root barrier is used, it can be located to allow tree roots to spread throughout the bioretention facility while protecting adjacent pavement. Locations and planting elevations should be selected to avoid blocking the facility's inlets and outlets.



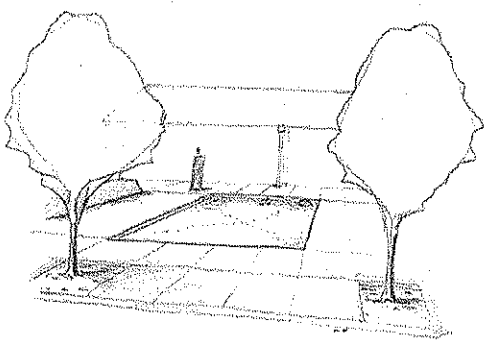
Bioretention facility configured as a tree well.
The root barrier is optional.

► APPLICATIONS

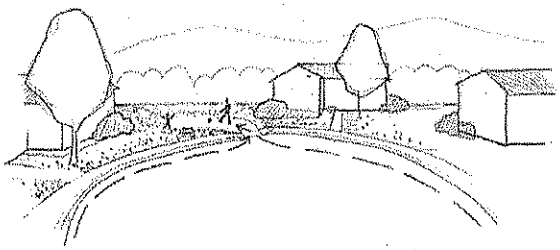
Multi-purpose landscaped areas. Bioretention facilities are easily adapted to serve multiple purposes. The loamy sand soil mix will support turf or a plant palette suitable to the location and a well-drained soil.

Example landscape treatments:

- Lawn with sloped transition to adjacent landscaping.
- Swale in setback area
- Swale in parking median
- Lawn with hardscaped edge treatment
- Decorative garden with formal or informal plantings
- Traffic island with low-maintenance landscaping
- Raised planter with seating
- Bioretention on a terraced slope



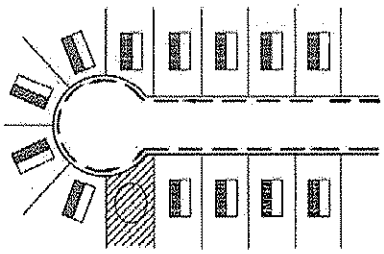
Bioretention facility configured as a recessed decorative lawn with hardscaped edge.



Bioretention facility configured and planted as a lawn/ play area.

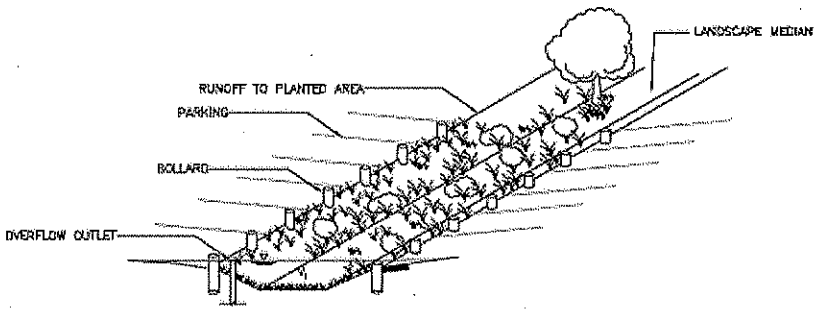
Residential subdivisions. Some subdivisions are designed to drain roofs and driveways to the streets (in the conventional manner) and then drain the streets to bioretention areas, with one bioretention area for each 1 to 6 lots, depending on subdivision layout and topography.

If allowed by the local jurisdiction, bioretention areas can be placed on a separate, dedicated parcel with joint ownership.



Bioretention facility receiving drainage from individual lots and the street in a residential subdivision.

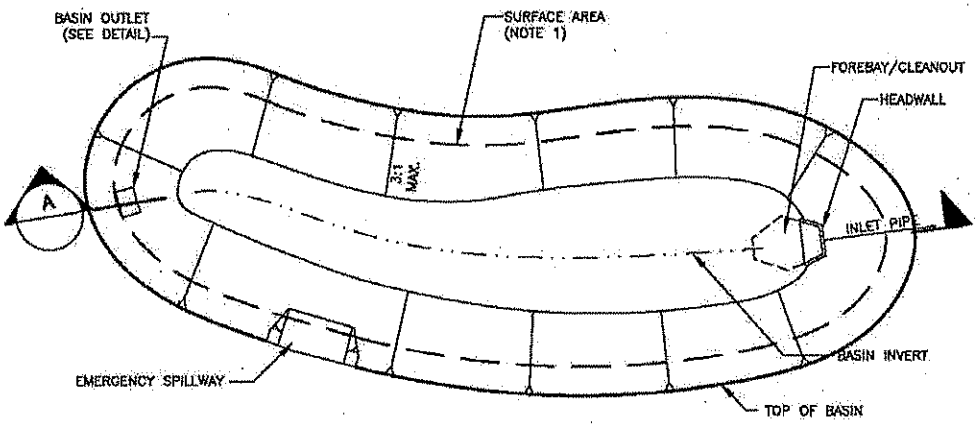
Sloped sites. Bioretention facilities must be constructed as a basin, or series of basins, with the circumference of each basin set level. It may be necessary to add curbs or low retaining walls.



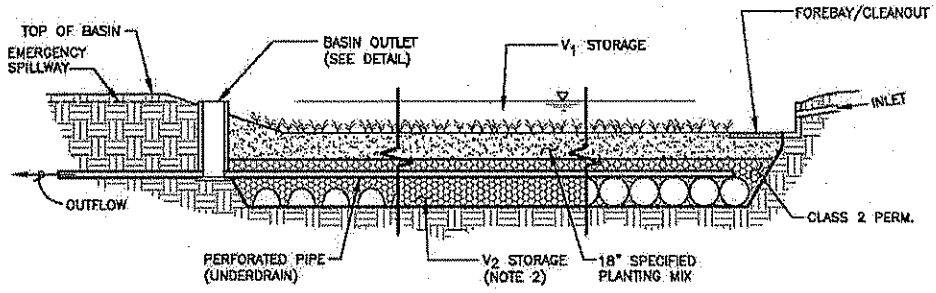
Bioretention facility configured as a parking median.
Note use of bollards in place of curbs, eliminating the need for curb cuts.

Design Checklist for Bioretention

- ☐ Volume or depth of surface reservoir meets or exceeds minimum.
- ☐ 18" depth "loamy sand" soil mix with minimum long-term percolation rate of 5"/hour.
- ☐ Area of soil mix meets or exceeds minimum.
- ☐ Perforated pipe underdrain bedded in "Class 2 perm" with connection and sufficient head to storm drain or discharge point (except in "A" or "B" soils).
- ☐ No filter fabric.
- ☐ Underdrain has a clean-out port consisting of a vertical, rigid, non-perforated PVC pipe, with a minimum diameter of 6 inches and a watertight cap.
- ☐ Location and footprint of facility are shown on site plan and landscaping plan.
- ☐ Bioretention area is designed as a basin (level edges) or a series of basins, and grading plan is consistent with these elevations. If facility is designed as a swale, check dams are set so the lip of each dam is at least as high as the toe of the next upstream dam.
- ☐ Inlets are 12" wide, have 4"-6" reveal and an apron or other provision to prevent blockage when vegetation grows in, and energy dissipation as needed.
- ☐ Overflow connected to a downstream storm drain or approved discharge point.
- ☐ Emergency spillage will be safely conveyed overland.
- ☐ Plantings are suitable to the climate and a well-drained soil.
- ☐ Irrigation system with connection to water supply.
- ☐ Vaults, utility boxes, and light standards are located outside the minimum soil mix surface area.
- ☐ When excavating, avoid smearing of the soils on bottom and side slopes. Minimize compaction of native soils and "rip" soils if clayey and/or compacted. Protect the area from construction site runoff.



PLAN VIEW
NOT TO SCALE

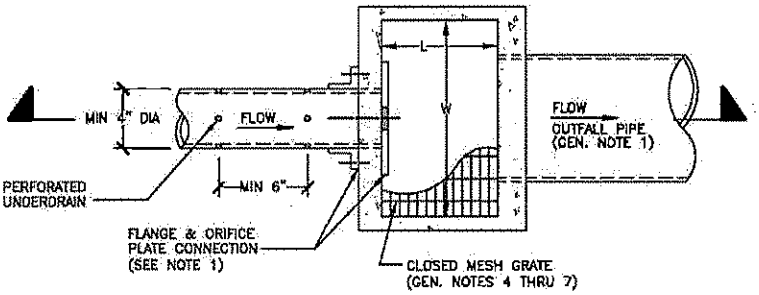


A SECTION
NOT TO SCALE

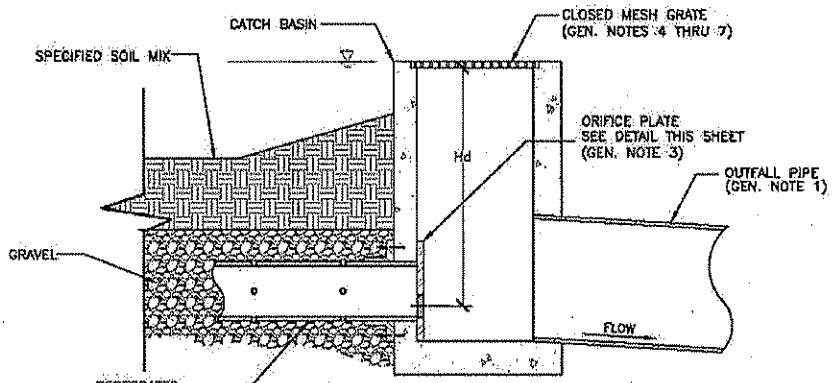
NOTE

1. SURFACE AREA LIMIT DETERMINED BY EXTENT OF SPECIFIED PLANTING MIX, WHICH IS GOVERNED BY THE OUTLET SPILL ELEVATION. FOR REQUIRED SURFACE AREA REFER TO THE FACTORS AND EQUATIONS IN THE STORMWATER C.3 GUIDEBOOK.
2. V_2 STORAGE ACCOMPLISHED WITH INFILTRATION ARCHES, PERFORATED PIPES, CLASS 2 PERM OR OTHER AT THE DESIGNERS DISCRETION.

Bioretention Facility

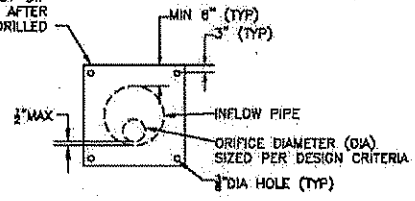


PLAN
N.T.S.



SECTION
N.T.S.

ORIFICE PLATE: MIN SQUARE DIMENSIONS 1.0 FT GREATER THAN PIPE DIA. HOT-DIP GALVANIZED PLATE AFTER HOLES HAVE BEEN DRILLED



FLOW CONTROL ORIFICE PLATE

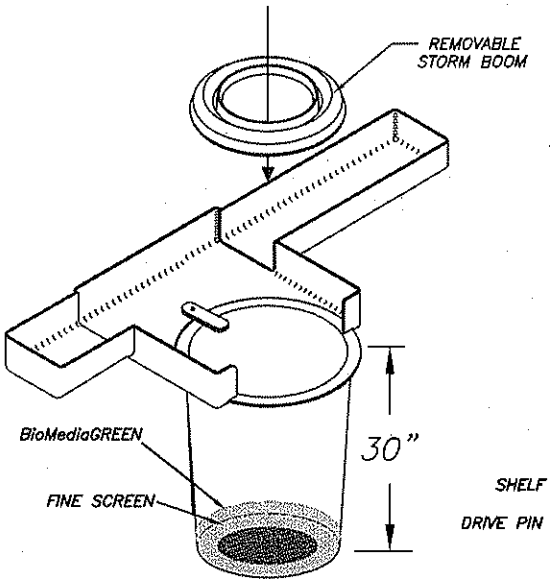
NOTE

1. ORIFICE PLATE & FLANGE CONNECTION TO CONCRETE SHALL BE FITTED WITH 30 DUROMETER NEOPRENE RING.

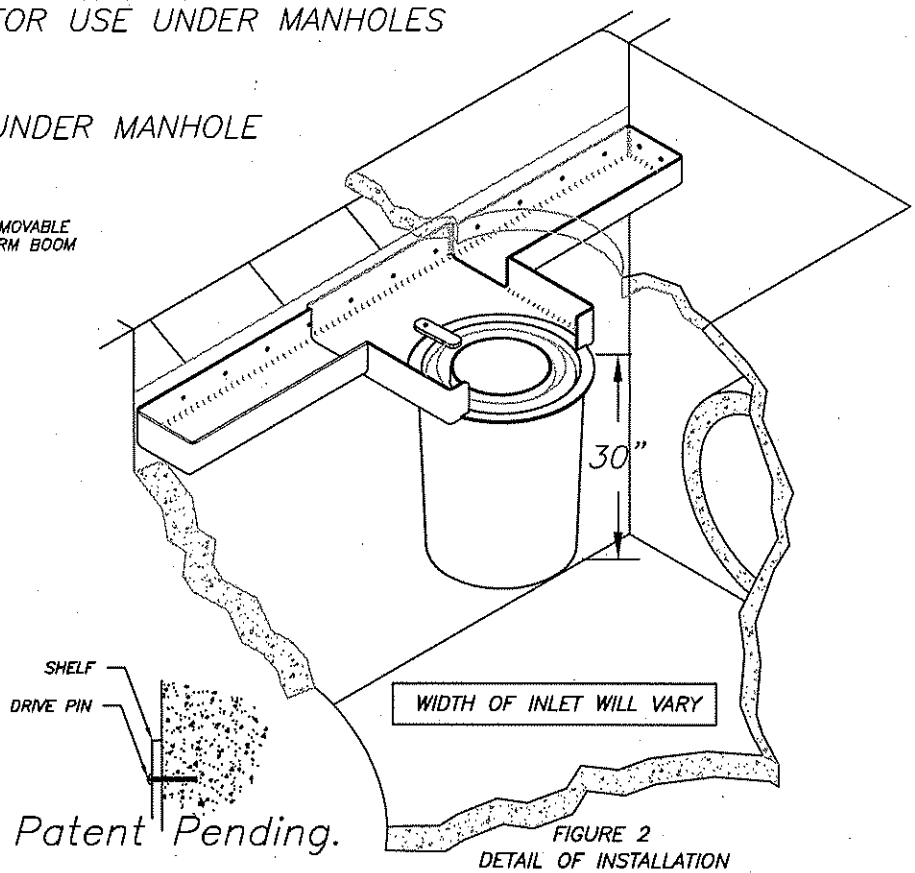
Bioretention Facility Outlet Detail - A

ENVIRO–SAFE HIGH CAPACITY MEDIA FILTER ROUND CURB INLET BASKET SYSTEM FOR USE UNDER MANHOLES

ROUND GISB FOR MOUNTING UNDER MANHOLE



DETAIL OF PARTS
FIGURE 1



Patent Pending.

FIGURE 2
DETAIL OF INSTALLATION

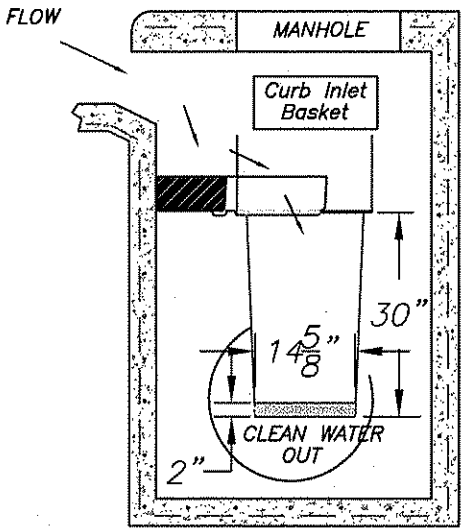


FIGURE 3
DETAIL OF PROCESS

FLOW RATES per Basket				
$Q=SO*c_d*A\sqrt{2*g*h}$		c_d = Coefficient of Discharge = .67		
	SO	A(ft^2)	h (in)	Q ($\frac{ft^3}{s}$)
BioMediaGREEN		1.06	2.0	0.212

BioMediaGREEN THIRD PARTY TESTED REMOVAL EFFICIENCIES

TPH (HYDROCARBONS) – 99% – Woves Environmental
FINE TSS – 83.4% – Woves Environmental (SI–Co–SI 106)
DISSOLVED METALS – 52% to 98% – Woves Environmental
DISSOLVED PHOSPHORUS – 62% – Woves Environmental
BACTERIA/FECAL COLIFORM – 65% – Woves Environmental

REMOVABLE BASKET CATCHES EVERYTHING AND MAY BE REMOVED THROUGH MANHOLE WITHOUT ENTRY.

5 YEAR MANUFACTURERS WARRANTY

PATENTED

ALL FILTER SCREENS ARE STAINLESS STEEL

NOTES:

1. SHELF SYSTEM PROVIDES FOR ENTIRE COVERAGE OF INLET OPENING SO TO DIVERT ALL FLOW TO BASKET.
2. SHELF SYSTEM MANUFACTURED FROM MARINE GRADE FIBERGLASS,GEL COATED FOR UV PROTECTION.
3. SHELF SYSTEM ATTACHED TO THE CATCH BASIN WITH NON–CORROSIVE HARDWARE.
4. FILTRATION BASKET STRUCTURE MANUFACTURED OF MARINE GRADE FIBERGLASS,GEL COATED FOR UV PROTECTION.
5. FILTRATION BASKET FINE SCREEN AND COARSE CONTAINMENT SCREEN MANUFACTURED FROM STAINLESS STEEL.
6. FILTRATION BASKET HOLDS BOOM OF ABSORBENT MEDIA TO CAPTURE HYDROCARBONS. BOOM IS EASILY REPLACED WITHOUT REMOVING MOUNTING HARDWARE.
7. FILTRATION BASKET LOCATION IS DIRECTLY UNDER MANHOLE FOR EASY MAINTENANCE.

SUNTREE QUALITY PRODUCTS ARE BUILT FOR EASY CLEANING AND ARE DESIGNED TO BE PERMANENT INFRASTRUCTURE AND SHOULD LAST FOR DECADES.

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760–433–7640 FAX:760–433–3176
Email: info@bioclean environmental.net

CURB INLET BASKET SYSTEM

DATE: 04/12/04 | SCALE:SF = 15

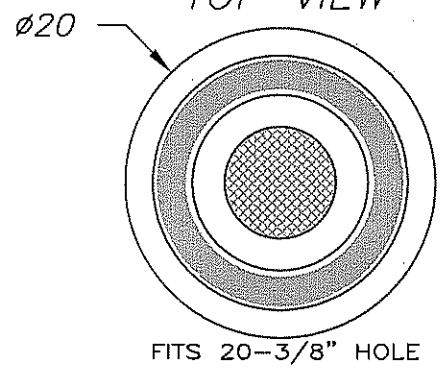
DRAFTER: N.R.B. | UNITS =INCHES

PROJECT:

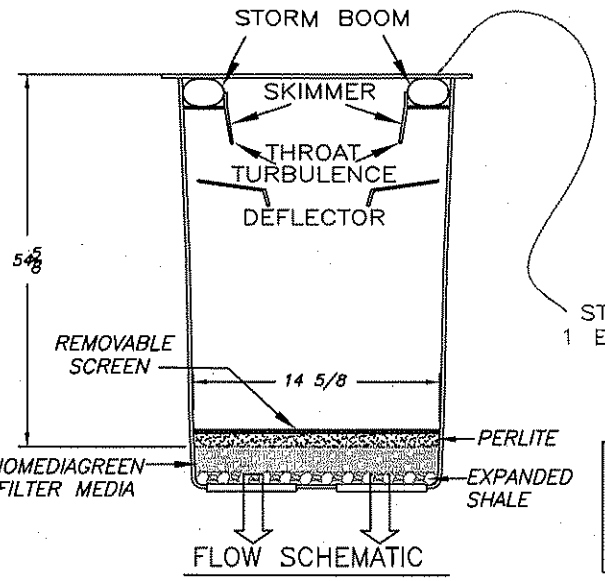
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:

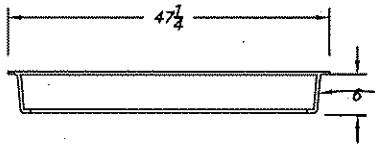
ENVIRO-SAFE HIGH CAPACITY MEDIA FILTER ROUND CURB INLET BASKET SYSTEM FOR USE UNDER MANHOLES

TOP VIEW



FLOW RATES per Basket				
$Q=SO*c_d*A\sqrt{2*g*h}$ $c_d = \frac{\text{Coefficient of}}{\text{Discharge}} = .67$				
	SO	$A(ft^2)$	h (in)	$Q\ (\frac{h^3}{s})$
FILTER PACK		1.06	2	.212

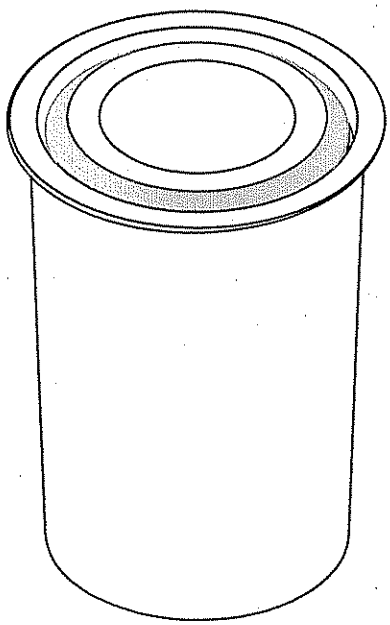


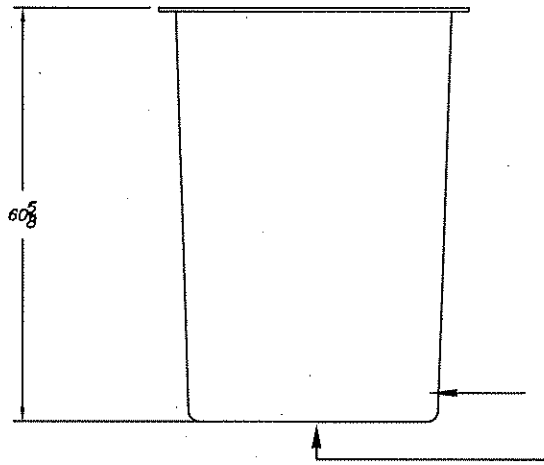


extension for tapered manhole lid with center drop

FIGURE 2
DETAIL OF INSTALLATION

REMOVE MANHOLE
INSERT GISB
REINSTALL MANHOLE





SIDE VIEW

5 YEAR MANUFACTURERS WARRANTY

ALL FILTER SCREENS ARE STAINLESS STEEL

BOX MANUFACTURED FROM MARINE GRADE FIBERGLASS & GEL COATED FOR UV PROTECTION

PATENTED

SUNTREE QUALITY PRODUCTS ARE BUILT FOR EASY CLEANING AND ARE DESIGNED TO BE PERMANENT INFRASTRUCTURE AND SHOULD LAST FOR DECADES.

BioMediaGREEN THIRD PARTY TESTED REMOVAL EFFICIENCIES

TPH (HYDROCARBONS) – 99% – Waves Environmental
FINE TSS – 85.4% – Waves Environmental (Sil-Ca-Sil 106)
DISSOLVED METALS – 52% to 98% – Waves Environmental
DISSOLVED PHOSPHORUS – 69% – Waves Environmental
BACTERIA/FECAL COLIFORM – 68% – Waves Enviornmental

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Email: info@bioceanenvironmental.net

DATE: 01/11/05	SCALE: SF = 15
DRAFTER: N.R.B.	UNITS = INCHES

PROJECT:

REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:

Hydraulic-Conductivity Flow Calculator

Calculates vertically downward flow rates given hydraulic conductivity, media thickness, and water head.

1. Enter the Hydraulic Conductivity (k) of the Filter Material: Value accepted.		1190	ft/day
2. Select the Units for the Hydraulic Conductivity entered in step 1: (Enter "M" for Metric or "E" for English units.)		E Selection accepted.	English
Hydraulic-Conductivity Conversions	Meters per Day:	363	m/day
	Meters per Hour:	15.1	m/hr
	Meters per Minute:	0.252	m/min
	Meters per Second:	0.0042	m/s
	Feet per Day:	1,190	ft/day
	Feet per Hour:	49.6	ft/hr
	Feet per Minute:	0.826	ft/min
	Feet per Second:	0.0138	ft/s
3. Enter the Thickness of the Filter Media in inches: Value accepted.		2	inches
4. Enter the Water Depth above the Media Surface: Value accepted.		27	inches
5. Enter the Horizontal Surface Area in square feet: Value accepted.		1.06	sqft
Calculated Flow Rates	Gallons per Minute:	**95.0**	**gpm**
	Cubic Feet per Second:	**0.212**	**cfs**
Optional Reynolds Number Check (Verifies Darcian Flow)			
6. Enter the D30 representative grain diameter for the porous media: Value accepted.		20	um
Calculated Reynolds Number (Should be less than approximately 10):		0.045	

Notes:

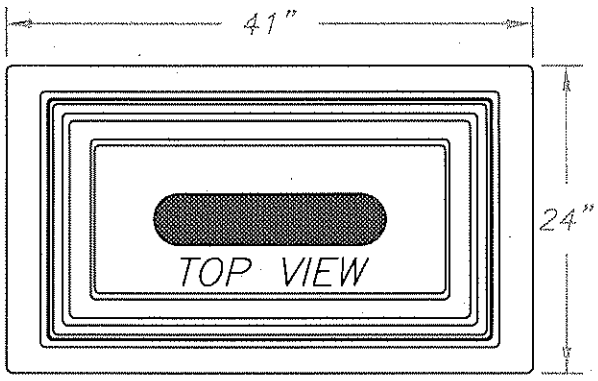
1. Values of hydraulic conductivity greater than 10,000 meters per day (and the equivalent in feet per day) will provide a warning that flow may be exceeding Darcian flow. This warning has no effect on calculator operation. Accordingly, check the Reynolds Number using the provided option.

2. Values of filter media thickness and water depth above media greater than 100 inches will provide a warning. As with several other warnings, this warning was provided to identify a possible incorrect value entry and does not affect the calculator operation.

3. Values of horizontal surface area that are greater than 10,000 square feet will provide a warning. Again, as with the other warnings, the warning was provided to identify possible incorrect value entries and does not affect calculator operation.

4. The D30 representative grain diameter (often stated d_{30}) is the grain diameter that allows 30 percent passing as determined by performing a sieve analysis.

Part # GISB MEDIA FILTER–24–41–25



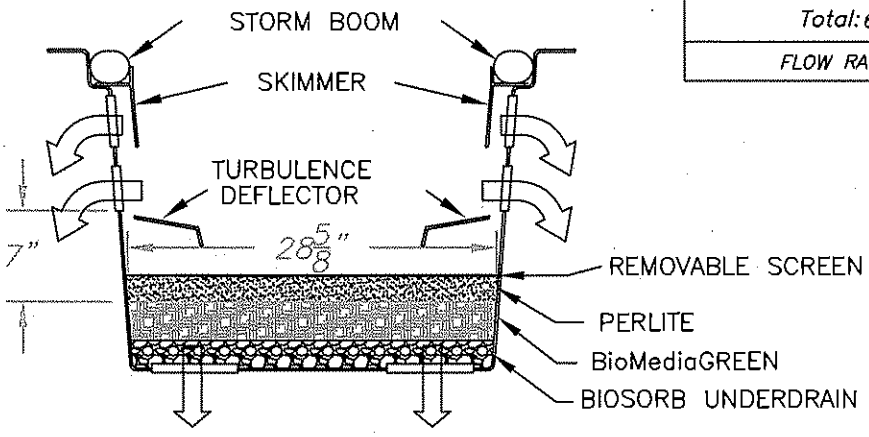
Flow Specifications

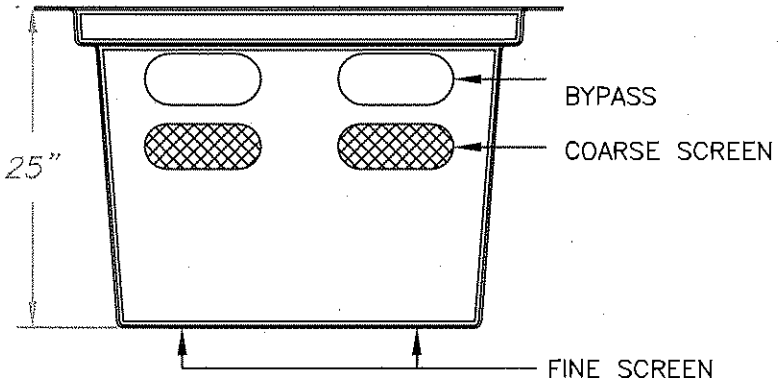
Description of filter opening	Percent Open (Based on Screen Dimensions)	Total Square Inches per Unit	Square Inches of Total Unobstructed Openings	Flow Rate (Cubic Feet per Second)
Skimmer protected By–Pass	100%	243.4	243.4	10.0 cfs
Coarse Screen 3/4" x 1–3/4" stainless steel flattened expanded	62%	215.2	133.4	6.4 cfs
PERLITE (granular) / BioMediaGREEN (porous blocks)	40% / 80%	354	N/A	50.7 gpm

SCREEN TREATED FLOW RATE	MEDIA TREATED FLOW RATE
Total: 6.4 cfs	Total: 50.7 gpm ≅ 0.14 cfs

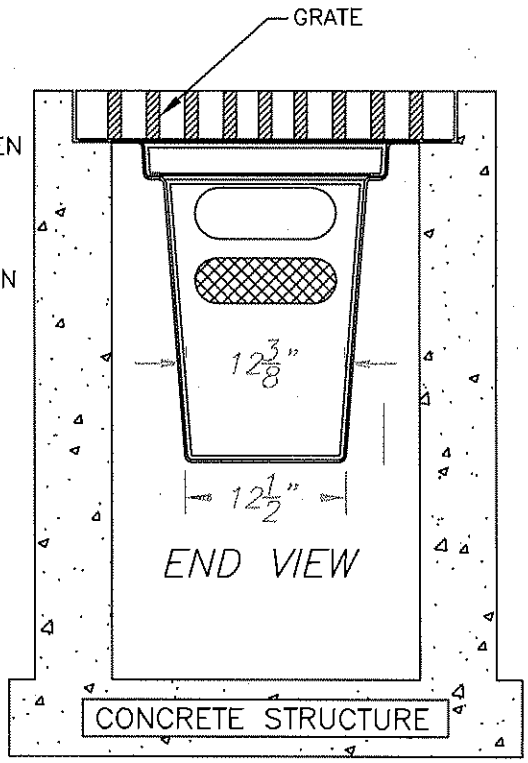
FLOW RATES BASED ON UNOBSTRUCTED OPENINGS

FLOW SCHEMATIC





SIDE VIEW



BioMediaGREEN REMOVAL EFFICIENCIES	
Total Suspended Solids "Sil-Co-Sil 106"	85%
Total Phosphorus	69%
Ortho Phosophorus	41%
Dissolved Copper	79%
Dissolved Lead	98%
Dissolved Zinc	78%
Fecal Coliform Bacteria	68%
TPH	99%

BOX MANUFACTURED FROM MARINE GRADE FIBERGLASS & GEL COATED FOR UV PROTECTION

5 YEAR MANUFACTURERS WARRANTY

PATENTED

ALL FILTER SCREENS ARE STAINLESS STEEL

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GRATE INLET SKIMMER BOX FOR MEDIA FILTER TYPE CATCH BASIN INSERT

DATE: 04/12/04 | SCALE:SF = 15

DRAFTER: N.R.B. | UNITS =INCHES

PROJECT:

REVISIONS: DATE:

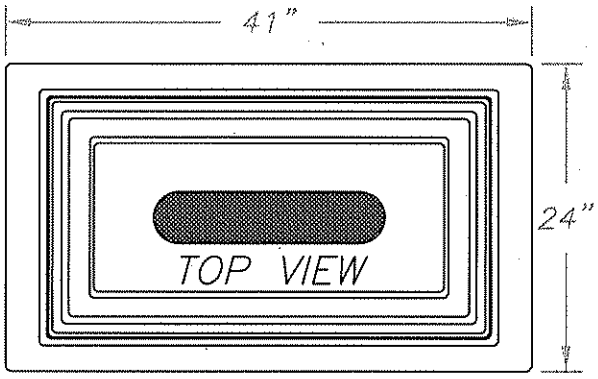
REVISIONS: DATE:

REVISIONS: DATE:

REVISIONS: DATE:

REVISIONS: DATE:

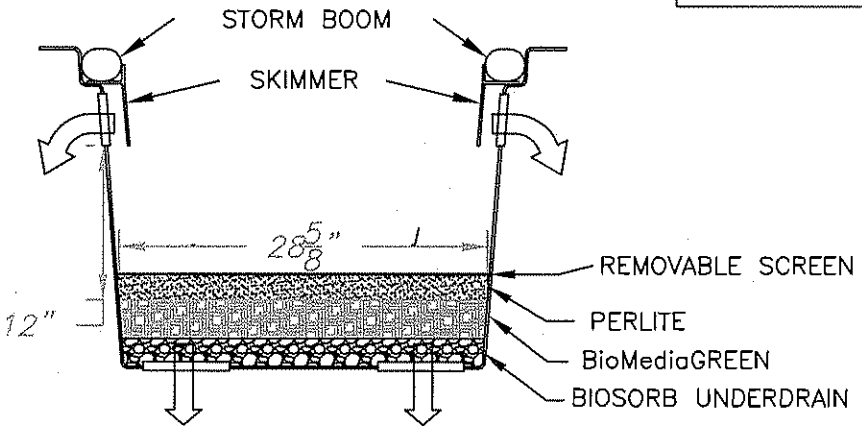
Part # GISB MEDIA FILTER–24–41–25 HIGH FLOW

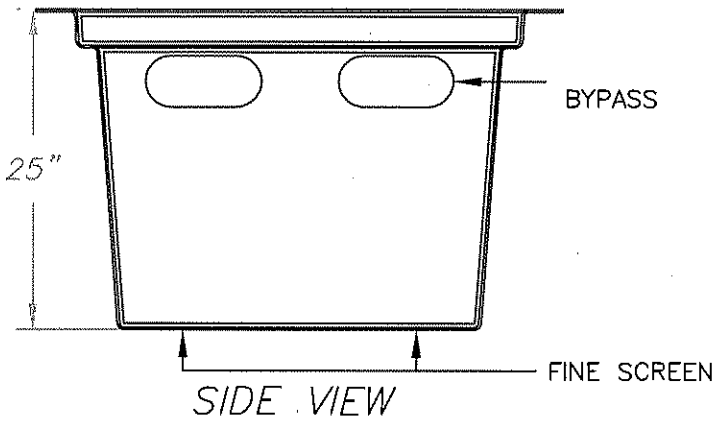


Flow Specifications

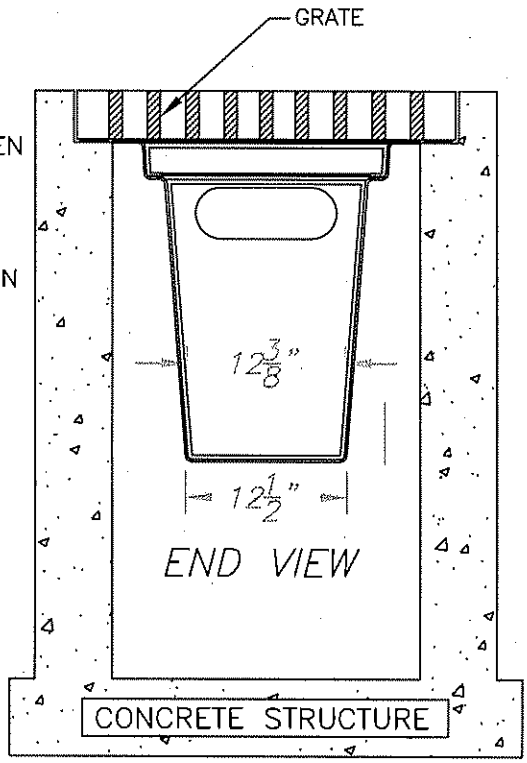
Description of filter opening	Percent Open (Based on Screen Dimensions)	Total Square Inches per Unit	Square Inches of Total Unobstructed Openings	Flow Rate (Cubic Feet per Second)
Skimmer protected By–Pass	100%	243.4	243.4	10.0 cfs
PERLITE (granular) / BioMediaGREEN (porous blocks)	40% / 80%	354	N/A	76 gpm
MEDIA TREATED FLOW RATE Total: 76 gpm ≃ 0.169 cfs				
FLOW RATES BASED ON UNOBSTRUCTED OPENINGS				

FLOW SCHEMATIC





SIDE VIEW



BioMediaGREEN REMOVAL EFFICIENCIES	
Total Suspended Solids "Sil–Co–Sil 106"	85%
Total Phosphorus	69%
Ortha Phosophorus	41%
Dissolved Copper	79%
Dissolved Lead	98%
Dissolved Zinc	78%
Fecal Coliform Bacteria	68%
TPH	99%

BOX MANUFACTURED FROM MARINE GRADE FIBERGLASS & GEL COATED FOR UV PROTECTION

5 YEAR MANUFACTURERS WARRANTY

PATENTED

ALL FILTER SCREENS ARE STAINLESS STEEL

SUNTREE QUALITY PRODUCTS ARE BUILT FOR EASY CLEANING AND ARE DESIGNED TO BE PERMANENT INFRASTRUCTURE AND SHOULD LAST FOR DECADES.

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GRATE INLET SKIMMER BOX FOR MEDIA FILTER TYPE CATCH BASIN INSERT

DATE: 04/12/04 | SCALE:SF = 15

DRAFTER: N.R.B. | UNITS =INCHES

PROJECT:	
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:

APPENDIX E

Summary of HMP Requirements

And

San Diego BMP Sizing Calculator Results

J-16325
Balboa Park Plaza
September 30, 2011

Summary - Hydromodification Management Plan (HMP) Requirements

Drainage Basin #	Drainage Node # at Point of Interest	Project Condition	Tributary Area (acres)	Impervious Area (acres)	% Impervious	Peak Flow Rates (cfs)	Results [1, 2, 3, 4]
100	120	Pre-project	7.1	0.6	8.3%	12.3	HMP Required
	120	Post-project	6.9	0.8	11.4%	11.1	
150	155	Pre-project	5.0	3.8	75.2%	15.7	HMP Exempt
	155	Post-project	5.0	3.8	75.2%	15.7	
200	220	Pre-project	22.6	11.3	50.2%	53.6	HMP Exempt
	220	Post-project	22.8	11.3	49.7%	52.7	
300 + 400	340 & 450	Pre-project	11.4	5.6	49.2%	23.3	HMP Exempt
	340 & 450	Post-project	11.5	4.0	34.5%	18.4	
500	510	Pre-project	3.2	1.4	45.0%	5.7	HMP Exempt
	510	Post-project	3.1	1.4	44.8%	5.5	

Note:
1. HMP Required - The project is expected to increase the impervious area for Drainage Basin 100 due to the proposed vehicular bypass bridge. A hydromodification management best management practice (BMP) will be implemented for Basin 100. Refer to Hydromodification Management Plan (HMP) report prepared for the project.
2. HMP Exempt - Per Section 4.5.1 of the City of San Diego Storm Water Standards Manual (Page 4-18 thru 4-19), the project may be exempt from HMP criteria if the proposed project does not increase the impervious area or peak flows to any discharge location.
3. For additional backup to impervious areas, refer to weighted runoff coefficient calculations and the Drainage Study Maps (pre-project and post-project) in the Drainage Study.
4. For additional backup to peak flow rates, refer to Appendices A, B, and E for analyses and hydrologic summary and the Drainage Study Maps (pre-project & post-project).

Basin 100

Project Summary

Project Name	Balboa Park Plaza
Project Applicant	
Jurisdiction	City of San Diego
Parcel (APN)	
Hydrologic Unit	Pueblo San Diego

Compliance Basin Summary

Basin Name:	Basin 100
Receiving Water:	Bridge Low Point
Rainfall Basin	Lindbergh Field
Mean Annual Precipitation (inches)	10.2
Project Basin Area (acres):	0.50
Watershed Area (acres):	0.00
SCCWRP Lateral Channel Susceptiblity (H, M, L):	
SCCWRP Vertifical Channel Susceptiblity (H, M, L):	
Overall Channel Susceptibility (H, M, L):	HIGH
Lower Flow Threshold (% of 2-Year Flow):	0.1

Drainage Management Area Summary

ID	Type	BMP ID	Description	Area (ac)	Pre-Project Cover	Post Surface Type	Drainage Soil	Slope
9468	Drains to LID	BMP 1	Node 105.1 - Paved Area (Ex. Impervious-Flat)	0.08	Impervious (Pre)	Concrete or asphalt	Type D (high runoff - clay soi...	Flat - slope (less ...
10946	Drains to LID	BMP 1	Node 105.2 - Paved Area (Ex. Pervious-Steep)	0.35	Pervious (Pre)	Concrete or asphalt	Type D (high runoff - clay soi...	Steep (greater 10%)
10949	Drains to LID	BMP 1	Node 105.3 - Paved Area (Ex. Pervious-Flat)	0.07	Pervious (Pre)	Concrete or asphalt	Type D (high runoff - clay soi...	Flat - slope (less ...

LID Facility Summary

BMP ID	Type	Description	Plan Area (sqft)	Volume 1(cft)	Volume 2(cft)	Orifice Flow (cfs)	Orifice Size (inch)
BMP 1	Bioretention + Cistern	Cistern to Bioretention (to determine required HMP volume)	365	3476	0.00	0.009	0.4

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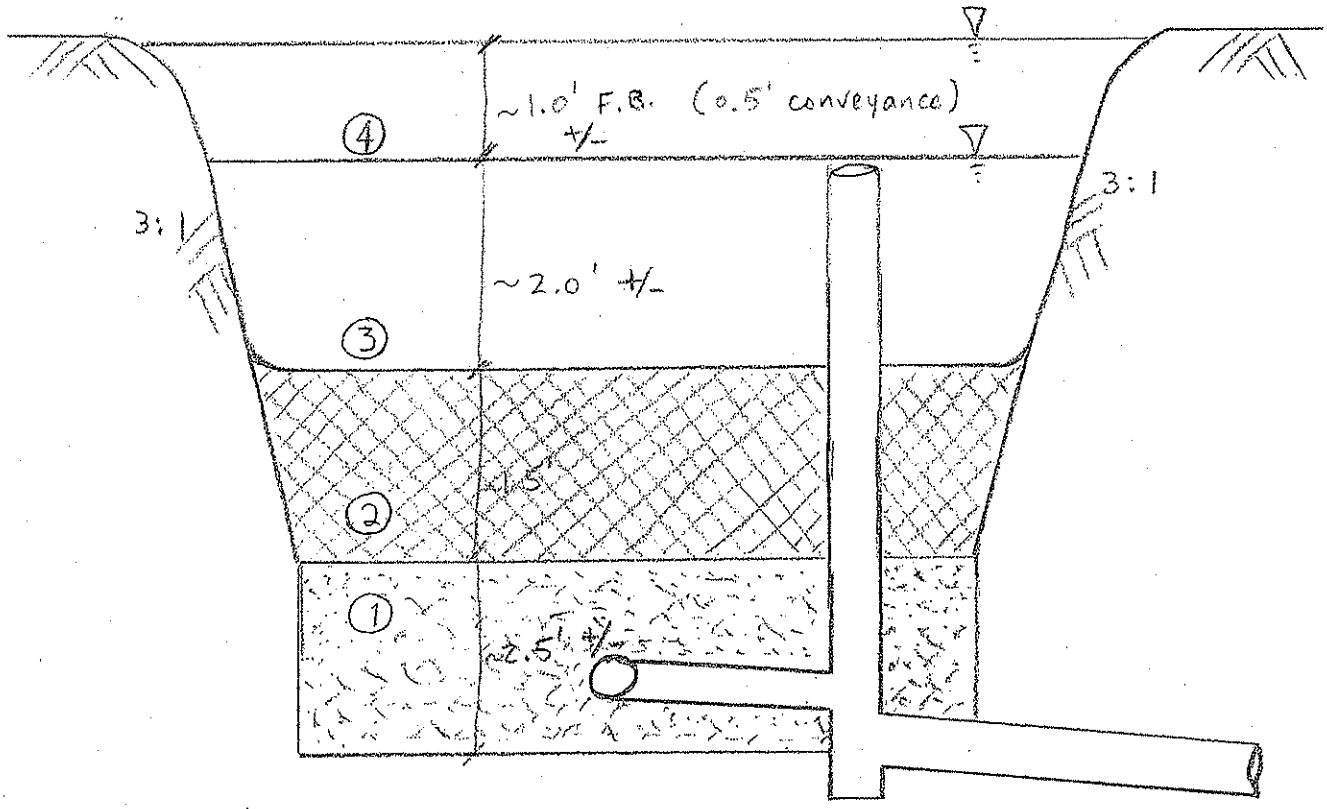
Date 10/3/11
Job No. 16325
Page 1 of
Done By
Checked By

Bioretention Basin Cross-section

for

Basin 100
(HMP / WQ)



(Not to Scale)

Legend:

1- Permeable base layer with subdrain.

2- 18" amended soil layer.

3- Surface ponding.

4- Flood control and freeboard.

Note: HMP_{VOLUME} provided will occur within zone 1, 2, & 3; with 40% voids in Zones 1 & 2.

$HMP_{VOL-PROVIDED} \geq HMP_{VOL-REQUIRED}$

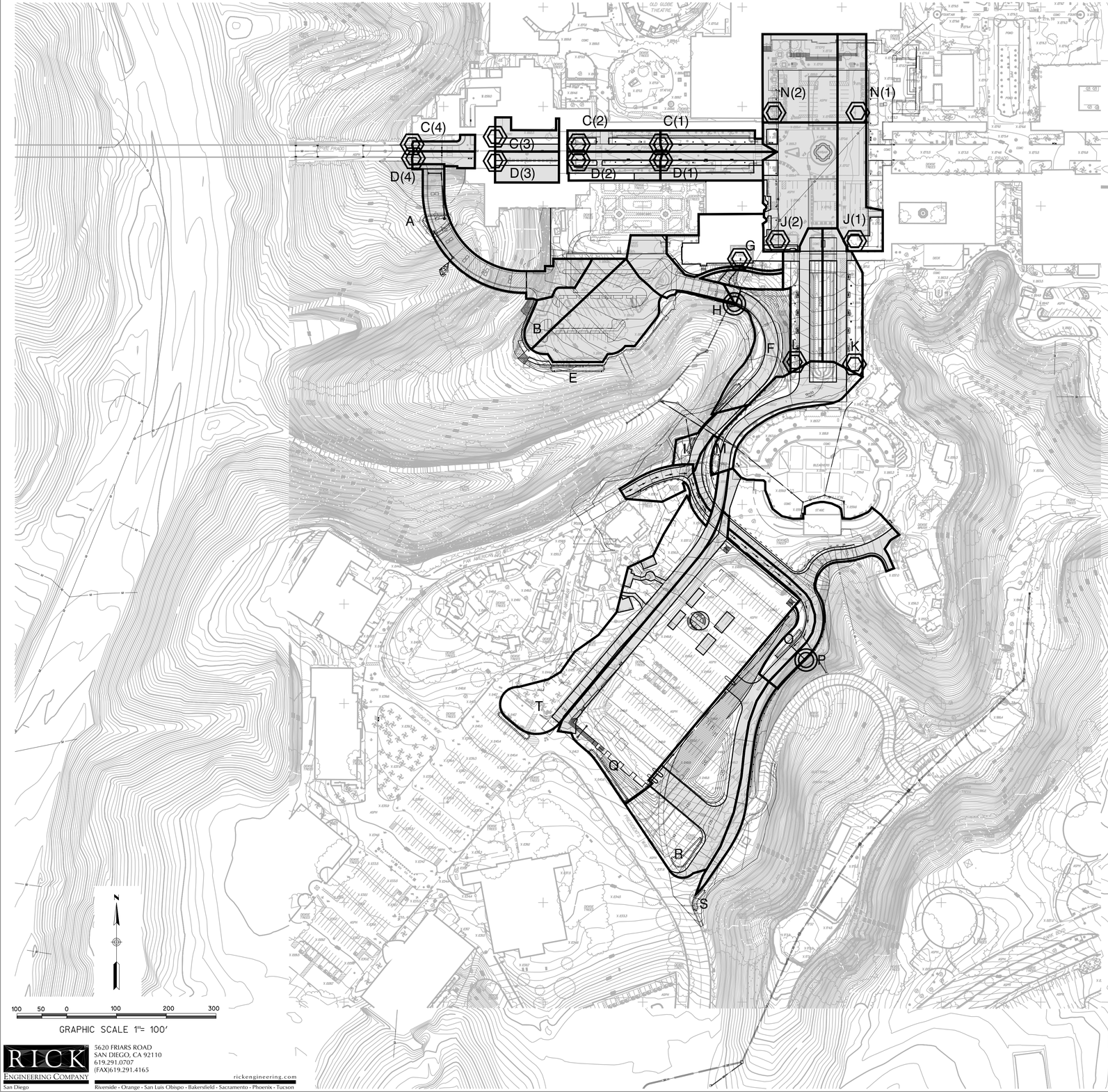
*See Attached for $HMP_{VOL-REQ'D}$

Compact Disc (CD):

Electronic Files for San Diego BMP Sizing Calculator

Map Pocket 1

Water Quality Technical Report Exhibit
for
Balboa Park Plaza



NOTE:

1. NON SHADED AREA WITHIN THE DMA BOUNDARIES REFLECT DMA AREA - PERVIOUS.

STORM WATER MANAGEMENT FEATURES

DRAINAGE MANAGEMENT AREA LEGEND:

PROPOSED BIORETENTION BASIN
(LOCATION A, B, E, F, I, M, O, Q, R, S, & T)

PROPOSED HIGH-RATE MEDIA FILTER - BIOCLEAN GRATE INLET BASKET WITH BIOMEDIA GREEN
(LOCATION C(1), C(2), C(3), C(4), D(1), D(2), D(3), D(4), G, J(1), J(2), K, L, N(1) & N(2))

PROPOSED HIGH-RATE MEDIA FILTER - BIOCLEAN CURB INLET BASKET WITH BIOMEDIA GREEN
(LOCATION H & P)

DMA AREA - IMPERVIOUS

DMA BOUNDARY TO BMP LOCATION

WATER QUALITY TECHNICA REPORT EXHIBIT FOR BALBOA PARK PLAZA

Date: April 18, 2011
Revised: October 5, 2011

J-16325

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Map Pocket 2

Hydromodification Management Plan Exhibit
for
Balboa Park Plaza

NOTES

HMP ANALYSES WERE PERFORMED USING SAN DIEGO BMP SIZING CALCULATOR BASED ON A PRELIMINARY SITE PLAN LAYOUT. ALL OTHER DRAINAGE BASINS ARE HMP EXEMPT, REFER TO REPORT FOR FURTHER EXPLANATION.

HMP LEGEND

Symbol	Description
(solid line)	TRIBUTARY BOUNDARY TO HYDROMODIFICATION MANAGEMENT / WATER QUALITY TREATMENT CONTROL BEST MANAGEMENT PRACTICE (BMP)
(dashed line)	SUB BASIN BOUNDARY FOR EACH DMA
(dotted rectangle)	LOCATION OF HYDROMODIFICATION MANAGEMENT / WATER QUALITY TREATMENT CONTROL BMP
0.50 AC.	TOTAL TRIBUTARY AREA TO HYDROMODIFICATION MANAGEMENT / WATER QUALITY TREATMENT CONTROL BEST MANAGEMENT PRACTICE (BMP)
(double circle)	POINT OF COMPLIANCE (POC)

SAN DIEGO BMP SIZING CALCULATOR INPUT DATA

- DESIGN GOAL: TREATMENT + FLOW CONTROL (USE RESULT FOR FLOW CONTROL ONLY)
- RAINFALL BASIN: LINDBERGH FIELD
- POINT OF COMPLIANCE (POC): OUTFALL TO EXISTING CANYON
- DRAINAGE SOIL (HYDROLOGIC SOIL TYPE): D
- POST SURFACE: VARIES (SEE EXHIBIT)
- PRE PROJECT COVER: VARIES (SEE EXHIBIT)
- PRE-PROJECT SLOPE: VARIES (SEE EXHIBIT)

30 15 0 30 60 90

GRAPHIC SCALE 1"= 30'

HYDROMODIFICATION MANAGEMENT PLAN EXHIBIT FOR BALBOA PARK PLAZA (BASIN 100)

J-16325 DATE: OCTOBER 5, 2011

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