Appendix D

Hydrology/WQMP

PRELIMINARY DRAINAGE STUDY

HOME2 HOTEL

SANTEE, CA

PREPARED FOR:

EXCEL HOTEL GROUP

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Date Prepared: July 8, 2022

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1.0 INTRODUCTION

The purpose of this study is to determine the anticipated runoff generated from the project site in pre-project and post-project conditions for the Home2 Hotel project located near the intersection of Riverview Parkway and Town Center Parkway, in the City of Santee. This report provides calculations to support the proposed development and conditional-use permit and to demonstrate no noticeable adverse impacts are anticipated to downstream receiving bodies or storm drain facilities as a result of the proposed development.

1.1 Location

The project site is located northwest of the intersection of Riverview Parkway and Town Center Parkway, on the south side of Town Center Parkway adjacent to the existing shopping center development in the City of Santee, County of San Diego, State of California.

1.1.1 Vicinity Map

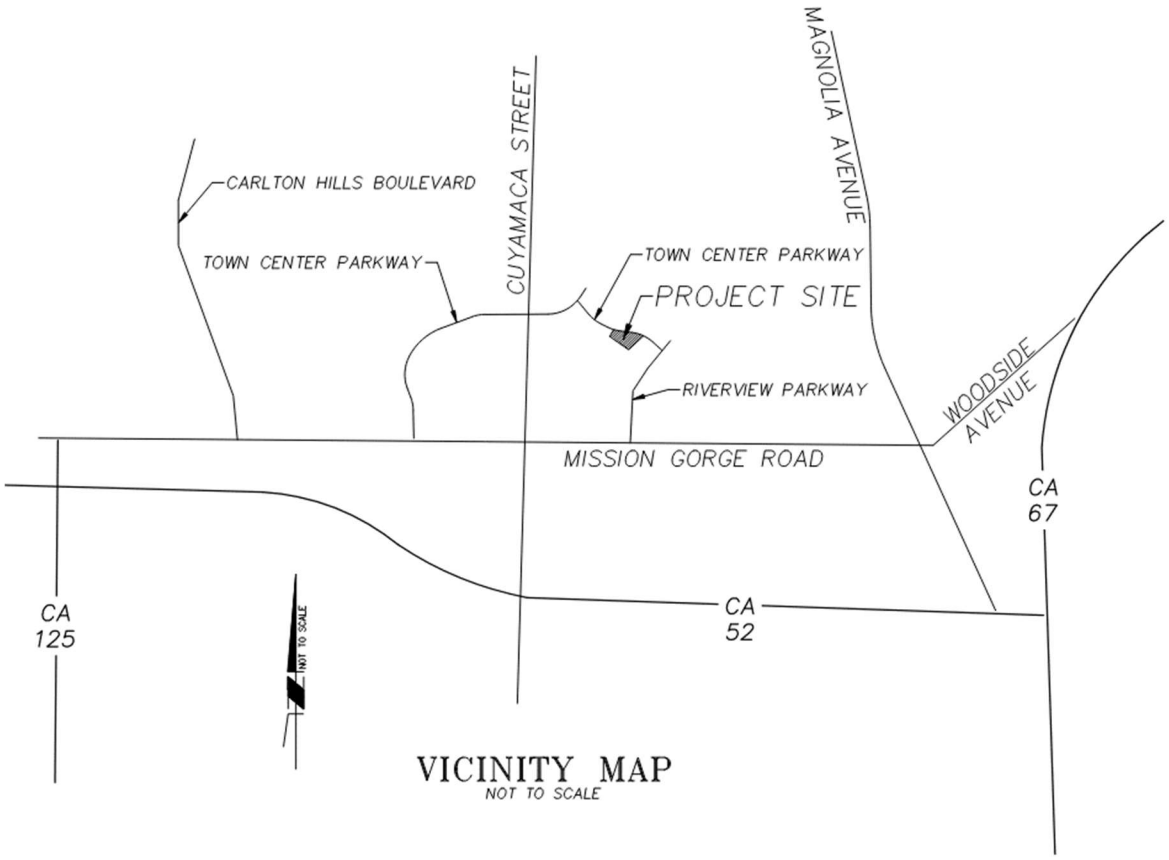

Figure 1-1: Vicinity map

2.0 PROJECT DESCRIPTION

2.1 Pre-Project Site Conditions

Under the existing conditions, the site is an existing asphalt-concrete parling lot, with raised planters dispersed throughout. The existing project site parcel is approximately 1.6 acres and largely falls within an overall drainage basin encompassing 2.7 acres. Runoff generally flows from north east to south west, via sheet flow across the existing parking area, and collected within a 3-foot-wide concrete ribbon gutter. The existing drainage basin is split into two subbasins, the east portion from Node 101 to Node 110 and the west basin from Node 121 to Node 130 (see pre-project hydrology map in Attachment 1).

Runoff from the eastern basin sheet flows from the southwest corner of the intersection of Town Center Parkway and Riverview Parkway, into the concrete ribbon gutter to the south. The ribbon gutter conveys runoff westerly, eventually discharging into an existing curb inlet located within the project site, near the eastern property line. The flow then enters an existing storm drain system that collects runoff from the overall shopping center area.

Runoff from the western subbasin follows a similar drainage pattern, draining from the northeast to the southwest and collecting within the existing ribbon gutter. The ribbon gutter conveys runoff westerly and then northerly until it is collected within the existing grated catch basin. The flow then enters the existing storm drain system.

2.2 Post-Project Site Conditions

The proposed development consists of the redevelopment of a portion of the overall parcel with a mid-rise hotel building and adjacent site improvements. Under the proposed conditions, the overall runoff pattern will not significantly change from pre-project conditions. Off-site run-on from the easter subbasin will continue to sheet flow from the existing parking areas, and collect within the existing ribbon gutter. The runoff will then collect within a proposed inlet within the project boundary, designed to isolate offsite runoff and drain into the same existing storm drain facility as pre-project conditions.

Prior to collecting within the existing storm drain, runoff generated from the proposed improvements within the eastern subbasin will be collected within water quality facilities proposed in the raised medians to treat the anticipated runoff.

Runoff from the western subbasin will also follow the general runoff pattern of pre-project conditions, draining from northeast to west. Runoff from the proposed improvements will be collected within water quality treatment facilities located within the proposed raised planters and collect into a proposed subgrade storm water system, eventually tying into the existing storm water system.

3.0 DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the Civil Engineer of Work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with current standards.

I understand that the check of the project design reports and calculations by the City of Santee is confined to review only and does not relieve me, as Engineer of Work, of my responsibilities for project design.

David Yeh, P.E. 62717, Exp. 6-30-2024 Date

4.0 METHOD OF ANALYSIS

Since the project area is less than 1 square mile, the study utilized the rational method, in accordance with the County of San Diego Hydrology Manual (County of San Diego, 2003). The following provides excerpts from the Hydrology Manual.

SECTION 3
RATIONAL METHOD AND MODIFIED RATIONAL METHOD

3.1 THE RATIONAL METHOD

The Rational Method (RM) is a mathematical formula used to determine the maximum runoff rate from a given rainfall. It has particular application in urban storm drainage, where it is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and small drainage structures. The RM is recommended for analyzing the runoff response from drainage areas up to approximately 1 square mile in size. It should not be used in instances where there is a junction of independent drainage systems or for drainage areas greater than approximately 1 square mile in size. In these instances, the Modified Rational Method (MRM) should be used for junctions of independent drainage systems in watersheds up to approximately 1 square mile in size (see Section 3.4); or the NRCS Hydrologic Method should be used for watersheds greater than approximately 1 square mile in size (see Section 4).

The RM can be applied using any design storm frequency (e.g., 100-year, 50-year, 10-year, etc.). The local agency determines the design storm frequency that must be used based on the type of project and specific local requirements. A discussion of design storm frequency is provided in Section 2.3 of this manual. A procedure has been developed that converts the 6-hour and 24-hour precipitation isopluvial map data to an Intensity-Duration curve that can be used for the rainfall intensity in the RM formula as shown in Figure 3-1. The RM is applicable to a 6-hour storm duration because the procedure uses Intensity-Duration Design Charts that are based on a 6-hour storm duration.

3.1.1 Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to

flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed as follows:

$$Q = C\ I\ A$$

Where: Q = peak discharge, in cubic feet per second (cfs)

C = runoff coefficient, proportion of the rainfall that runs off the surface (no units)

I = average rainfall intensity for a duration equal to the T_c for the area, in inches per hour (Note: If the computed T_c is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)

A = drainage area contributing to the design location, in acres Combining the units for the expression CIA yields:

$$\left(\frac{1\,\text{acre}\times\text{inch}}{\text{hour}}\right)\left(\frac{43{,}560\ \text{ft}^2}{\text{acre}}\right)\left(\frac{1\,\text{foot}}{12\,\text{inches}}\right)\left(\frac{1\,\text{hour}}{3{,}600\,\text{seconds}}\right) \Rightarrow 1.008\,\text{cfs}$$

For practical purposes the unit conversion coefficient difference of 0.8% can be ignored.

The RM formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

Unlike the MRM (discussed in Section 3.4) or the NRCS hydrologic method (discussed in Section 4), the RM does not create hydrographs and therefore does not add separate subarea hydrographs at collection points. Instead, the RM develops peak discharges in the main line by increasing the T_c as flow travels downstream.

Characteristics of, or assumptions inherent to, the RM are listed below:

The discharge flow rate resulting from any I is maximum when the I lasts as long as or longer than the T_c.

1. The storm frequency of peak discharges is the same as that of I for the given T_c.

2. The fraction of rainfall that becomes runoff (or the runoff coefficient, C) is independent of I or precipitation zone number (PZN) condition (PZN Condition is discussed in Section 4.1.2.4).

3. The peak rate of runoff is the only information produced by using the RM.

3.1.2 Runoff Coefficient

Table 3-1 lists the estimated runoff coefficients for urban areas. The concepts related to the runoff coefficient were evaluated in a report entitled *Evaluation, Rational Method "C" Values* (Hill, 2002) that was reviewed by the Hydrology Manual Committee. The Report is available at San Diego County Department of Public Works, Flood Control Section and on the San Diego County Department of Public Works web page.

The runoff coefficients are based on land use and soil type. Soil type can be determined from the soil type map provided in Appendix A. An appropriate runoff coefficient (C) for each type of land use in the subarea should be selected from this table and multiplied by the percentage of the total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient (Σ[CA]). Good engineering judgment should be used when applying the values presented in Table 3-1, as adjustments to these values may be appropriate based on site-specific characteristics. In any event, the impervious percentage (% Impervious) as given in the table, for any area, shall govern the selected value for C. The runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following formula:

$$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$$

Where: C_p = Pervious Coefficient Runoff Value for the soil type (shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious). Soil type can be determined from the soil type map provided in Appendix A.

The values in Table 3-1 are typical for most urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the local agency.

3.1.3 Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr) for a duration equal to the T_c for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_c calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration Design Chart (Figure 3-1). The 6-hour storm rainfall amount (P_6) and the 24-hour storm rainfall amount (P_{24}) for the selected storm frequency are also needed for calculation of I. P_6 and P_{24} can be read from the isopluvial maps provided in Appendix B. An Intensity-Duration Design Chart applicable to all areas within San Diego County is provided as Figure 3-1. Figure 3-2 provides an example of use of the Intensity-Duration Design Chart. Intensity can also be calculated using the following equation:

$$I = 7.44\ P_6\ D^{-0.645}$$

Where: P_6 = adjusted 6-hour storm rainfall amount (see discussion below) D = duration in minutes (use T_c)

Note: This equation applies only to the 6-hour storm rainfall amount (i.e., P_6 cannot be changed to P_{24} to calculate a 24-hour intensity using this equation).

The Intensity-Duration Design Chart and the equation are for the 6-hour storm rainfall amount. In general, P_6 for the selected frequency should be between 45% and 65% of P_{24} for the selected frequency. If P_6 is not within 45% to 65% of P_{24}, P_6 should be increased or decreased as necessary to meet this criteria. The isopluvial lines are based on precipitation gauge data. At the time that the isopluvial lines were created, the majority of precipitation gauges in San Diego County were read daily, and these readings yielded 24-hour precipitation data. Some 6-hour data were available from the few recording gauges distributed throughout the County at that time; however, some 6-hour data were extrapolated. Therefore, the 24-hour precipitation data for San Diego County are considered to be more reliable.

3.1.4 Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the drainage area to the point of interest. The T_c is composed of two components: initial time of concentration (T_i) and travel time (T_t). Methods of computation for T_i and T_t are discussed below. The T_i is the time required for runoff to travel across the surface of the most remote subarea in the study, or "initial subarea." Guidelines for designating the initial subarea are provided within the discussion of computation of T_i. The T_t is the time required for the runoff to flow in a watercourse (e.g., swale, channel, gutter, pipe) or series of watercourses from the initial subarea to the point of interest. For the RM, the T_c at any point within the drainage area is given by:

$$T_c = T_i + T_t$$

Methods of calculation differ for natural watersheds (nonurbanized) and for urban drainage systems. When analyzing storm drain systems, the designer must consider the possibility that an existing natural watershed may become urbanized during the useful life of the storm drain system. Future land uses must be used for T_c and runoff calculations, and can be determined from the local Community General Plan.

3.1.4.1 Initial Time of Concentration

The initial time of concentration is typically based on sheet flow at the upstream end of a drainage basin. The Overland Time of Flow (Figure 3-3) is approximated by an equation developed by the Federal Aviation Agency (FAA) for analyzing flow on runaways (FAA, 1970). The usual runway configuration consists of a crown, like most freeways, with sloping pavement that directs flow to either side of the runway. This type of flow is uniform in the direction perpendicular to the velocity and is very shallow. Since these depths are ¼ of an inch (more or less) in magnitude, the relative roughness is high. Some higher relative roughness values for overland flow are presented in Table 3.5 of the HEC-1 Flood Hydrograph Package User's Manual (USACE, 1990). a Tc calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).

5.0 HYDROLOGIC ANALYSIS CALCULATIONS AND RESULTS

5.1 Calculation Methods

Per the attached hydrological soil group map and the enlarged area encompassing the project site, the project site is situated on Type B soil as defined by the current County of San Diego Hydrology Manual and further supplemented with information from USDA's NRCS Web Soil Survey, found in Attachments 3 and 4.

Per the County of San Diego Hydrology Manual's table 3-1, based on soil type B and the site being fully developed with parking lots with minimal planters (approximately 90% impervious), the runoff coefficient used in all hydraulic calculations is **0.84** for all area in pre project conditions. Under post-project conditions, the existing AC parking area is to be redeveloped with a mid-rise hotel building and surrounding parking areas and other associated improvements. Overall, the percentage of impervious areas will decrease slightly in post project conditions, however a conservative estimate of 90% impervious was used. Therefore, under post-project conditions a runoff coefficient of **0.84** was used for all areas. This was then correlated to the proper land-use type based on the percent impervious listed in the Hydrology Manual.

The analysis was performed using Advanced Engineering Software, which has built-in capabilities to perform Modified Rational Method Calculations. The inputs included the subarea acreage, land-use, flow length, and representative elevations of the site. The program calculates the time of concentration and corresponding intensity to determine the peak flow rates. The user must also input a "code" value which signifies what type of hydrologic/hydraulic computation is to be performed. A summary of the specific codes is provided below in Table 5-1.

Table 5-1: AES Code Summary Table

Code Number	Function
0	Enter Comment
1	Confluence Analysis at Node
2	Initial Subarea Analysis
3	Pipe/Box/Culvert Traveltime (Computer Sized)
4	Pipe/Box/Culvert Traveltime (User Sized)
5	Open Channel Traveltime

6	Streetflow Analysis Through Subarea
7	User-Specified Hydrology Data at Node
8	Addition of Subarea Runoff To Main Stream
9	V-Gutter Flow Through Subarea
10	Copy Main-Stream Data onto A Memory Bank
11	Confluence A Memory Bank with The Main-Stream Memory
12	Clear A Memory Bank
13	Clear The Main Stream
14	Copy A Memory Bank onto The Main-Stream Memory
15	Hydrologic Data Bank Storage Functions
16	User-Specified Source Flow at A Node

5.2 Pre-Project Runoff Summary

The complete output files from the AES modified rational method analyses are provided in the attached appendices. A summary for the pre-project peak flow rate calculations is provided in Table 5-2.

Table 5-2: Pre-project hydrologic analysis summary

Node	Area (ac)	Flow Length (ft)	Tc (mins)	Intensity (in/hr)	Q (cfs)
110 (within ex 24" RCP)	1.3	375	4.6 (use 5)	6.6	7.2
115 (within ex A4 CO)	0.1	220	3.0 (use 5)	6.6	0.6
130	1.4	475	6.3	5.7	6.4

The pre-project hydrologic analysis was divided into two subbasins that drain into two catch basins. The eastern basin is collected within an existing curb inlet in the raised island near the eastern property line of the site. Runoff sheet flows from the existing parking lot, and is collected within the existing ribbon gutter, that drains into the curb inlet at Node 110.

The western basin also sheet flows from the northeast to south west, collecting within the concrete ribbon gutter. The ribbon gutter conveys runoff westerly, and then north to the existing grate inlet at Node 130. See Attachment 5 for the full AES analysis output.

5.3 Post-Project Runoff Summary

The complete output from the AES modified rational method analysis for the post-project hydrologic analysis is provided as an appendix to this report. A summary of the post-project calculated peak flow rates are provided in Table 5-3.

Table 5-3: Post-project hydrologic analysis summary

Node	Area (ac)	Flow Length (ft)	Tc (mins)	Intensity (in/hr)	Q (cfs)
110	1.8	615	8.8	4.6	7.4
108 (within ex. 24" RCP)	2.8	695	9.0	4.5	11.0
115 (within ex A4 CO)	0.1	220	3.0 (use 5)	6.6	0.6
119 (Curb inlet to MWS)	0.8	385	7.5	4.7	3.2
125 (Curb inlet to MWS)	0.5	188	4.6 (use 5)	6.6	3.0
133 (Curb cut to biofiltration)	0.4	155	4.5 (use 5)	6.6	2.3

For the post-project hydrologic analysis, the entire site drains into the existing 24-inch RCP storm drain running easterly, from the project through the existing shopping center. Off-site run on (5.3 cfs) from the area east of the project boundary, is collected within a proposed inlet to prevent co-mingling of on-site and offsite flows.

The remainder of the on-site runoff is directed into water quality BMPs prior to collecting within an underground storm drain system that ties into the exiting 24-inch RCP storm drain. The general flow pattern is retained, with runoff flowing in a westerly direction.

5.4 Peak Flow Comparison

The comparison of pre-project and post-project peak flow rates are provided in Table 5-4. The proposed project is anticipated to result in an overall decrease in peak flow rate for the entire project site due to increased flow routing, increased pervious area, and the conveyance of storm water into

proposed water quality BMPs. The on-site routing into the existing storm drain system, at the east of the project, is necessary to accommodate depths required for structural BMPs for storm water quality. This routing temporarily increases area draining to this system, but ultimately the drainage basin area does not increase.

Table 5-4: Peak Flow Comparison Summary			
Node	Pre-Project Flow (cfs)	Post-Project Flow (cfs)	Increase in Flow (cfs)
110 (108 Post Flow in ex 24" RCP)	7.2	11.0	3.8
130	6.4	N/A	-6.4
115	0.6	0.6	0

6.0 HYDRAULIC ANALYSIS

Hydraulic analyses were performed on the existing and proposed storm drain facilities in order to determine the adequacy to handle the anticipated peak flows from the 100-year storm event.

6.1 Existing 24-inch RCP SD

For this preliminary drainage study, normal depth Manning's equation calculations were performed to show the system has adequate capacity to convey anticipated flow rates. The Hydraulic Toolbox v5.1, developed by the FHWA, was utilized to perform these calculations.

Under pre-project conditions the anticipated flow depth for the peak flow rates associated with the 100-year storm event is 0.95 feet (d/D=0.48).

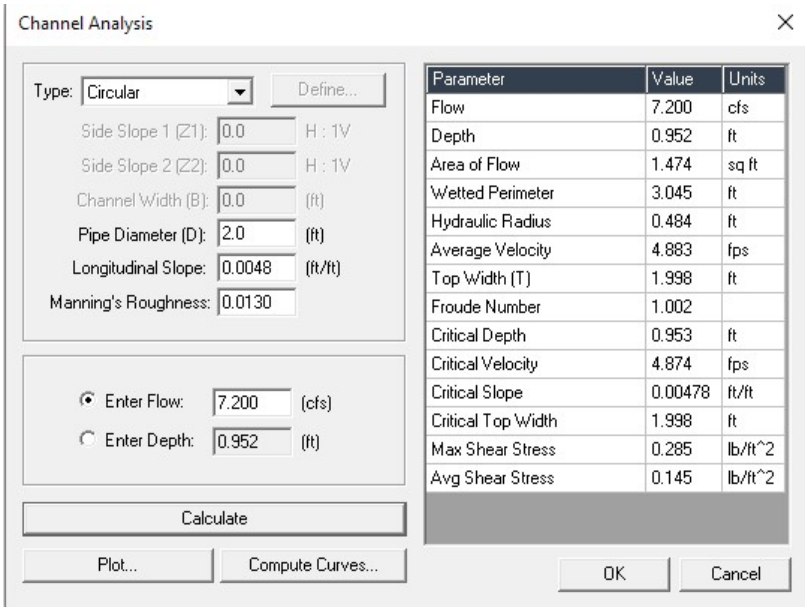

Figure 6-1: Pre-project hydraulic analysis existing 24" RCP SD

Under post-project conditions, a temporary increase in flow is anticipated in the existing 24" RCP storm drain.

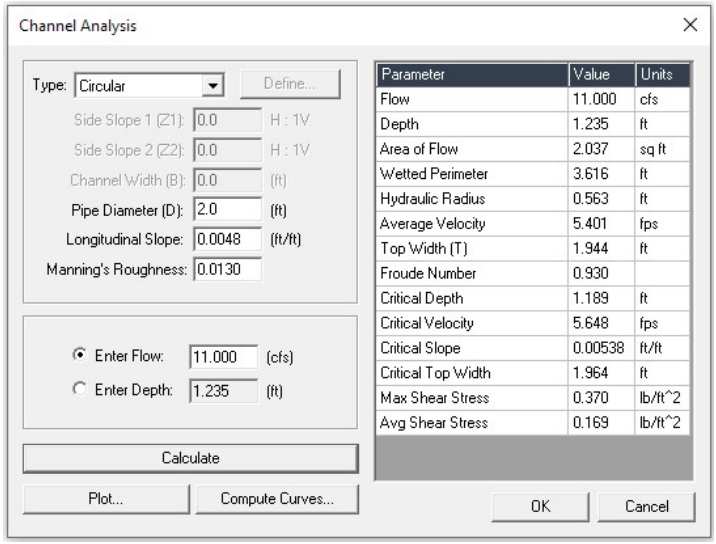

Figure 6-2: Post-project hydraulic analysis existing 24" RCP SD

Based on the hydraulic analysis, the existing system has adequate capacity to convey the post-project flow rates with a depth of flow of 1.2 feet (d/D=0.6).

6.2 Proposed 18" Storm Drain

The analysis on the proposed 18-inch storm drain reflects the maximum flow rate experienced by the system, at node 110.

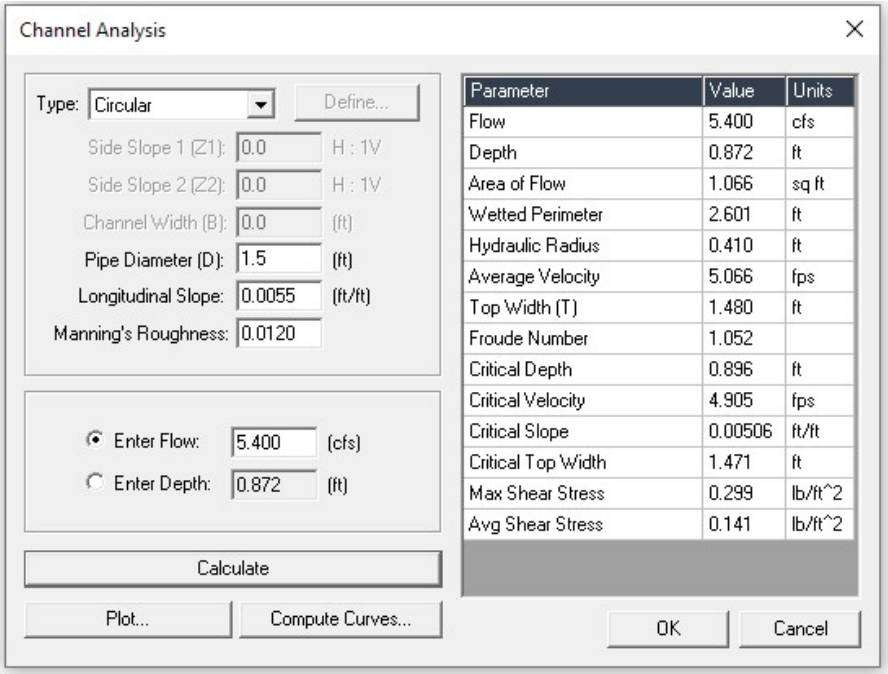

Figure 6-3: Post-project hydraulic analysis proposed 18" SD

7.0 CONCLUSIONS

The preliminary hydrologic and hydraulic analyses outlined in this report demonstrate no negative impacts to downstream facilities are anticipated as a result of the proposed development. The existing and proposed storm water facilities are adequately sized to convey runoff.

Additionally, the overall peak flow rates anticipated in post-project conditions are below pre-project due to the flow routing, increased pervious areas, and water quality BMPs.

Attachment 1: Pre-Project Hydrology Map

DRAINAGE BASIN SUMMARY TABLE

US Node	DS Node	US Elev	DS Elev	Flow Length (ft)	Slope (%)	Area (AC)	C-Value
101	102	349	347	60	3.33%	0.08	0.84
102	105	347	344	165	1.82%	0.6	0.84
105	110	344	341.6	150	1.60%	0.62	0.84
110	110						
110	110						
111	112	342.5	340.5	55	3.64%	0.04	0.84
112	115	336.9	336.3	165	0.36%		
115	115						
113	114	343.5	341	95	2.63%	0.07	0.84
114	115	337.5	336.5	28	3.57%		
115	115						
115	110	336.5	336.3	66	0.30%		
121	122	346.3	345.2	70	1.57%	0.06	0.84
122	125	345.2	341.8	200	1.70%	0.54	0.84
125	130	341.8	340.3	205	0.73%	0.75	0.84

NOTES

1. EX GRATE INLET
2. EX RIBBON GUTTER
3. EX CURB AND GUTTER
4. EX STORM DRAIN
5. EX CURB INLET

LEGEND

- OVERALL DRAINAGE BOUNDARY
- SUBBASIN
- NODE — NODE – XXX / ELEV – XXX.X
- LENGTH/AREA — L (FT) – XXX / A (AC) –XXX.X
- FLOW PATH
- FLOW DIRECTION

TOWN CENTER PARKWAY

NODE – 130
ELEV – 340.3

FLOW ENTERS EXISTING GRATE INLET
Q100=6.4 CFS

L (FT) – 205
A (AC) –0.79

NODE – 121
ELEV – 346.3

L (FT) – 70
A (AC) –0.06

NODE – 122
ELEV – 345.2

L (FT) – 200
A (AC) –0.54

NODE – 101
ELEV – 349.0

L (FT) – 60
A (AC) –0.08

NODE – 102
ELEV – 347.0

L (FT) – 165
A (AC) –0.60

PROJECT BOUNDARY

FLOW ENTERS EXISTING CURB INLET
Q100=7.2 CFS

TOTAL FLOW IN SD
Q100=7.8 CFS

NODE – 110
ELEV – 341.6

L (FT) – 150
A (AC) –0.62

NODE – 105
ELEV – 344.0

NODE – 125
ELEV – 341.8

PROJECT BOUNDARY

12" PVC SD

NODE – 112
ELEV – 340.5

NODE – 111
ELEV – 342.5

8" PVC SD

NODE – 115
ELEV – 341.6

12" PVC SD

FLOW IN EX. SD
Q100=0.6 CFS

FLOW IN EX. SD
Q100=0.2 CFS

NODE – 113
ELEV – 343.5

NODE – 114
ELEV – 341.0

FLOW IN EX. SD
Q100=0.4 CFS

SCALE: 1" = 20'

0 20' 40' 60'

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CITY OF SANTEE

HOME2 HOTEL

TOWN CENTER PARKWAY

PRE-PROJECT HYDROLOGY

ATTACHMENT 1

SHEET NO. 1 OF 1

FILE: C:\USERS\JKMCK\DROPBOX (LANDMARK CONSULTING)\0348-1 SANTEE HOME2 HOTEL\E REPORTS AND ANALYSIS\DRAINAGE\CAD\348-1 HYDRO.DWG PLOTTED: 7/8/2022 11:08:46 AM

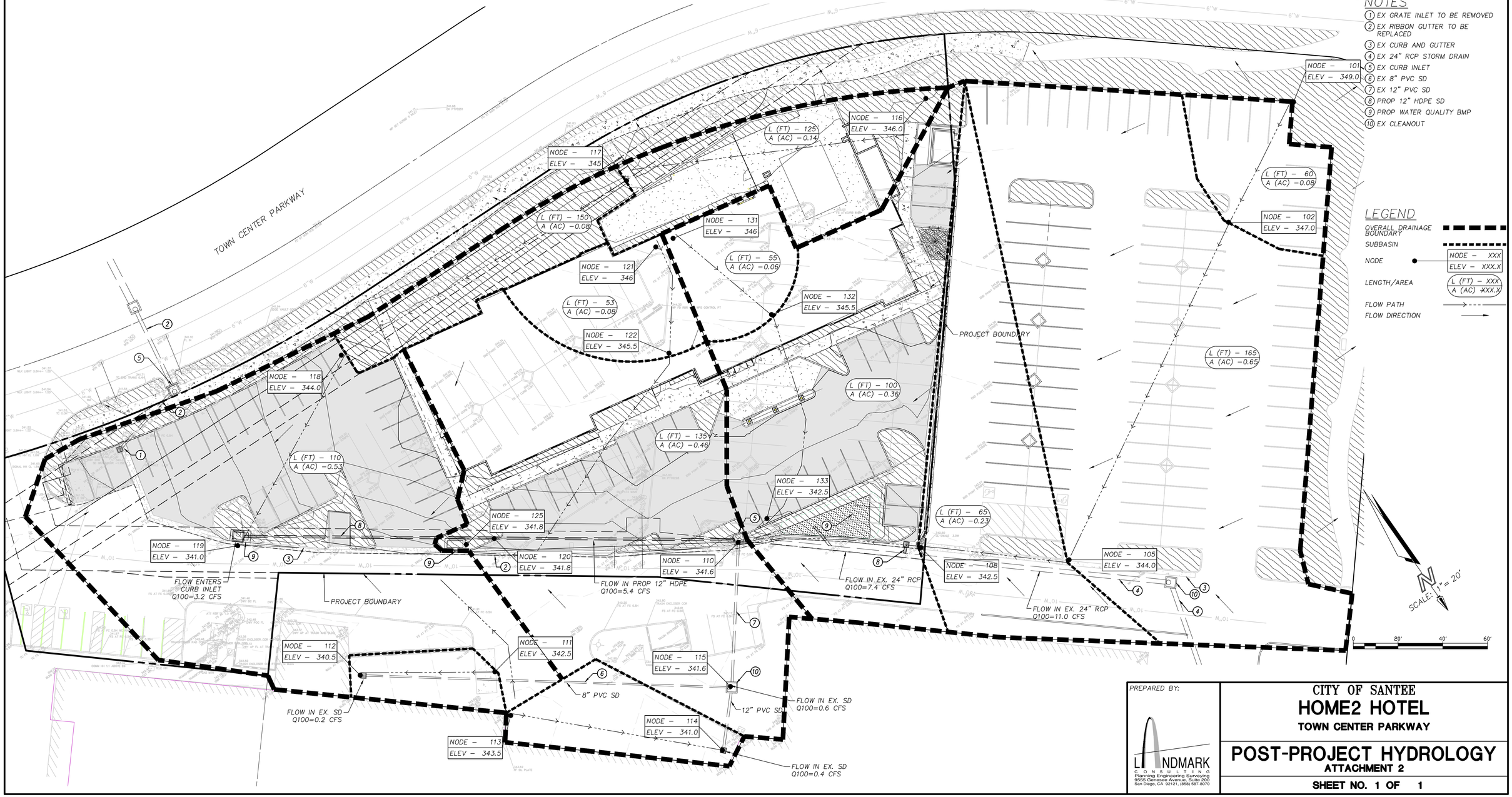
Attachment 2: Post-project Hydrology Map

DRAINAGE BASIN SUMMARY TABLE

US Node	DS Node	US Elev	DS Elev	Flow Length (ft)	Slope (%)	Area (AC)	C-Value
101	102	349	347	60	3.33%	0.08	0.84
102	105	347	344	165	1.82%	0.65	0.84
105	108	344	342.5	65	2.31%	0.23	0.84
108	108						
111	112	342.5	340.5	55	3.64%	0.04	0.84
112	115	336.9	336.3	165	0.36%		
115	115						
113	114	343.5	341	95	2.63%	0.07	0.84
114	115	337.5	336.5	28	3.57%		
115	115						

115	110	336.5	336.3	66	0.30%		
110	110						
116	117	346	345	125	0.80%	0.14	0.84
117	118	345	344	150	0.67%	0.08	0.84
118	119	344	341	110	2.73%	0.53	0.84
119	120	337.5	336.88	120	0.52%		
120	120						
121	122	346	345.5	53	0.94%	0.08	0.84
122	125	345.5	342	135	2.59%	0.46	0.84
125	120	337	336.88	10	1.20%		

120	120						
120	110	336.88	336.3	110	0.53%		
110	110						
131	132	346	345.5	55	0.91%	0.06	0.84
132	133	345.5	342.5	100	3.00%	0.36	0.84
133	110	338	336.3	20	8.50%		
110	110						
110	110						
110	108	336.3	335.9	80	0.50%		



NOTES

1. EX GRATE INLET TO BE REMOVED
2. EX RIBBON GUTTER TO BE REPLACED
3. EX CURB AND GUTTER
4. EX 24" RCP STORM DRAIN
5. EX CURB INLET
6. EX 8" PVC SD
7. EX 12" PVC SD
8. PROP 12" HDPE SD
9. PROP WATER QUALITY BMP
10. EX CLEANOUT

LEGEND

- OVERALL DRAINAGE BOUNDARY
- SUBBASIN
- NODE — NODE – XXX / ELEV – XXX.X
- LENGTH/AREA — L (FT) – XXX / A (AC) –XXX.X
- FLOW PATH
- FLOW DIRECTION

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CITY OF SANTEE

HOME2 HOTEL

TOWN CENTER PARKWAY

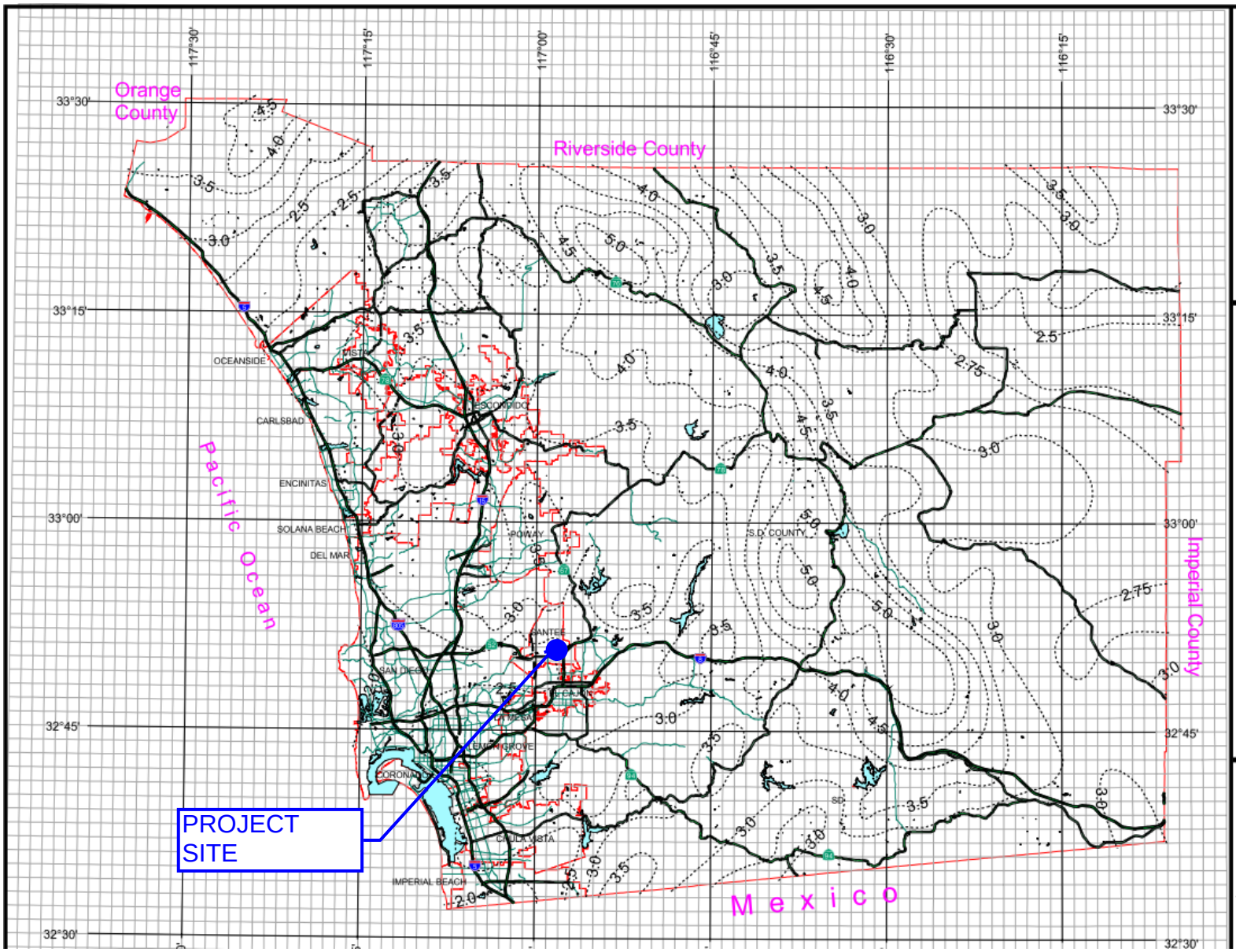
POST-PROJECT HYDROLOGY

ATTACHMENT 2

SHEET NO. 1 OF 1

FILE: C:\USERS\JKMCK\DROPBOX (LANDMARK CONSULTING)\0348-1 SANTEE HOME2 HOTEL\E REPORTS AND ANALYSIS\DRAINAGE\CAD\348-1 HYDRO POST.DWG PLOTTED: 7/8/2022 9:54:09 AM

Attachment 3: Hydrology Manual Excerpts



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

I = 2.5 IN

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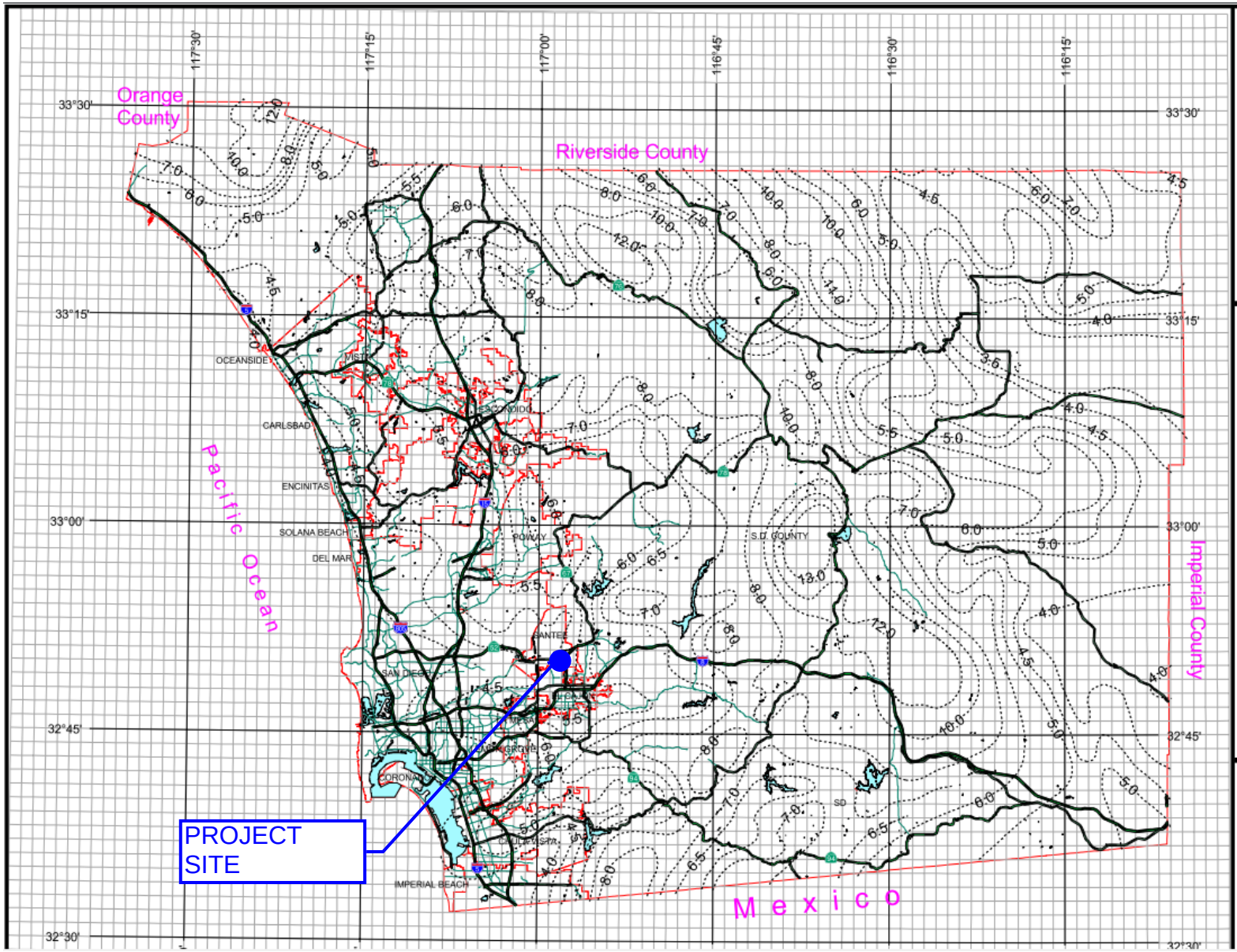
SANTEE, CA

100-YEAR 6-HOUR PRECIPITATION



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

I = 5.0 IN

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100-YEAR 24-HOUR PRECIPITATION

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

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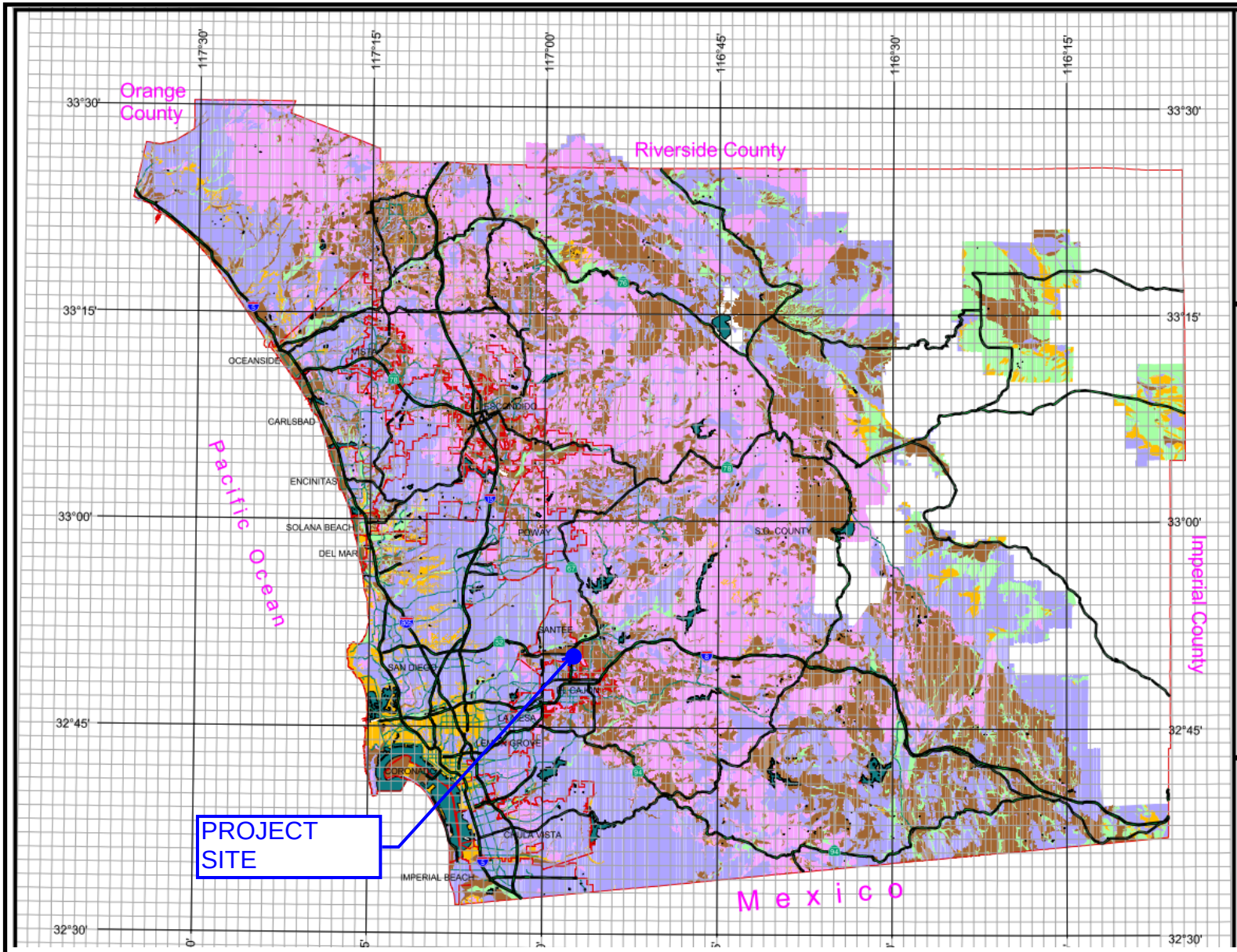
COUNTY OF SAN DIEGO RUNOFF COEFFICIENT



County of San Diego Hydrology Manual

Soil Hydrologic Groups

Legend

Soil Groups

- Group A
- Group B
- Group C
- Group D
- Undetermined
- Data Unavailable

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TYPE 'B' SOILS

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COUNTY OF SAN DIEGO SOIL GROUP MAP

Attachment 4: Web Soil Survey

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Diego County Area, California

June 29, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:742 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 16, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 18, 2018—Aug 22, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GoA	Grangeville fine sandy loam, 0 to 2 percent slopes	1.4	100.0%
Totals for Area of Interest		**1.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Diego County Area, California

GoA—Grangeville fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hbc8
Elevation: 10 to 1,800 feet
Mean annual precipitation: 8 to 16 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 260 to 300 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Grangeville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grangeville

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 11 inches: fine sandy loam
H2 - 11 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Ecological site: R019XG911CA - Loamy Fan
Hydric soil rating: No

Minor Components

Tujunga

Percent of map unit: 5 percent

Hydric soil rating: No

Chino

Percent of map unit: 5 percent
Hydric soil rating: No

Visalia

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, rise
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

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Attachment 5: Pre-Project AES Analysis

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**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2012 Advanced Engineering Software (aes)
              Ver. 18.2 Release Date: 05/08/2012  License ID 1503

                              Analysis prepared by:

                                LANDMARK CONSULTING
                              9555 GENESEE AVE, STE 200
                                SAN DIEGO, CA 92121
                                   (858) 587-8070

 ************************* DESCRIPTION OF STUDY *************************
* HOME2 HOTEL SANTEE PRE-PROJECT HYDROLOGY                              *
* 100-YEAR STORM EVENT                                                  *
* JUNE, 2022                                                            *
 *************************************************************************

  FILE NAME: 3481E00.DAT
  TIME/DATE OF STUDY: 15:05 07/06/2022
-------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
```

```
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    349.00
  DOWNSTREAM ELEVATION(FEET) =    347.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.427
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    344.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   165.00   CHANNEL SLOPE =  0.0182
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.82
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.51
  Tc(MIN.) =    3.94
  SUBAREA AREA(ACRES) =     0.60       SUBAREA RUNOFF(CFS) =    3.32
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       3.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    344.00  DOWNSTREAM(FEET) =    341.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.02
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   0.62
  Tc(MIN.) =    4.56
  SUBAREA AREA(ACRES) =     0.62       SUBAREA RUNOFF(CFS) =    3.43
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       7.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   4.34
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    110.00 =     375.00 FEET.

+----------------------------------------------------------------------------+
| FLOW ENTERS EXISTING CURB INLET                                            |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    342.50
  DOWNSTREAM ELEVATION(FEET) =    340.50
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.257
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.22
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    115.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.90  DOWNSTREAM(FEET) =   336.30
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.77
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =    3.81
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    115.00 =     220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.81
  RAINFALL INTENSITY(INCH/HR) =   6.59
  TOTAL STREAM AREA(ACRES) =     0.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    95.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    341.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.961
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    76.32
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.39
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.50  DOWNSTREAM(FEET) =   336.50
  FLOW LENGTH(FEET) =    28.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.39
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    3.06
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    115.00 =     123.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.06
  RAINFALL INTENSITY(INCH/HR) =   6.59
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.39

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.22     3.81        6.587          0.04
      2        0.39     3.06        6.587          0.07

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        0.57     3.06       6.587
      2        0.61     3.81       6.587

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.61   Tc(MIN.) =    3.81
  TOTAL AREA(ACRES) =        0.1
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    115.00 =     220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    110.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.50  DOWNSTREAM(FEET) =   336.30
  FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.13
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.61
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    4.33
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    110.00 =     286.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.61     4.33       6.587        0.11
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    110.00 =     286.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.19     4.56       6.587        1.30
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    110.00 =     375.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       7.43       4.33        6.587
      2       7.80       4.56        6.587

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.80   Tc(MIN.) =    4.56
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    346.30
  DOWNSTREAM ELEVATION(FEET) =    345.20
  ELEVATION DIFFERENCE(FEET) =      1.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.263
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    65.71
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.20  DOWNSTREAM(FEET) =    341.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0170
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.433
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.73
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.92
  Tc(MIN.) =    5.19
  SUBAREA AREA(ACRES) =     0.54       SUBAREA RUNOFF(CFS) =    2.92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       3.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.13
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    125.00 =     270.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    130.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    341.80  DOWNSTREAM(FEET) =    340.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   205.00   CHANNEL SLOPE =  0.0073
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.642
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.92
  AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   1.17
  Tc(MIN.) =    6.36
  SUBAREA AREA(ACRES) =     0.75       SUBAREA RUNOFF(CFS) =    3.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       6.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   3.12
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    130.00 =     475.00 FEET.

+----------------------------------------------------------------------------+
| FLOW ENTERS EXISTING GRATE INLET                                           |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.4  TC(MIN.) =      6.36
  PEAK FLOW RATE(CFS)   =       6.40
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Attachment 6: Post-Project AES Analysis

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2012 Advanced Engineering Software (aes)
              Ver. 18.2 Release Date: 05/08/2012  License ID 1503

                              Analysis prepared by:

                                LANDMARK CONSULTING
                              9555 GENESEE AVE, STE 200
                                SAN DIEGO, CA 92121
                                   (858) 587-8070

 ************************* DESCRIPTION OF STUDY *************************
* HOME2 HOTEL SANTEE POST-PROJECT HYDROLOGY                             *
* 100-YEAR STORM EVENT                                                  *
* JUNE, 2022                                                            *
 ************************************************************************

  FILE NAME: 3481P00.DAT
  TIME/DATE OF STUDY: 08:53 07/08/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
```

```
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    349.00
  DOWNSTREAM ELEVATION(FEET) =    347.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.427
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    105.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.00  DOWNSTREAM(FEET) =    344.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   165.00   CHANNEL SLOPE =  0.0182
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.87
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.47
  Tc(MIN.) =    3.90
  SUBAREA AREA(ACRES) =     0.65       SUBAREA RUNOFF(CFS) =    3.60
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       4.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   2.39
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    108.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    344.00  DOWNSTREAM(FEET) =    342.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =    65.00   CHANNEL SLOPE =  0.0231
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.47
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   0.24
  Tc(MIN.) =    4.14
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    1.27
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       5.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.34   FLOW VELOCITY(FEET/SEC.) =   4.58
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    108.00 =     290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    342.50
  DOWNSTREAM ELEVATION(FEET) =    340.50
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.257
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    115.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.90  DOWNSTREAM(FEET) =   336.30
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.77
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =    3.81
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    115.00 =     220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.81
  RAINFALL INTENSITY(INCH/HR) =   6.59
  TOTAL STREAM AREA(ACRES) =     0.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    95.00
  UPSTREAM ELEVATION(FEET) =    343.50
  DOWNSTREAM ELEVATION(FEET) =    341.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.961
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    76.32
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   337.50  DOWNSTREAM(FEET) =   336.50
  FLOW LENGTH(FEET) =    28.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.39
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    3.06
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    115.00 =     123.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.06
  RAINFALL INTENSITY(INCH/HR) =   6.59
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.39

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.22     3.81        6.587          0.04
      2        0.39     3.06        6.587          0.07

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        0.57     3.06       6.587
      2        0.61     3.81       6.587

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.61   Tc(MIN.) =    3.81
  TOTAL AREA(ACRES) =        0.1
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    115.00 =     220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    110.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.50  DOWNSTREAM(FEET) =   336.30
  FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.13
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.61
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    4.33
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    110.00 =     286.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
  UPSTREAM ELEVATION(FEET) =    346.00
  DOWNSTREAM ELEVATION(FEET) =    345.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.773
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    56.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.00  DOWNSTREAM(FEET) =    344.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0067
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.483
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.96
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.87
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   2.87
  Tc(MIN.) =    6.64
  SUBAREA AREA(ACRES) =     0.08       SUBAREA RUNOFF(CFS) =    0.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       1.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    344.00  DOWNSTREAM(FEET) =    341.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   110.00   CHANNEL SLOPE =  0.0273
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.058
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.07
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.89
  Tc(MIN.) =    7.53
  SUBAREA AREA(ACRES) =     0.53       SUBAREA RUNOFF(CFS) =    2.25
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.42
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    119.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.50  DOWNSTREAM(FEET) =   336.88
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.09
  (PIPE FLOW VELOCITY CORRESPONDING TO FULL PIPE CAPACITY FLOW)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.19
```

```
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    120.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   4.80
  TOTAL STREAM AREA(ACRES) =     0.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.19

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    53.00
  UPSTREAM ELEVATION(FEET) =    346.00
  DOWNSTREAM ELEVATION(FEET) =    345.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.474
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.50  DOWNSTREAM(FEET) =    342.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   135.00   CHANNEL SLOPE =  0.0259
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.96
```

```
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.15
  Tc(MIN.) =    4.62
  SUBAREA AREA(ACRES) =     0.46       SUBAREA RUNOFF(CFS) =    2.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.27
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    125.00 =     188.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    120.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.00  DOWNSTREAM(FEET) =   336.88
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.99
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.66
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    120.00 =     198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.66
  RAINFALL INTENSITY(INCH/HR) =   6.59
  TOTAL STREAM AREA(ACRES) =     0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.99

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.19     8.18        4.796          0.75
      2        2.99     4.66        6.587          0.54

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
```

```
     1        4.80     4.66       6.587
     2        5.36     8.18       4.796

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.36   Tc(MIN.) =    8.18
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    120.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    110.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.88  DOWNSTREAM(FEET) =   336.30
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.12
  (PIPE FLOW VELOCITY CORRESPONDING TO FULL PIPE CAPACITY FLOW)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.36
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    8.76
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    110.00 =     615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.36     8.76       4.586        1.29
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    110.00 =     615.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.61     4.33       6.587        0.11
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    110.00 =     286.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.26       4.33        6.587
      2       5.79       8.76        4.586

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.79   Tc(MIN.) =    8.76
```

```
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    346.00
  DOWNSTREAM ELEVATION(FEET) =    345.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.583
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.50  DOWNSTREAM(FEET) =    342.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0300
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.016   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.587
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8400
  SOIL CLASSIFICATION IS "B"
  S.C.S. CURVE NUMBER (AMC II) =  94
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.85
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.90
  Tc(MIN.) =    4.48
  SUBAREA AREA(ACRES) =     0.36       SUBAREA RUNOFF(CFS) =    1.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.840
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       2.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   2.24
  LONGEST FLOWPATH FROM NODE    131.00 TO NODE    133.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    110.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   336.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.26
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.32
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.52
  LONGEST FLOWPATH FROM NODE    131.00 TO NODE    110.00 =     175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.32     4.52       6.587        0.42
  LONGEST FLOWPATH FROM NODE    131.00 TO NODE    110.00 =     175.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.79     8.76       4.586        1.40
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    110.00 =     615.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       5.31       4.52        6.587
      2       7.40       8.76        4.586

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.40   Tc(MIN.) =    8.76
  TOTAL AREA(ACRES) =        1.8

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
```

```
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    108.00 IS CODE =  41
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.30  DOWNSTREAM(FEET) =   335.90
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.80
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.40
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.04
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    108.00 =     695.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  11
------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.40     9.04       4.495        1.82
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    108.00 =     695.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.31     4.14       6.587        0.96
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    108.00 =     290.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       8.70       4.14        6.587
      2      11.03       9.04        4.495

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.03   Tc(MIN.) =    9.04
  TOTAL AREA(ACRES) =        2.8

******************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  12
------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================
```

```
===========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         2.8  TC(MIN.) =      9.04
  PEAK FLOW RATE(CFS)   =       11.03
===========================================================================
===========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

CITY OF SANTEE

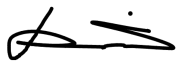
PRIORITY DEVELOPMENT PROJECT (PDP)

STORM WATER QUALITY MANAGEMENT PLAN (SWQMP)

FOR
SANTEE HOTEL
PERMIT APPLICATION NUMBER: DR2022-06

381 TOWN CENTER PARKWAY
SANTEE, CA 92071

ASSESSOR'S PARCEL NUMBER(S):
381-052-04-00
ENGINEER OF WORK:



David H. YEH, PE LIC. #62717

PREPARED FOR:

EXCEL HOTEL GROUP
10174 OLD GROVE ROAD STE. 200
SAN DIEGO, CA 92131
858-621-4908

PDP SWQMP PREPARED BY:

LANDMARK CONSULTING
9555 GENESEE AVE. SUITE 200
SAN DIEGO, CA 92121
858-587-8070

DATE OF SWQMP:
July 5, 2022

PLANS PREPARED BY:
LANDMARK CONSULTING
9555 GENESEE AVE. SUITE 200
SAN DIEGO, CA 92121
858-587-8070

PDP SWQMP Template Date: February 2016
PDP SWQMP Preparation Date: July 5, 2022

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TABLE OF CONTENTS

ACRONYMS

APN	Assessor's Parcel Number
BMP	Best Management Practice
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan

SWQMP PREPARER'S
CERTIFICATION PAGE

Project Name: Santee Hotel
Permit Application Number: DR2022-06

PREPARER'S CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the City of Santee BMP Design Manual, which is a design manual for compliance with local City of Santee and County of San Diego requirements and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

I have read and understand that the [City Engineer] has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the [City Engineer] is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

PE# 62717, Exp. 6/30/24

_____

Engineer of Work's Signature, PE Number & Expiration Date

David Yeh

_____

Print Name

Landmark Consulting

_____

Company

7/5/22

_____

Date

Engineer's Seal:

PDP SWQMP Template Date: February 2016
PDP SWQMP Preparation Date: July 5, 2022

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SWQMP PROJECT OWNER'S
CERTIFICATION PAGE

Project Name: Santee Hotel
Permit Application Number: Insert Permit Application Number: DR2022-06

PROJECT OWNER'S CERTIFICATION

This PDP SWQMP has been prepared for Excel Hotel Group by Landmark Consulting. The PDP SWQMP is intended to comply with the PDP requirements of the City of Santee's BMP Design Manual, which is a design manual for compliance with local City and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan. Once the undersigned transfers its interests in the property, its successor-in-interest shall bear the aforementioned responsibility to implement the best management practices (BMPs) described within this plan, including ensuring on-going operation and maintenance of structural BMPs. A signed copy of this document shall be available on the subject property into perpetuity.

_____
Project Owner's Signature

Neil Patel
_____
Print Name

Excel Hotel Group
_____
Company

858-621-4908
_____
Date

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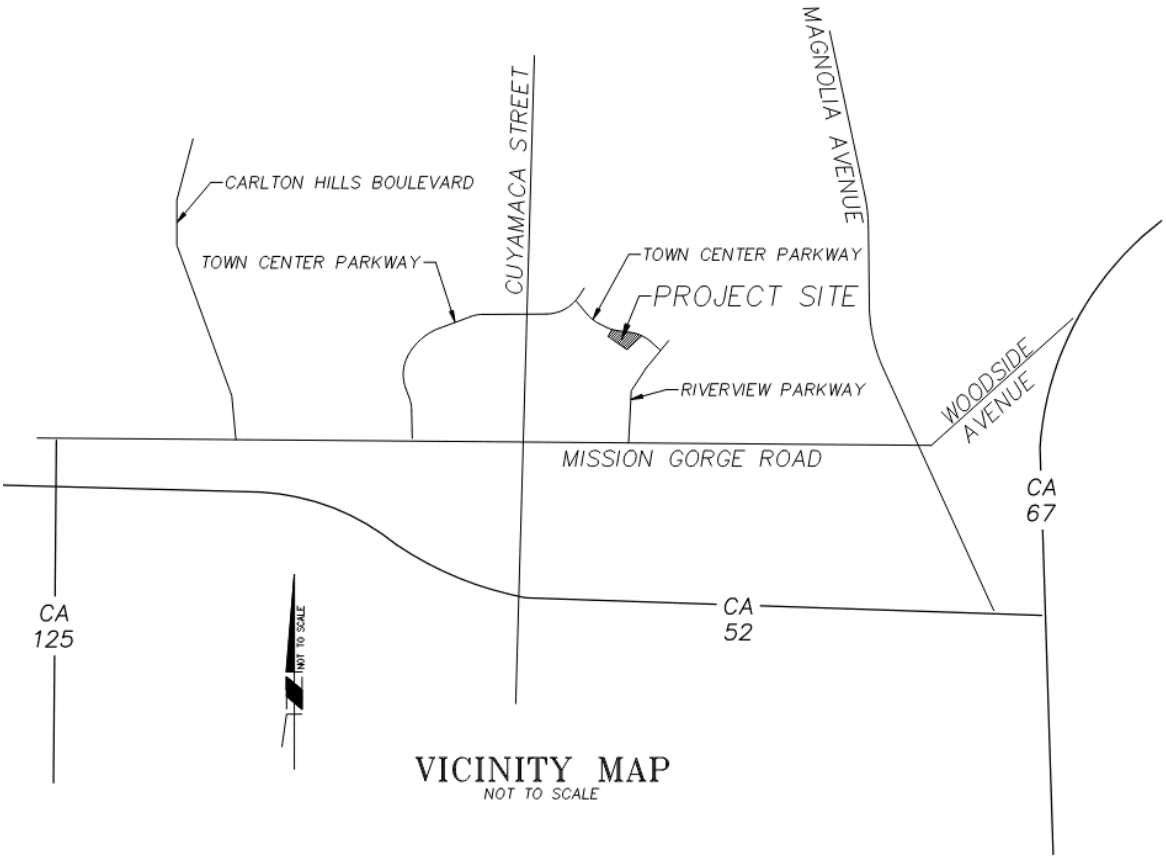
SUBMITTAL RECORD

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In column 4 summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Submittal Number	Date	Project Status	Summary of Changes
1	7/8/22	X Preliminary Design / Planning/ CEQA ☐ Final Design	Initial Submittal
2	10/24/2022	☒ Preliminary Design / Planning/ CEQA ☐ Final Design	2nd Submittal
3		☐ Preliminary Design / Planning/ CEQA ☐ Final Design	
4		☐ Preliminary Design / Planning/ CEQA ☐ Final Design	

PROJECT VICINITY MAP

Project Name: Home2 Hotel
Permit Application Number: Permit Application Number: TBD



Applicability of Permanent, Post-Construction Storm Water BMP Requirements **(Storm Water Intake Form for all Development Permit Applications)**	**Form I-1** Model BMP Design Manual [August 31, 2015]

Project Identification

Project Name: **Home2 Hotel**	
Permit Application Number: TBD	Date: 7/5/22
Project Address: **TOWN CENTER PARKWAY & RIVERVIEW PARKWAY** **SANTEE, CA 92071**	

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". **Upon reaching a Stop, do not complete further Steps beyond the Stop.**

Refer to BMP Design Manual sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual for guidance.	X Yes	Go to Step 2.
	☐ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual *in its entirety* for guidance, AND complete Form I-2, Project Type Determination.	☐ Standard Project	Stop. Only Standard Project requirements apply, including Standard Project SWQMP.
	X PDP	Standard and PDP requirements apply, including PDP SWQMP. Go to Step 3.
	☐ Exception to PDP definitions	Stop. Standard Project requirements apply, and any additional requirements specific to the type of project. Provide discussion and list any additional requirements below. Prepare Standard Project SWQMP.

Form I-1 Page 2, Form Template Date: August 31, 2015		
[Step 2 Continued from Page 1] Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		
Step 3 (PDPs only). Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual for guidance.	☐ Yes	Consult the [City Engineer] to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	X No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (*not required if prior lawful approval does not apply*):		
Step 4 (PDPs only). Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual for guidance.	☐ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	X No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do <u>not</u> apply: Hydromodifications requirements do not apply as the project proposes connecting stormwater discharge directly to an existing underground SD line that is an HMP exempt system. This existing system conveys runoff directly into the greater San Diego River Basin under Cuyamaca Street. Please reference attached HMP Exempt Mapping Exhibit within this report for visual.		
Step 5 (PDPs subject to hydromodification control requirements only). Does protection of critical coarse sediment yield areas	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.

apply based on review of WMAA Potential Critical Coarse Sediment Yield Area Map? See Section 6.2 of the BMP Design Manual for guidance.	□ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.

Priority Determination Form	Form I-2 Model BMP Design Manual [August 31, 2015]
Project Information	
Project Name: **Home2 Hotel**	
Permit Application Number: TBD	Date: 7/5/22
Project Address: **381 TOWN CENTER PARKWAY SANTEE, CA 92071**	

Project Type Determination: Standard Project or Priority Development Project (PDP)			
The project is (select one): ☐ New Development X Redevelopment			
The total proposed newly created or replaced impervious area is: _54,756_ ft^2 (___1.26___) acres			
Is the project in any of the following categories, (a) through (f)?			
Yes ☐	No X	(a)	New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes X	No ☐	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes X	No ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

Form I-2 Page 2, Form Template Date: August 31, 2015			
Yes ☐	No X	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes ☐	No X	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes X	No ☐	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?

☐ No – the project is <u>not</u> a Priority Development Project (Standard Project).

X Yes – the project is a Priority Development Project (PDP).

The following is for redevelopment PDPs only:

The area of existing (pre-project) impervious area at the project site is: __60,393___ ft^2 (A)
The total proposed newly created or replaced impervious area is ___54,756_____ ft^2 (B)
Percent impervious surface created or replaced (B/A)*100: ___91____%
The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – only new impervious areas are considered PDP

OR

X greater than fifty percent (50%) – the entire project site is a PDP

Site Design Checklist For PDPs	Form I-3B (PDPs) Model BMP Design Manual [August 31, 2015]
Project Summary Information	
Project Name	**Home2 Hotel**
Project Address	**381 TOWN CENTER PARKWAY SANTEE, CA 92071**
Assessor's Parcel Number(s) (APN(s))	**381-052-04-00**
Permit Application Number	TBD
Project Hydrologic Unit	Select One: ☐ Santa Margarita 902 ☐ San Luis Rey 903 ☐ Carlsbad 904 ☐ San Dieguito 905 ☐ Penasquitos 906 X San Diego 907 ☐ Pueblo San Diego 908 ☐ Sweetwater 909 ☐ Otay 910 ☐ Tijuana 911
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Diego River Watershed – 907.00
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	_____1.62___ Acres (_____70562_____ Square Feet)
Area to be Disturbed by the Project (Project Area)	____1.62____ Acres (_____70562_____ Square Feet)
Project Proposed Impervious Area (subset of Project Area)	____1.26____ Acres (_____54,756_____ Square Feet)
Project Proposed Pervious Area (subset of Project Area)	____0.363____ Acres (_____15806_____ Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Description of Existing Site Condition

Current Status of the Site (select all that apply):
X Existing development

☐ Previously graded but not built out

☐ Demolition completed without new construction

☐ Agricultural or other non-impervious use

☐ Vacant, undeveloped/natural

Description / Additional Information:

Parking lot and planter area islands

Existing Land Cover Includes (select all that apply):
☐ Vegetative Cover

☐ Non-Vegetated Pervious Areas

X Impervious Areas

Description / Additional Information: Existing site is currently a fully AC paved parking lot.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):
☐ NRCS Type A

X NRCS Type B

☐ NRCS Type C

☐ NRCS Type D

Approximate Depth to Groundwater (GW):
☐ GW Depth < 5 feet

☐ 5 feet < GW Depth < 10 feet

10 feet < GW Depth < 20 feet

X GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

☐ Watercourses

☐ Seeps

☐ Springs

☐ Wetlands

X None

Description / Additional Information:

Description of Existing Site Drainage Patterns

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

(1) whether existing drainage conveyance is natural or urban;

(2) Is runoff from offsite conveyed through the site? if yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site;

(3)Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and

(4) Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Describe existing site drainage patterns:

Under the existing conditions, the site is an existing asphalt-concrete parling lot, with raised planters dispersed throughout. The existing project site parcel is approximately 1.6 acres and largely falls within an overall drainage basin encompassing 2.7 acres. Runoff generally flows from northeast to southwest, via sheet flow across the existing parking area, and collected within a 3-foot-wide concrete ribbon gutter. The existing drainage basin is split into two subbasins, an easterly portion and westerly portion. Runoff from the eastern basin sheet flows from the southwest corner of the intersection of Town Center Parkway and Riverview Parkway, into the concrete ribbon gutter to the south. The ribbon gutter conveys runoff westerly, eventually discharging into an existing curb inlet located within the project site, near the eastern property line. The flow then enters an existing storm drain system that collects runoff from the overall shopping center area.
Runoff from the western subbasin follows a similar drainage pattern, draining from the northeast to the southwest and collecting within the existing ribbon gutter. The ribbon gutter conveys runoff westerly and then northerly until it is collected within the existing grated catch basin. The flow then enters the existing storm drain system.

Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:
The proposed development consists of the redevelopment of a portion of the overall parcel with a mid-rise hotel building and adjacent site improvements.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): Proposed impervious features of the project consist of the mid rise hotel structure as well as onsite hardscape and AC parking spaces/proposed parking lot.

List/describe proposed pervious features of the project (e.g., landscape areas):
Proposed pervious features of the project site consist of landscaping as well as landscaped curb islands/ proposed vegetated BMP Basins for water quality treatment.

Does the project include grading and changes to site topography?
X Yes
☐ No

Description / Additional Information:

Form I-3B Page 5 of 10, Form Template Date: August 31, 2015
Description of Proposed Site Drainage Patterns

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

X Yes
☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre- and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Describe proposed site drainage patterns:
Under the proposed conditions, the overall runoff pattern will not significantly change from pre-project conditions. Off-site run-on from the easterly subbasin directly adjacent to the easterly property line of the site will now sheet flow from the existing parking areas and collect within a proposed ribbon gutter running north to south along the Easterly Property line. The easterly offsite runoff will then collect within a proposed inlet located near the southerly project boundary at the intersection of the proposed north-south ribbon gutter and the existing east-west ribbon gutter. This will isolate offsite runoff and drain into the same existing storm drain facility as pre-project conditions.
Prior to collecting within the existing storm drain, runoff generated from the proposed improvements within the eastern subbasin will be collected within water quality facilities proposed in the raised medians to treat the anticipated runoff.
Runoff from the western subbasin will also follow the general runoff pattern of pre-project conditions, draining from northeast to west. Runoff from the proposed improvements will be collected within water quality treatment facilities located within the proposed raised planters and collect into a proposed subgrade storm water system, eventually tying into the existing storm water system.

Form I-3B Page 6 of 10, Form Template Date: August 31, 2015

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

X On-site storm drain inlets

☐ Interior floor drains and elevator shaft sump pumps

☐ Interior parking garages

X Need for future indoor & structural pest control

X Landscape/Outdoor Pesticide Use

X Pools, spas, ponds, decorative fountains, and other water features

☐ Food service

X Refuse areas

☐ Industrial processes

☐ Outdoor storage of equipment or materials

☐ Vehicle and Equipment Cleaning

☐ Vehicle/Equipment Repair and Maintenance

☐ Fuel Dispensing Areas

☐ Loading Docks

X Fire Sprinkler Test Water

☐ Miscellaneous Drain or Wash Water

X Plazas, sidewalks, and parking lots

Description / Additional Information:

Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable): From the following post development drainage description above, onsite runoff will enter a series of structural BMPs (biofiltration planters/modular wetland units) for treatment located within the project boundary, and the discharge from these facilities will tie into the existing HMP exempt underground storm drain system. This drainage system is currently running under the existing ribbon gutter along the southwesterly boundary line of the project. The existing underground line runs southerly underneath parking areas of Santee Trolley Square prior to routing westerly to Cuyamaca Street. The exempt system then routes approximately 1,000 feet north (Parallel to Cuyamaca) past the intersection of Cuyamaca Street and Town Center Parkway before discharging into the greater San Diego River Basin.

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
San Diego River (Upper)	Indicator Bacteria	TMDL TBD 2025
San Diego River (Upper)	Oxygen, Dissolved	TMDL TBD 2025
San Diego River (Upper)	Sulfates	TMDL TBD 2025

Identification of Project Site Pollutants*

***Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)**

Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Expected from the Project Site	Also, a Receiving Water Pollutant of Concern
Sediment		X	
Nutrients		X	X
Heavy Metals	X		
Organic Compounds		X	X
Trash & Debris		X	

Oxygen Demanding Substances			
Oil & Grease		X	
Bacteria & Viruses		X	X
Pesticides		X	

Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

☐ Yes, hydromodification management flow control structural BMPs required.

No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

X No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

Hydromodifications requirements do not apply as the project proposes connecting stormwater discharge directly to an existing underground SD line that is an HMP exempt system. This existing system conveys runoff directly into the greater San Diego River Basin under Cuyamaca Street. Please reference attached HMP Exempt Mapping Exhibit within this report for visual.

Critical Coarse Sediment Yield Areas*

***This Section only required if hydromodification management requirements apply**

Form I-3B Page 9 of 10, Form Template Date: August 31, 2015
Flow Control for Post-Project Runoff*   ***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.   This section is N/A. Project is HMP Exempt.
Has a geomorphic assessment been performed for the receiving channel(s)?   ☐ No, the low flow threshold is 0.1Q2 (default low flow threshold)   ☐ Yes, the result is the low flow threshold is 0.1Q2   ☐ Yes, the result is the low flow threshold is 0.3Q2   ☐ Yes, the result is the low flow threshold is 0.5Q2   If a geomorphic assessment has been performed, provide title, date, and preparer: Discussion / Additional Information: (optional)   This section is N/A. Project is HMP Exempt.

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

☐ Yes
☐ No, No critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the BMP Design Manual been performed?

☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite
☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment
☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
☐ No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

☐ No critical coarse sediment yield areas to be protected based on verification of GLUs onsite
☐ Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 2.b of the SWQMP.
☐ Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:
Section N/A as project is HMP Exempt.

Form I-3B Page 10 of 10, Form Template Date: August 31, 2015
Other Site Requirements and Constraints
When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.
Optional Additional Information or Continuation of Previous Sections As Needed
No additional requirements/site constraints.

Source Control BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)	Form I-4 Model BMP Design Manual [August 31, 2015]

Project Identification

Home2 Hotel - Santee

Permit Application Number: TBD

Source Control BMPs

All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	X Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	X Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	X N/A
Discussion / justification if SC-3 not implemented:			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	X N/A
Discussion / justification if SC-4 not implemented:			

Form I-4 Page 2 of 2, Form Template Date: August 31, 2015			
Source Control Requirement	**Applied?**		
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	X Yes	☐ No	☐ N/A
Discussion / justification if SC-5 not implemented:			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
X On-site storm drain inlets	X Yes	☐ No	☐ N/A
☐ Interior floor drains and elevator shaft sump pumps	☐ Yes	☐ No	☐ N/A
☐ Interior parking garages	☐ Yes	☐ No	☐ N/A
X Need for future indoor & structural pest control	X Yes	☐ No	☐ N/A
X Landscape/Outdoor Pesticide Use	X Yes	☐ No	☐ N/A
X Pools, spas, ponds, decorative fountains, and other water features	X Yes	☐ No	☐ N/A
☐ Food service	☐ Yes	☐ No	☐ N/A
X Refuse areas	☐ Yes	☐ No	☐ N/A
☐ Industrial processes	☐ Yes	☐ No	☐ N/A
☐ Outdoor storage of equipment or materials	☐ Yes	☐ No	☐ N/A
☐ Vehicle and Equipment Cleaning	☐ Yes	☐ No	☐ N/A
☐ Vehicle/Equipment Repair and Maintenance	☐ Yes	☐ No	☐ N/A
☐ Fuel Dispensing Areas	☐ Yes	☐ No	☐ N/A
☐ Loading Docks	☐ Yes	☐ No	☐ N/A
X Fire Sprinkler Test Water	X Yes	☐ No	☐ N/A
☐ Miscellaneous Drain or Wash Water	☐ Yes	☐ No	☐ N/A
X Plazas, sidewalks, and parking lots	X Yes	☐ No	☐ N/A

Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.

Site Design BMP Checklist for All Development Projects (Standard Projects and Priority Development Projects)	Form I-5 Model BMP Design Manual [August 31, 2015]

Project Identification

Home2 Hotel - Santee

Permit Application Number: TBD

Site Design BMPs

All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	X Yes	☐ No	☐ N/A
Discussion / justification if SD-1 not implemented:			
SD-2 Conserve Natural Areas, Soils, and Vegetation	X Yes	☐ No	☐ N/A
Discussion / justification if SD-2 not implemented:			
SD-3 Minimize Impervious Area	X Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	X Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	X Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented:			

Form I-5 Page 2 of 2, Form Template Date: August 31, 2015			
Site Design Requirement	**Applied?**		
SD-6 Runoff Collection	☐ Yes	☐ No	X N/A
Discussion / justification if SD-6 not implemented: N/A due to low 36-hour volume demand. See Form I-7. Roof drains shall drain to landscape areas, however retaining water in any appreciating volume will not occur insite (I.E. no rain barrels or cisterns).			
SD-7 Landscaping with Native or Drought Tolerant Species	X Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	☐ No	X N/A
Discussion / justification if SD-8 not implemented: N/A due to low 36-hour volume demand. See Form I-7.			

Summary of PDP Structural BMPs	Form I-6 (PDPs) Model BMP Design Manual [August 31, 2015]
Project Identification	
Home2 Hotel - Santee	
Permit Application Number: TBD	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the BMP Design Manual). Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).	

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

Step 1. Part a. DCV calculated based on DCV = DAC. D = the 85th percentile 24-hr storm depth determined from figure B1.1: 85th percentile 24-hour Isopluvial Map. A is equal to the area of the project site. C is the area weighted runoff factor which was calculated utilizing pervious and impervious areas of the site. Part b. Determine DMAs for site. This site consists of different DMA boundaries as shown on the DMA exhibit, based on proposed runoff drainage elevations.

Step 2. Form I-7 filled out, harvest and use feasibility analysis performed. Harvest and use considered infeasible due to low 36-hour water volume demand.

Step 3. Form I-8 filled out, infiltration considered infeasible due to project site underlying soils. Per project geotechnical report, project is immediately underlain with 4-6 feet of compacted fill that has clayey soils. Underneath the compacted fill is another 4 to 6 feet of clayey soils. Infiltration through these existing soil types would likely yield an infiltration rate of less than 0.5 in/hr. Infiltration there is not feasible for the project site.

Step 4. Size bio-filtration BMPs/Modular Wetland Systems per design criteria and considerations listed in the fact sheets. Biofiltration BMPs must be able to biofilter 1.5 times the DCV, or store 0.75 times the DCV, whichever is lesser, and be sized per the minimum sizing footprint factor of 0.03. The governing requirement for this project, was the minimum sizing footprint factor. A Modular Wetland System was also sized to treat DMA-4 by having an effective treatment rate equal to 1.5 (Factor of Safety) times the Water Quality flowrate of the DMA, based on a rainfall intensity of 0.2 in/hr. The proposed basins/planters and MWS will sufficiently satisfy pollutant control requirements as demonstrated by the bmp sizing calculation worksheets provided within this SWQMP.

Modular wetland systems were selected for treatment of site drainage areas for several reasons. The first and main reason, is site constraints and available footprint space. These units are compact and require a lesser footprint than biofiltration basins per tributary treatment area. Biofiltration basins were utilized in larger landscaped areas, but for smaller landscaped curb islands, modular wetlands were selected due to footprint size limitations. The other condition that warranted the MWS's was feasibility for tying overflow pipes to existing HMP exempt storm drain piping. The MWS's can utilize a shallower depth of placement for overflow than the overflow for a biofiltration basin, thus making connection to a shallower existing storm drain feasible.

There also is one smaller drainage management area at the east side of site that is suitable for use of a Tree Well for stormwater treatment. A tree well was proposed here due to limiting availability for footprint space within the curb island within this drainage area. The drainage management area (DMA-11) consists of a total of only 1,824 sf *and the DCV can effectively be treated and mitigated by a single tree within this island.*

The basins that were selected for this project are lined biofiltration basins. Biofiltration basins were selected as infiltration is not feasible for the site, and as there is existing underground storm drain to connect to with overflow, a discharge system from the basin is ideal to keep footprint size of facility to a minimum, in lieu of a retention basin/ full infiltration basin.

(Continue on page 2 as necessary.)

Form I-6 Page 2 of X, Form Template Date: August 31, 2015
(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)
(Continued from page 1)

Form I-6 Page 3 of X (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. TW-1 Tree Well	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) X Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: X Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	David H. Yeh Professional Engineer # 62717 Landmark Consulting 9555 Genesee Ave. Suite 200 San Diego, CA 92121
Who will be the final owner of this BMP?	Excel Hotel Group
Who will maintain this BMP into perpetuity?	Excel Hotel Group
What is the funding mechanism for maintenance?	Owner to fund the required maintenance.

Form I-6 Page 3 of X (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. BF-1-1 Biofiltration Basin	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) X Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: X Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	David H. Yeh Professional Engineer # 62717 Landmark Consulting 9555 Genesee Ave. Suite 200 San Diego, CA 92121
Who will be the final owner of this BMP?	Excel Hotel Group
Who will maintain this BMP into perpetuity?	Excel Hotel Group
What is the funding mechanism for maintenance?	Owner to fund the required maintenance.

Form I-6 Page 3 of X (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. BF-1-7 Biofiltration Basin	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) X Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: X Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	David H. Yeh Professional Engineer # 62717 Landmark Consulting 9555 Genesee Ave. Suite 200 San Diego, CA 92121
Who will be the final owner of this BMP?	Excel Hotel Group
Who will maintain this BMP into perpetuity?	Excel Hotel Group
What is the funding mechanism for maintenance?	Owner to fund the required maintenance.

Form I-6 Page 3 of X (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. MOD-1 Modular Wetland System 1	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☒ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: X Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	David H. Yeh Professional Engineer # 62717 Landmark Consulting 9555 Genesee Ave. Suite 200 San Diego, CA 92121
Who will be the final owner of this BMP?	Excel Hotel Group
Who will maintain this BMP into perpetuity?	Excel Hotel Group
What is the funding mechanism for maintenance?	Owner to fund the required maintenance.

Form I-6 Page 3 of X (Copy as many as needed) , Form Template Date: August 31, 2015	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. MOD-2 Modular Wetland System 2	
Construction Plan Sheet No.	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☒ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: X Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the BMP Design Manual)	David H. Yeh Professional Engineer # 62717 Landmark Consulting 9555 Genesee Ave. Suite 200 San Diego, CA 92121
Who will be the final owner of this BMP?	Excel Hotel Group
Who will maintain this BMP into perpetuity?	Excel Hotel Group
What is the funding mechanism for maintenance?	Owner to fund the required maintenance.

ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	X Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	X Included on DMA Exhibit in Attachment 1a ☐ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	X Included ☐ Not included because the entire project will use infiltration BMPs
Attachment 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	X Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines	X Included

Harvest and Use Feasibility Checklist	Worksheet B.3-1 : Form I-7

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?
☑ Toilet and urinal flushing
☑ Landscape irrigation
☐ Other:_____

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.
[Provide a summary of calculations here]

ETWU = 2.8 in/month x ((0.3 x 12,460 sf of L.S)/0.9) x 0.015 = 175 gal/day
Total = 175 gal/day = 35 cf/36 hours

3. Calculate the DCV using worksheet B-2.1.
DCV = 2313 cf (cubic feet)
[Provide a summary of calculations here]
0.50 in/ (12in/ft) x 55511 sf (effective tributary area) = 2313 cf

3a. Is the 36-hour demand greater than or equal to the DCV?	3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36-hour demand less than 0.25DCV?
☐ Yes ⇩ / ☑ No ⇨	☐ Yes ⇩ / ☑ No ⇨	☑ Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.

Is harvest and use feasible based on further evaluation?
☐ Yes, refer to Appendix E to select and size harvest and use BMPs.
☑ No, select alternate BMPs.

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

X Underlying hydrologic soil group

X Approximate depth to groundwater

X Existing natural hydrologic features (watercourses, seeps, springs, wetlands)

X Critical coarse sediment yield areas to be protected

X Existing topography and impervious areas

X Existing and proposed site drainage network and connections to drainage offsite

X Proposed demolition

X Proposed grading

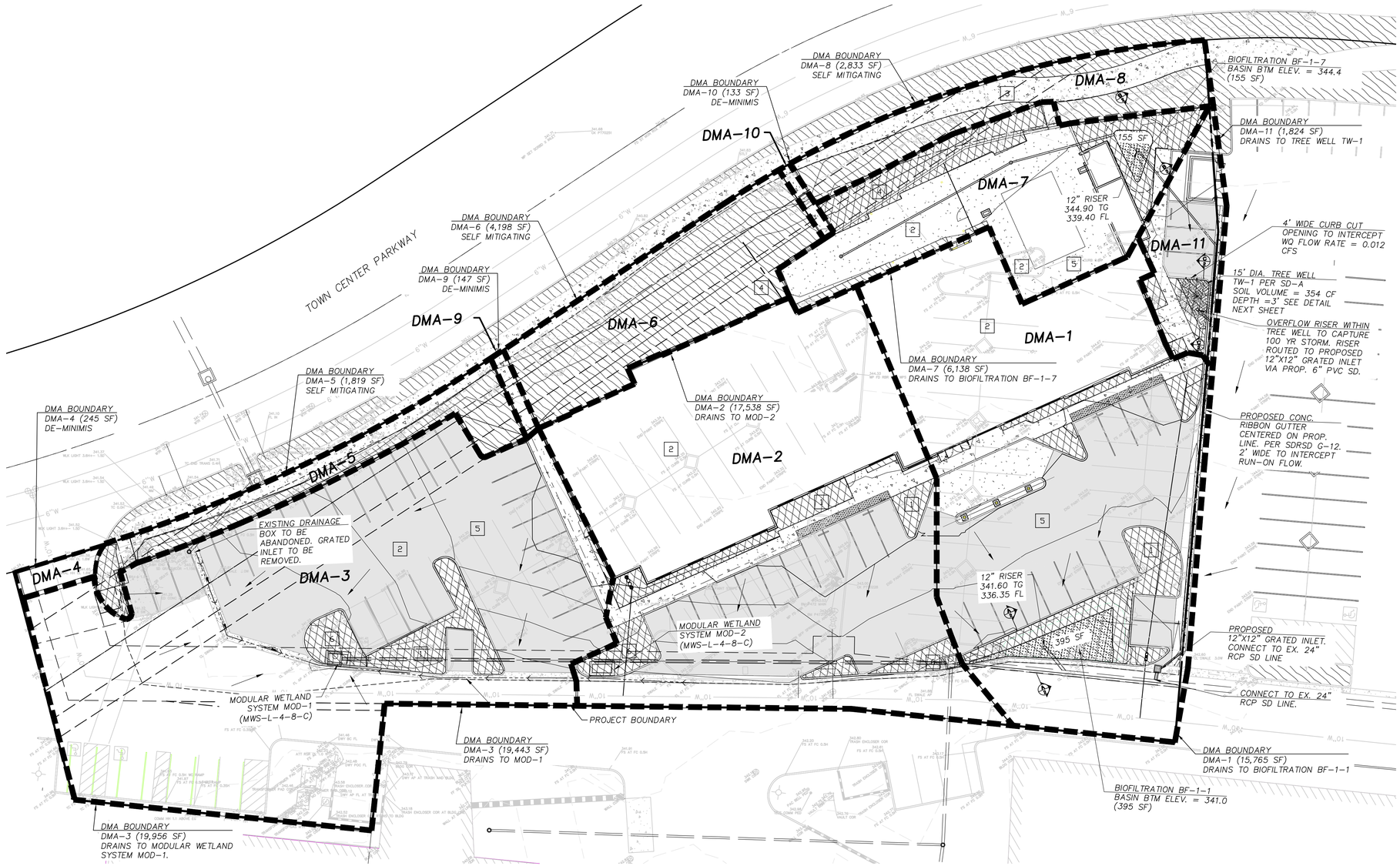
X Proposed impervious features

X Proposed design features and surface treatments used to minimize imperviousness

X Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)

X Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)

X Structural BMPs (identify location, type of BMP, and size/detail)



LEGEND

- OVERALL DRAINAGE BOUNDARY (DMA)
- PERVIOUS AREA
- IMPERVIOUS AREA
- FLOW DIRECTION
- GRADED/DISTURBED AREA
- MWS
- ON-SITE SD

SITE DESIGN/SOURCE CONTROL/LID NOTES:

1. LANDSCAPE AREAS TO BE PLANTED WITH PEST/DROUGHT TOLERANT SPECIES. (SC-6, SD-7)
2. SLOPE IMPERVIOUS AREAS TO DRAIN INTO PERVIOUS AREAS. DIRECT ROOF DRAINS TO BIOFILTRATION BASIN. (LID 2.2.5)
3. DISCONNECT IMPERVIOUS SURFACES. (LID 2.2.3.2, SD-5)
4. MINIMIZE SOIL COMPACTION OUTSIDE BUILDING FOOTPRINT. (LID 2.2.4)
5. KEEP PLAZAS/SIDEWALKS/DRIVEWAY SWEPT AND CLEAR OF DEBRIS. (SC-6)
6. ENSURE NEAREST STORM DRAIN INLET IS STAMPED "NO DUMPING! DRAINS TO OCEAN" OR SIMILAR. (SC-2)

DISTURBED AREA

TOTAL GRADED/DISTURBED AREA: 55,402 SF

UNDERLYING HYDROLOGIC SOIL GROUP: TYPE B SOIL
APPROXIMATE DEPTH TO GROUNDWATER: > 10 FT, < 20 FT
NO EXISTING HYDROLOGIC FEATURES ON-SITE

MODULAR WETLAND SUMMARY TABLE

DMA	DMA-3	DMA-2
Area (sf)	19443	17538
Impervious Area (sf)	18217	16206
C Value	0.86	0.85
DCV (cf)	697	621
1.5*Qwq (cfs)	0.115	0.102
BMP ID	MOD-1	MOD-2
MWS Unit	MWS-L-4-8	MWS-L-4-8
Treatment Flow Rate (cfs)	0.115	0.115
Adequate Capacity?	Yes	Yes

Volume Criteria For Sizing	MOD-1	MOD-2
Soil Media Vol. of MWS	64 CF (4'x4'x4')	64 CF (4'x4'x4')
Volume Retained in Pores (0.2 x Media Volume) (CF)	12.8	12.8
1.5% of DCV (CF)	10.45	9.32
Adequately Sized	Yes	Yes

DMA SUMMARY TABLE

DMA	TYPE	AREA (SF)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	BMP AREA (SF)
1	DRAINS TO BMP (BF-1-1)	15,765	13,860	1,905	395
2	DRAINS TO MWS	17,538	16,206	1,332	MWS-L-4-8-C
3	DRAINS TO MWS	19,443	18,217	1,226	MWS-L-4-8-C
4	DE-MINIMIS	245	245	0	N/A
5	SELF-MITIGATING	1,819	685	1,134	N/A
6	SELF-MITIGATING	4,198	0	4,198	N/A
7	DRAINS TO BMP (BF-1-7)	6,138	5,430	708	155
8	SELF-MITIGATING	2,833	1150	1,683	N/A
9	DE-MINIMIS	147	147	0	N/A
10	DE-MINIMIS	133	133	0	N/A
11	DRAINS TO TW-1	1,824	1,552	272	Tree Well

REGISTERED PROFESSIONAL ENGINEER
DAVID H. YEH
NO. 62717
EXP. 6/30/24
CIVIL
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9555 GENESEE AVE STE 200
SAN DIEGO, CA 92121
PHONE: (858)587-8070
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EMAIL: DAVID@LMCO.NET

SCALE: 1" = 20'

0 20' 40' 60'

PREPARED BY:

LANDMARK CONSULTING
Planning Engineering Surveying
9555 Genesee Avenue, Suite 200
San Diego, CA 92121, (858) 587-8070

CITY OF SANTEE

HOME2 HOTEL

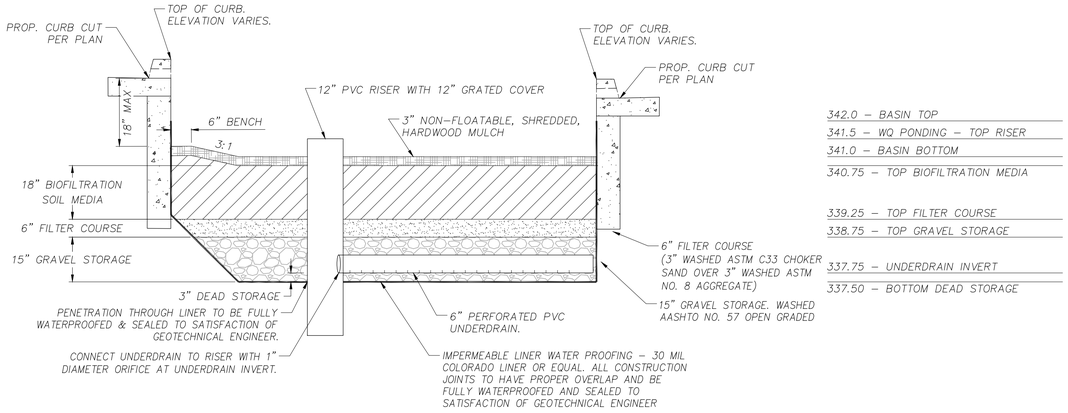
TOWN CENTER PARKWAY

DMA EXHIBIT

ATTACHMENT 1

SHEET NO. 1 OF 2

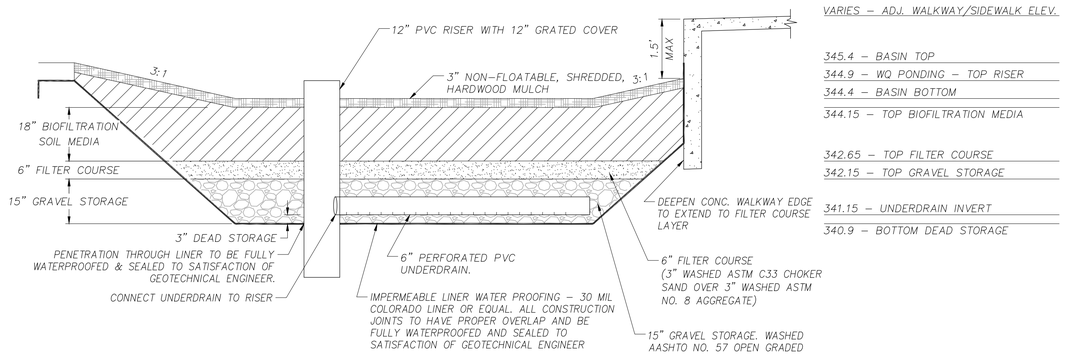
FILE: C:\USERS\JKMCK\DROPBOX (LANDMARK CONSULTING)\0348-1 SANTEE HOME2 HOTEL\E REPORTS AND ANALYSIS\SWQMP\CAD\348-1 BMP.DWG PLOTTED: 7/8/2022 3:08:26 PM



BF-1-1
TREATS DMA-1

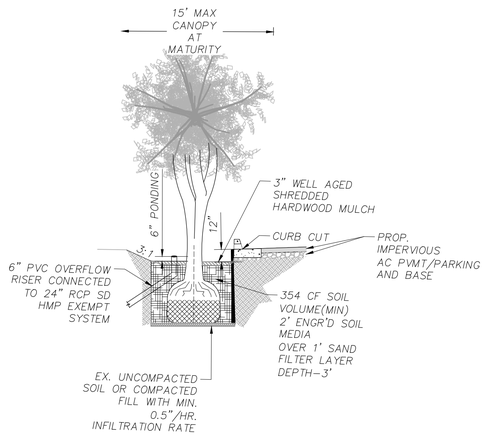
SECTION A-A (BIOFILTRATION BASIN BF-1-1)
NOT TO SCALE

NOTE: PLEASE SEE CUT SHEETS WITHIN REPORT FOR MODULAR WETLAND DETAILS



BF-1-7
TREATS DMA-7

SECTION B-B (BIOFILTRATION BASIN BF-1-7)
NOT TO SCALE



SECTION C-C TREE WELL
NOT TO SCALE

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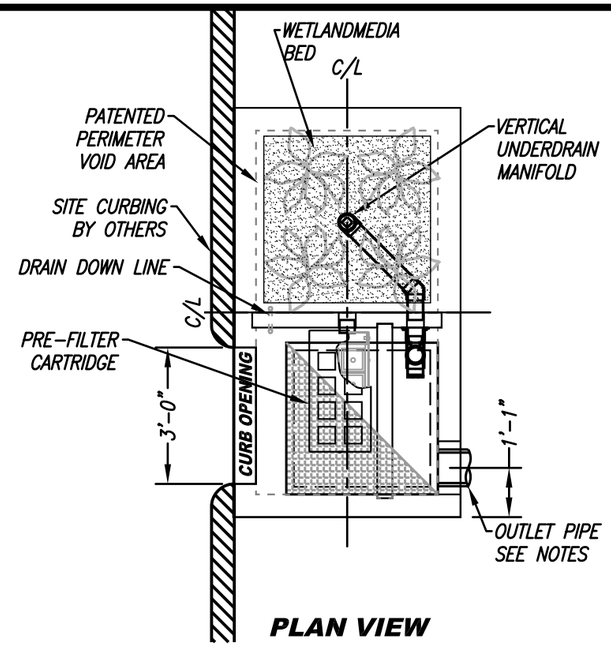
CITY OF SANTEE
HOME2 HOTEL
TOWN CENTER PARKWAY

DMA EXHIBIT
ATTACHMENT 1

SHEET NO. 2 OF 2

SITE SPECIFIC DATA			
PROJECT NUMBER			
ORDER NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN	OPEN PLANTER	PEDESTRIAN
FRAME & COVER	36" X 36"	N/A	N/A
WETLANDMEDIA VOLUME (CY)			TBD
ORIFICE SIZE (DIA. INCHES)			TBD
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



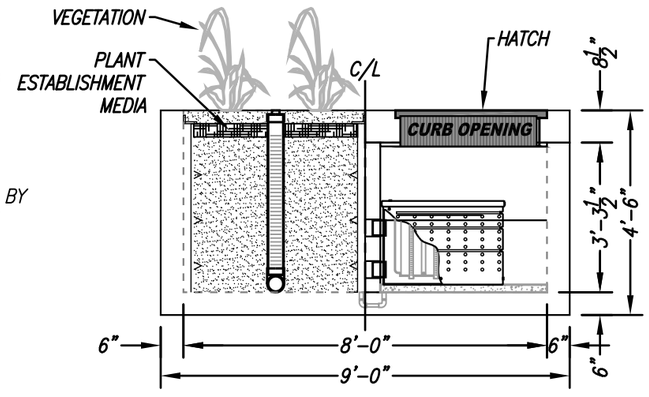
PLAN VIEW

INSTALLATION NOTES

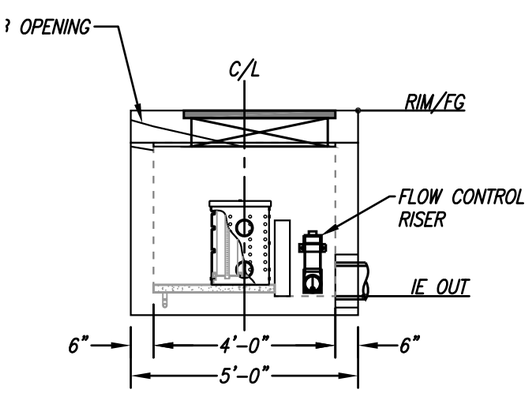
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

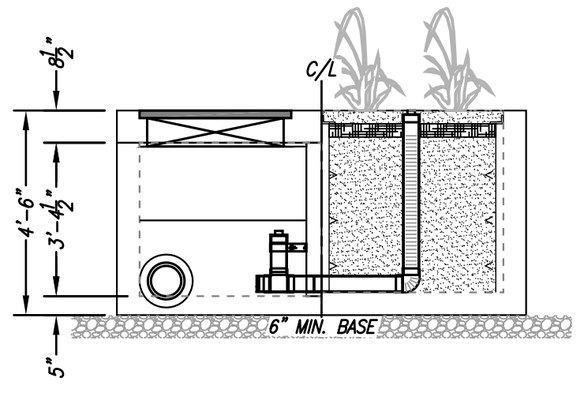
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	0.115
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

Bio Clean
A Forterra Company

MWS-L-4-8-C
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

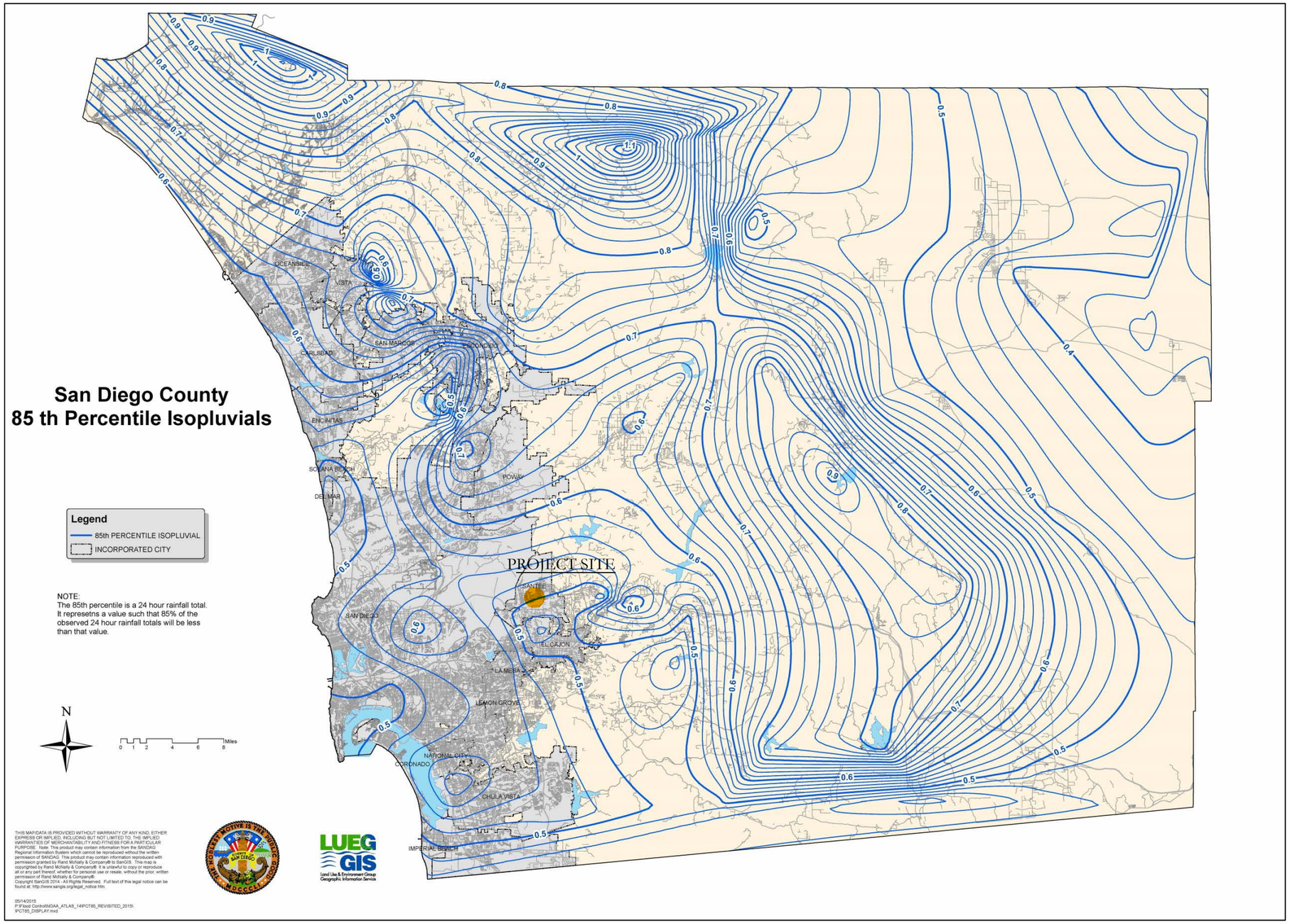


Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	DMA-1	DMA-7	DMA-11								unitless
	2	85th Percentile 24-hr Storm Depth	0.50	0.50	0.50								inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	13,860	5,430	1,552								sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)	0	0	0								sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	0	0	0								sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)	0	0	0								sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)	0	0	0								sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	0	0	0								sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)	1,905	708	272								sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	Yes					No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A			1								#
	19	Average Mature Tree Canopy Diameter			15								ft
	20	Number of Rain Barrels Proposed per SD-E			0								#
	21	Average Rain Barrel Size			0								gal
Initial Runoff Factor Calculation	22	Total Tributary Area	15,765	6,138	1,824	0	0	0	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.83	0.83	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.83	0.83	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	545	212	62	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.83	0.83	0.81	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	545	212	62	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	100	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.83	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	13,085	5,095	0	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	100	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	545	212	0	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	DMA-1	DMA-7	DMA-11	-	-	-	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.50	0.50	0.50	-	-	-	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	D	D	D								unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted								unitless
	5	Nature of Restriction	Structures	Structures	Structures								unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	Yes								yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No								yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	No	No	No								yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer											in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	-	-	-	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	4.5%	4.5%	4.5%	-	-	-	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.02	0.02	0.02	-	-	-	-	-	-	-	ratio
	13	Required Retention Volume	11	4	0	-	-	-	-	-	-	-	cubic-feet

No Warning Messages

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	DMA-1	DMA-7	DMA-11	-	-	-	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	-	-	-	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	545	212	0	-	-	-	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated									unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined									unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain									unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard									unitless
	8	Provided Surface Area	395	155									sq-ft
	9	Provided Surface Ponding Depth	6	6									inches
	10	Provided Soil Media Thickness	18	18									inches
	11	Provided Gravel Thickness (Total Thickness)	21	21									inches
	12	Underdrain Offset	3	3									inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	6.00	6.00									inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.10	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	0	0	0	0	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.15	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	82	32	0	0	0	0	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	463	180	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	1.7044	1.7044	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	186.40	475.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	16.80	16.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	1	1	0	0	0	0	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	3	0	0	0	0	0	0	0	0	hours
	40	Total Depth Biofiltered	46.80	46.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	694	270	0	0	0	0	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	694	270	0	0	0	0	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	347	135	0	0	0	0	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	347	135	0	0	0	0	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	-	-	-	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

No Warning Messages

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	DMA-3	DMA-2									unitless
	1	Basin Drains to the Following BMP Type	Flow-Thru	Flow-Thru									unitless
	2	85th Percentile 24-hr Storm Depth	0.50	0.50									inches
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.00	0.00									in/hr
	4	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	18,217	16,206									sq-ft
	5	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)	0	0									sq-ft
	6	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	0	0									sq-ft
	7	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)	0	0									sq-ft
	8	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)	0	0									sq-ft
	9	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	0	0									sq-ft
	10	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)	1,226	1,332									sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No									yes/no
	12	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	13	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	14	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	16	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	17	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	18	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	19	Number of Tree Wells Proposed per SD-A				~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	#
	20	Average Mature Tree Canopy Diameter											ft
	21	Number of Rain Barrels Proposed per SD-E											#
	22	Average Rain Barrel Size											gal
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in Downstream Drainage?											unitless
	24	Identify Downstream Drainage Basin Providing Treatment in Series											unitless
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas											percent
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
Initial Runoff Factor Calculation	28	Total Tributary Area	19,443	17,538	0	0	0	0	0	0	0	0	sq-ft
	29	Initial Runoff Factor for Standard Drainage Areas	0.86	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	31	Initial Weighted Runoff Factor	0.86	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	32	Initial Design Capture Volume	697	621	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	34	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.86	0.85	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	38	Design Capture Volume After Dispersion Techniques	697	621	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	40	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	41	Final Adjusted Runoff Factor	0.86	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	42	Final Effective Tributary Area	16,721	14,907	0	0	0	0	0	0	0	0	sq-ft
	43	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	697	621	0	0	0	0	0	0	0	0	cubic-feet

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

Automated Worksheet B.6-1: Sizing Flow-Thru BMPs (V1.3)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Flow-Thru BMP Inputs	0	Drainage Basin ID or Name	DMA-3	DMA-2	-	-	-	-	-	-	-	-	unitless
	1	Final Effective Tributary Area	16,721	14,907	-	-	-	-	-	-	-	-	sq-ft
	2	Final Adjusted Runoff Factor	0.86	0.85	-	-	-	-	-	-	-	-	unitless
	3	Final Design Capture Volume Tributary to BMP	697	621	-	-	-	-	-	-	-	-	cubic-feet
	4	Volume Effectively Retained and/or Biofiltered	0	0	-	-	-	-	-	-	-	-	cubic-feet
	5	Deficit of Effectively Treated Stormwater Requiring Flow-Thru Treatment	-697	-621	-	-	-	-	-	-	-	-	cubic-feet
	6	Maximum Rated Water Quality Flow Rate of Proposed BMP	0.115	0.115									CFS
Flow Rate Calculations	7	Adjustment Factor	1.00	1.00	-	-	-	-	-	-	-	-	unitless
	8	Design Rainfall Intensity for Flow-Thru BMPs	0.20	0.20	-	-	-	-	-	-	-	-	in/hr
	9	Water Quality Flow Rate Requiring Flow-Thru Treatment	0.077	0.068	-	-	-	-	-	-	-	-	CFS
Result	10	Is Flow-Thru BMP Adequately Sized?	Yes	Yes	-	-	-	-	-	-	-	-	unitless

Worksheet B.6-1 General Notes:

A. Applicants may use this worksheet to size flow-thru BMPs (FT-1 through FT-5) for up to 10 basins. Note that applicants proposing flow-thru BMPs must provide supplemental documentation to support the maximum water quality flow rate referenced above, demonstrate medium to high pollutant removal efficiency for project's most significant pollutants of concern, and must also implement an offsite alternative compliance project to offset the deficit of effectively treated stormwater volume. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red/orange and summarized below.

	Area (sf)	Depth (ft)	C	DCV		
DMA 11	1,824	0.041666667	0.82	62.32		
	Canopy Area (sf)	**2 CF/SF Soil Volume (cf)**	**Soil Depth (ft)**	**Tree Well Surface Area (sf)**	**Dimensions (Use)**	
1 - 15ft Diameter Tree	176.65	353.3	3	118	See plans for surface area	Treats DCV = 100
						DCV thus reduced to 0

TCV = TIV + TCIV + TETV	
TIV = 0.2 * Soil Volume	70.66
TCIV = (0.04/12)*Canopy Area	0.588833333
TETV = 0.1*Soil Volume	35.33
TCV =	106.5788333

Per COSD BMP Manual TCV = 100 CF **Use 100 CF for DCV Reduction**

Worksheet B.2-1. DCV

Design Capture Volume		Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.5	inches
2	Area tributary to BMP (s)	A=	0.042	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.82	unitless
4	Street trees volume reduction	TCV=	100	cubic-feet
5	Rain barrels volume reduction	RCV=		cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	Goes to 0	cubic-feet

DCV Calculation = DCV (DMA -11) = 0.5/12 * (0.042*43560) * (0.82) = 62.5 CF

Total DCV - TCV must go to 0

TCV = 100 CF

100 CF > 62.5 CF Therefore DCV reduced to zero.

Mature Tree Canopy Diameter (ft)	Tree Credit Volume (ft^3/tree)
5	10
10	40
15	100
20	180
25	290
30	400

Basis for the reduction in DCV:

Tree credit volume was estimated based on typical characteristics of street trees as follows:

It is assumed that each tree and associated trench or box is considered a single BMP, with calculations based on the media storage volume and/or the individual tree within the tree BMP as appropriate. Tree credit volume is calculated as:

$$TCV = TIV + TCIV + TETV$$

Where:

- TCV = Tree credit volume (ft^3)
- TIV = Total infiltration volume of all storage layers within tree BMPs (ft^3)
- $TCIV$ = Total canopy interception volume of all individual trees within tree BMPs (ft^3)
- $TETV$ = Total evapotranspiration volume, sums the media evapotranspiration storage within each tree BMP (ft^3)

Total infiltration volume was calculated as the total volume infiltrated within the BMP storage layers. Infiltration volume was assumed to be 20% of the total BMP storage layer volume, the available pore space in the soil volume (porosity – field capacity). Total canopy interception volume was calculated for all street trees within the tributary area as the average interception capacity for the entire mature tree total canopy projection area. Interception capacity was determined to be 0.04 inches for all street tree sizes, an average from the findings published by Breuer et al (2003) for coniferous and deciduous trees. Total evapotranspiration volume is the available evapotranspiration storage volume (field capacity – wilting point) within the BMP storage layer media. TEVT is assumed to be 10% of the minimum soil volume. The minimum soil volume as required by SD-A fact sheet of 2 cubic feet per unit canopy projection area was assumed for estimating reduction in DCV.

B.2.1.2 Green Roofs

When green roofs are implemented in accordance with the SD-C factsheet the green roof footprint must be assigned a runoff factor of 0.10 for adjusted runoff factor calculations.

B.2.1.3 Permeable Pavement

When a permeable pavement is implemented in accordance with the SD-D factsheet and it **does not have an impermeable liner** and has an equivalent storage depth greater than the 85th percentile 24 hour precipitation depth below the underdrain, if an underdrain is present, then the footprint of the permeable pavement must be assigned a runoff factor of 0.10 for adjusted runoff factor calculations.

Permeable Pavement can also be designed as a structural BMP to treat run on from adjacent areas. Refer to INF-3 factsheet and Appendix B.4 for additional guidance.

B.2.2 Adjustment to DCV

When the following site design BMPs are implemented the anticipated volume reduction from these BMPs must be deducted from the DCV to estimate the volume for which the downstream structural BMP should be sized for:

- SD-A: Tree Wells
- SD-E Rain barrels

B.2.2.1 Tree Wells

Tree Well credit volume (tree BMPs) is a sum of three runoff reduction volumes provided by trees that decrease the required DCV for a tributary area. The following reduction in DCV is allowed per tree based on the mature diameter of the tree canopy, when trees are implemented in accordance with SD-A factsheet:

Mature Tree Canopy Diameter (ft)	Tree Well Credit Volume (ft^3/tree)
5	10
10	40
15	100
20	180
25	290
30	420

Basis for the reduction in DCV:

Tree Well credit volume is estimated based on typical characteristics of Tree Wells as follows:

It is assumed that each tree is considered a single BMP, with calculations based on the soil media reservoir volume and/or the individual tree within the tree BMP as appropriate. Tree Well credit volume is calculated as:

$$TWCV = TIV + TCIV + TETV$$

Where:

- *TWCV* = Tree Well credit volume (ft^3)
- *TIV* = Total infiltration volume of all storage layers within tree BMPs (ft^3)
- *TCIV* = Total canopy interception volume of tree BMPs (ft^3)
- *TETV* = Total evapotranspiration volume, sums the media evapotranspiration storage within each tree BMP (ft^3)

Total infiltration volume is calculated as the total volume stored within the tree BMP soil media reservoir. Infiltration volume was assumed to be 20% of the total BMP soil media reservoir volume, the available pore space in the soil media reservoir (porosity – field capacity).

Total canopy interception volume was calculated as the average interception capacity for the entire mature tree canopy projection area. Interception capacity was determined to be 0.04 inches per square foot for all tree sizes, an average from the findings published by Breuer et al (2003) for coniferous and deciduous trees.

Total evapotranspiration volume is the available evapotranspiration storage volume (field capacity – wilting point) within the BMP storage layer media. TEVT is assumed to be 10% of the minimum soil volume. The minimum soil volume as required by SD-A fact sheet of 2 cubic feet per unit canopy projection area was assumed for estimating reduction in DCV.

There may be rain events that generate more runoff than the tree well can handle. Installing an overflow above the design storm water retention level of the reservoir can prevent system failure during extreme weather events. Placement of the overflow should be determined based on the infiltration rate of the subsoil.. If infiltration is not adequate to remove water from the rooting zone (the top 18 to 24 inches of soil media reservoir) within 48 hours, the depth of the soil media reservoir may be increased, and the overflow should be placed such that if water rises to the level of the rooting zone it will drain in less than 48 hours.

B.2.2.2 Rain Barrels

Rain barrels are containers that can capture rooftop runoff and store it for future use. Credit can be taken for the full rain barrel volume when each barrel volume is smaller than 100 gallons, implemented per SD-E fact sheet and meet the following criteria:

E.6 SD-A Street Trees

MS4 Permit Category
Site Design

Manual Category
Site Design

Applicable Performance Standard
Site Design

Primary Benefits
Volume Reduction

Street Trees (Source: County of San Diego LID Manual – EOA, Inc.)

Description

Trees planted to intercept rainfall and runoff can be used as storm water management measures that provide additional benefits beyond those typically associated with trees, including energy conservation, air quality improvement, and aesthetic enhancement. Typical storm water management benefits associated with trees include:

- **Interception of rainfall** – tree surfaces (roots, foliage, bark, and branches) intercept, evaporate, store, or convey precipitation to the soil before it reaches surrounding impervious surfaces
- **Reduced erosion** – trees protect denuded area by intercepting or reducing the velocity of rain drops as they fall through the tree canopy
- **Increased infiltration** – soil conditions created by roots and fallen leaves promote infiltration
- **Treatment of storm water** – trees provide treatment through uptake of nutrients and other storm water pollutants (phytoremediation) and support of other biological processes that break down pollutants

Typical street tree system components include:

- Trees of the appropriate species for site conditions and constraints
- Available growing space based on tree species, soil type, water availability, surrounding land uses, and project goals

- Optional suspended pavement design to provide structural support for adjacent pavement without requiring compaction of underlying layers
- Optional root barrier devices as needed; a root barrier is a device installed in the ground, between a tree and the sidewalk, intended to guide roots down and away from the sidewalk in order to prevent sidewalk lifting from tree roots.
- Optional tree grates; to be considered to maximize available space for pedestrian circulation and to protect tree roots from compaction related to pedestrian circulation; tree grates are typically made up of porous material that will allow the runoff to soak through.
- Optional shallow surface depression for ponding of excess runoff
- Optional planter box drain

Design Adaptations for Project Goals

Site design BMP to provide incidental treatment. Street trees primarily functions as site design BMPs for incidental treatment. Benefits from street trees are accounted for by adjustment factors presented in Appendix B.2. This credit can apply to non-street trees as well (that meet the same criteria). Trees as a site design BMP are only credited up to 0.25 times the DCV from the project footprint (with a maximum single tree credit volume of 400 ft^3). Copermittees may deviate from the criteria by developing additional sizing guidance and design requirements.

Storm water pollutant control BMP to provide treatment. Applicants are allowed to design trees as a pollutant control BMP and obtain credit greater than 0.25 times the DCV from the project footprint (or a credit greater than 400 ft^3 from a single tree). For this option to be approved by the [City Engineer], applicant is required to do infiltration feasibility screening (Appendix C and D) and provide calculations supporting the amount of credit claimed from implementing trees within the project footprint. The [City Engineer] has the discretion to request additional analysis before approving credits greater than 0.25 times the DCV from the project footprint (or a credit greater than 400 ft^3 from a single tree).

Design Criteria and Considerations

Street Trees must meet the following design criteria and considerations. Deviations from the below criteria may be approved at the discretion of the [City Engineer] if it is determined to be appropriate:

Siting and Design	*Intent/Rationale*
☐ **Tree species** is appropriately chosen for the development (private or public). For public rights-of-ways, local planning guidelines and zoning provisions for the permissible species and placement of trees are consulted. A list of trees appropriate for site design that can be used	Proper tree placement and species selection minimizes problems such as pavement damage by surface roots and poor growth.

Siting and Design	*Intent/Rationale*
by all county municipalities are provided in Appendix E.20	
Location of trees planted along public streets follows local requirements and guidelines. Vehicle and pedestrian line of sight are considered in tree selection and placement. Unless exemption is granted by the [City Engineer] the following minimum tree separation distance is followed	
☐	Roadway safety for both vehicular and pedestrian traffic is a key consideration for placement along public streets.
Underground utilities and overhead wires are considered in the design and avoided or circumvented. Underground utilities are routed around or through the planter in suspended pavement applications. All underground utilities are protected from water and root penetration.	Tree growth can damage utilities and overhead wires resulting in service interruptions. Protecting utilities routed through the planter prevents damage and service interruptions.
☐	

Improvement	Minimum distance to Street Tree
Traffic Signal, Stop sign	20 feet
Underground Utility lines (except sewer)	5 feet
Sewer Lines	10 feet
Above ground utility structures (Transformers, Hydrants, Utility poles, etc.)	10 feet
Driveways	10 feet
Intersections (intersecting curb lines of two streets)	25 feet

E.6 SD-A Tree Wells

MS4 Permit Category
Site Design

Manual Category
Site Design

Applicable Performance Standard
Site Design

Primary Benefits
Volume Reduction

Tree Wells (Source: County of San Diego LID Manual – EOA, Inc.)

Description

Trees planted to intercept rainfall and runoff can be used as storm water management measures that provide additional benefits beyond those typically associated with trees, including energy conservation, air quality improvement, and aesthetic enhancement. Typical storm water management benefits associated with trees include:

- **Interception of rainfall** – tree surfaces (roots, foliage, bark, and branches) intercept, evaporate, store, or convey precipitation to the soil before it reaches surrounding impervious surfaces
- **Reduced erosion** – trees protect denuded area by intercepting or reducing the velocity of rain drops as they fall through the tree canopy
- **Increased infiltration** – soil conditions created by roots and fallen leaves promote infiltration
- **Treatment of storm water** – trees provide treatment through uptake of nutrients and other storm water pollutants (phytoremediation) and support of other biological processes that break down pollutants

Typical tree well system components include:

- Trees of the appropriate species for site conditions and constraints
- Available soil media reservoir volume based on mature tree size, soil type, water availability, surrounding land uses, and project goals

Siting and Design	*Intent/Rationale*
	tree credit volume must be reduced proportionately.

Conceptual Design and Sizing Approach for Site Design

1. Determine the areas where street trees can be used in the site design to achieve incidental treatment. Street trees reduce runoff volumes from the site. Refer to Appendix B.2. Document the proposed tree locations in the SWQMP.
2. When trees are proposed as a storm water pollutant control BMP, applicant must complete feasibility analysis in Appendix C and D and submit detailed calculations for the DCV treated by trees. Document the proposed tree locations, feasibility analysis and sizing calculations in the SWQMP. The following calculations should be performed and the smallest of the three should be used as the volume treated by trees:
    a. Delineate the DMA (tributary area) to the tree and calculate the associated DCV.
    b. Calculate the required diversion flow rate using Appendix B.1.2 and size the inlet required to covey this flow rate to the tree. If the proposed inlet cannot convey the diversion flow rate for the entire tributary area, then the DCV that enters the tree should be proportionally reduced.
        i. For example, 0.5 acre drains to the tree and the associated DCV is 820 ft3. The required diversion flow rate is 0.10 ft3/s, but only an inlet that can divert 0.05 ft3/s could be installed.
        ii. Then the effective DCV draining to the tree = 820 ft3 * (0.05/0.10) = 420 ft3
    c. Estimate the amount of storm water treated by the tree by summing the following:
        i. Evapotranspiration credit of 0.1 * amount of soil volume installed; and
        ii. Infiltration credit calculated using sizing procedures in Appendix B.4.

Maintenance Overview

Normal Expected Maintenance. Tree health shall be maintained as part of normal landscape maintenance. Additionally, ensure that storm water runoff can be conveyed into the street tree well as designed. That is, the opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression) shall not be blocked, filled, re-graded, or otherwise changed in a manner that prevents storm water from draining into the street tree well. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure. Street Trees are site design BMPs that normally do not require maintenance actions beyond routine landscape maintenance. The normal expected maintenance described above ensures the BMP functionality. If changes have been made to the tree well entrance / opening such that runoff is prevented from draining into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well, or a surface depression has been filled so runoff flows away from the tree well), the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance will be required to restore drainage into the tree well as designed.

Surface ponding of runoff directed into street tree wells is expected to infiltrate/evapotranspirate within 24-96 hours following a storm event. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging or compaction of the soils surrounding the tree. Loosen or replace the soils to restore drainage.

Other Special Considerations. Site design BMPs, such as tree wells, installed within a new development or redevelopment project are components of an overall storm water management strategy for the project. The presence of site design BMPs within a project is usually a factor in the determination of the amount of runoff to be managed with structural BMPs (i.e., the amount of runoff expected to reach downstream retention or biofiltration basins that process storm water runoff from the project as a whole). When site design BMPs are not maintained or are removed, this can lead to clogging or failure of downstream structural BMPs due to greater delivery of runoff and pollutants than intended for the structural BMP. Therefore, the [City Engineer] may require confirmation of maintenance of site design BMPs as part of their structural BMP maintenance documentation requirements. Site design BMPs that have been installed as part of the project should not be removed, nor should they be bypassed by re-routing roof drains or re-grading surfaces within the project. If changes are necessary, consult the [City Engineer] to determine requirements.

Sediment Loading. Consider the effects of BMP design and tributary area land uses on the clogging potential of the BMP. If the Street Tree is designed with dimensions outside the ranges recommended in this fact sheet (i.e. higher loading rate), or will treat runoff from erosion prone tributary land uses, complete the sediment loading analysis included in Appendix E.27.

Summary of Standard Inspection and Maintenance

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

Threshold/Indicator	Maintenance Action	Typical Maintenance Frequency
Tree health	Routine actions as necessary to maintain tree health.	• Inspect monthly. • Maintain when needed.
Dead or diseased tree	Remove dead or diseased tree. Replace per original plans.	• Inspect monthly. • Maintain when needed.
Standing water in street tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health	Loosen or replace soils surrounding the tree to restore drainage.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water).	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed
Entrance / opening to the street tree well is	Make repairs as appropriate to restore	• Inspect monthly.

Threshold/Indicator	Maintenance Action	Typical Maintenance Frequency
blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well)	drainage into the tree well.	• Maintain when needed.

February 20, 2023 CTE Job No. 4830.2200060

Excel Hotel Group
Attn: David Thorne
10174 Old Grove Road, Suite #200
San Diego, CA 92131
Telephone: (858) 621-4908 x120 Via Email: dthorne@excelhotelgroup.com

Subject: In-Situ Percolation Testing for
Santee Hotel Site
Town Center Parkway, APN: 381-052-04
Santee, California

Mr. Thorne:

As requested, Construction Testing & Engineering Inc. (CTE) has completed percolation testing at Town Center Parkway, APN: 381-052-04 in Santee, California. The percolation tests were excavated using a truck-mounted drill rig (CME-75) equipped with eight-inch hollow stem augers. The approximate site location is shown on the attached Figure 1.

It is CTE's understanding that two stormwater BMP's are proposed at the site. Four percolation tests (two tests per proposed BMP locations) were performed to depths ranging from approximately 40 to 59 inches below the ground surface (bgs). The attached Figure 2 shows the approximate percolation test locations. The evaluation was performed in substantial accordance with Appendix C of the Model BMP Design Manual for the San Diego Region "Geotechnical and Groundwater Investigation Requirements", dated January 2021.

PERCOLATION TEST METHODS

The percolation tests were performed in substantial accordance with the methods approved by the San Diego Region BMP Design Manual with a presoak period of approximately 18 to 19 hours. Percolation test results and calculated infiltration rates are presented below in Table 1. Field Data and percolation to infiltration calculations are included in Appendix A.

CALCULATED INFILTRATED RATE

As per the San Diego Region BMP design documents (2021) infiltration rates are to be evaluated using the Porchet Method. San Diego BMP design documents utilized the Porchet Method through guidance of the County of Riverside (2011). The intent of calculating the infiltration rate is to take

into account bias inherent in percolation test borehole sidewall infiltration that would not occur at a basin bottom where such sidewalls are not present.

The infiltration rate (I_t) is derived by the equation:

$$I_t = \frac{\Delta H\ \pi r2\ 60}{\Delta t(\pi r2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Given the measured percolation rates, the calculated infiltration rates are presented with and without a Factor of Safety of 2.0 applied in Table 1 below. A completed I-8 Worksheet is included in Appendix B. The civil engineer of record should determine an appropriate factor of safety to be applied via completion of Worksheet D.5-1 of Appendix County of San Diego "Best Management Practice Design Manual", Appendix D or other approved methods. CTE does not recommend using a factor of safety of less than 2.0.

TABLE 1
RESULTS OF PERCOLATION TESTING WITH FACTOR OF SAFETY APPLIED

Test Location	Test Depth (inches)	Procedure	Geologic Unit	Percolation Rate (inches per hour)	Infiltration Rate (inches per hour)	Infiltration Rate with FOS of 2 Applied (inches per hour)
P-1	56	non-sandy	Qppf	0.000	0.000	0.000
P-2	40	non-sandy	Qppf	0.000	0.000	0.000
P-3	59	non-sandy	Qu	0.000	0.000	0.000
P-4	42	non-sandy	Qppf	0.000	0.000	0.000

NOTES
Water level was measured from a fixed point at the top of the hole.
Weather was overcast during percolation testing.
Qppf = Quaternary Previously Placed Fill
Qu = Quaternary Alluvium and Colluvium, undivided
The test holes were eight inches in diameter.

CONCLUSIONS & RECOMMENDATIONS

Based on the infiltration rates observed, and after applying a factor of safety of 2.0, it appears that the site exhibits a "No Infiltration" condition. Additionally, CTE has completed form I-8, provided in Attachment B, and arrived at a result of "No Infiltration" for the site. This form should be reviewed by the project Civil Engineer for concurrence and/or comment, and for final determination of the infiltration feasibility condition.

LIMITATIONS

The evaluation and geotechnical analysis presented in the geotechnical documents have been conducted according to current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed. Variations may exist and conditions not observed or described may be encountered during construction.

The recommendations provided have been developed in order to reduce the potential for onsite soil conditions and infiltration to adversely impact the proposed improvements. However, even with the design and construction recommendations provided, some post construction movement of soils and improvement distress should be anticipated.

Conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described are encountered, our office should be notified and additional recommendations, if required, will be provided upon request.

The opportunity to be of service is appreciated. If you have any questions regarding our recommendations, please do not hesitate to contact this office.

Respectfully submitted,

CONSTRUCTION TESTING & ENGINEERING, INC.

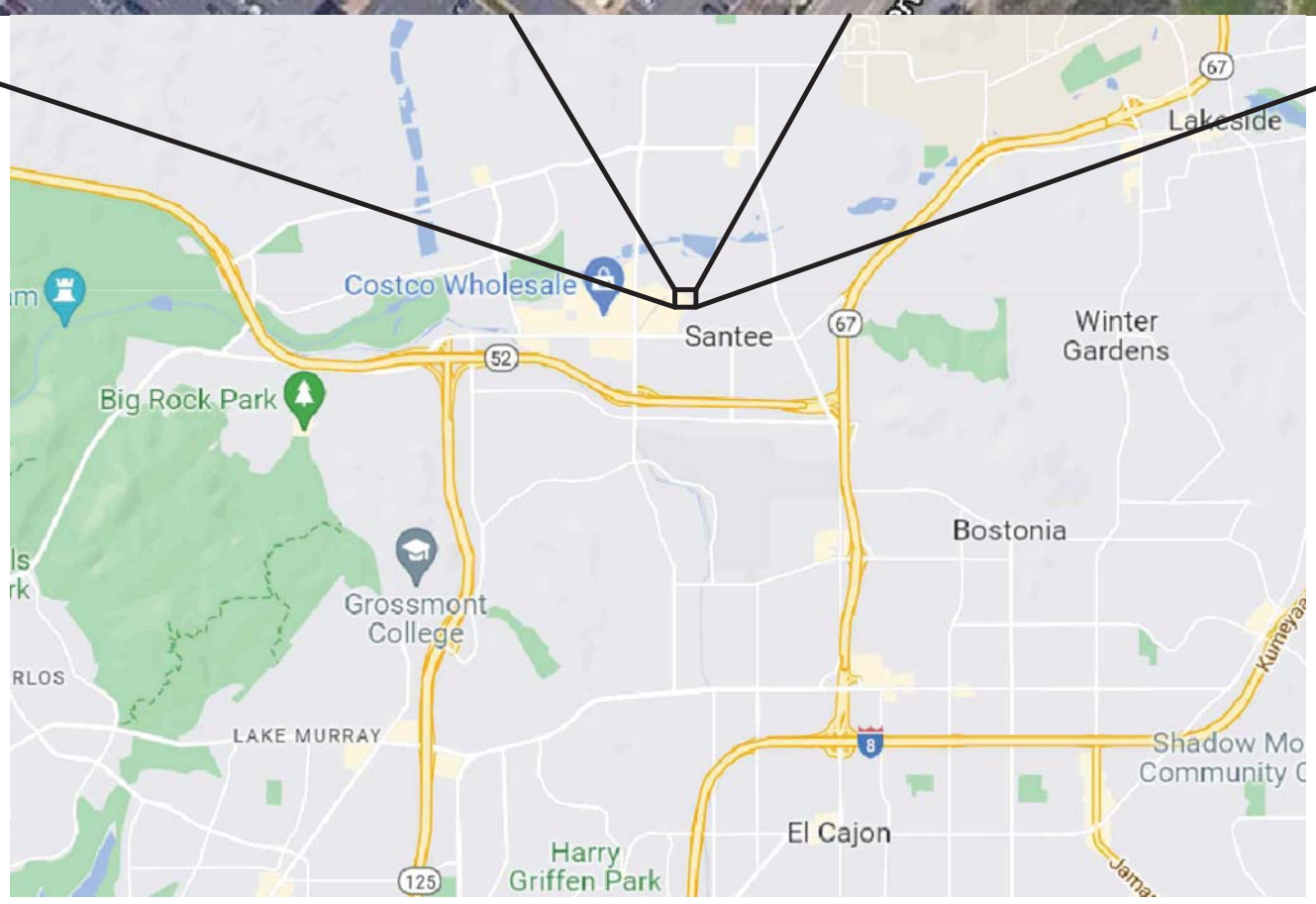
Colm J. Kenny, GE #3201
Senior Engineer

David J. Tamborrell, GIT #947
Project Geologist

DJT/CJK:ach

Attachments: Figure 1 (Site Index Map)
Figure 2 (Exploration Location Map)

Attachment A Percolation Test Data and Infiltration Rate Conversion Calculations
Attachment B Worksheet I-8



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SITE INDEX MAP

SANTEE HOTEL SITE
TOWN CENTER PARKWAY, A.P.N. 381-052-04-00
SANTEE, CALIFORNIA

SCALE:	DATE:
AS SHOWN	08/22
CTE JOB NO.: 4830.2200060	FIGURE: 1

EXPLANATION

C-6 APPROXIMATE CPT LOCATION

B-3 APPROXIMATE BORING LOCATION

P-4 APPROXIMATE PERCOLATION TEST

Qppf PREVIOUSLY PLACED FILL OVER

Qu QUATERNARY ALLVUIUM/COLLUVIUM OVER

Kgr CRETACEOUS GRANITIC ROCKS

50 0 50 100 150

SCALE 1" = 50'

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GEOTECHNICAL EXPLORATION MAP

SANTEE HOTEL SITE
TOWN CENTER PARKWAY, A.P.N. 381-052-04-00
SANTEE, CALIFORNIA

CTE JOB NO:	4830.2200060.0000
SCALE:	1" = 50'
DATE:	2/2023
FIGURE:	2

ATTACHMENT A

PERCOLATION TEST DATA AND INFILTRATION RATE CONVERSION CALCULATIONS

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DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	**GRAVELS** MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES
		GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	**SILTS AND CLAYS** LIQUID LIMIT IS LESS THAN 50		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" 4 10 40 200

CLEAR SQUARE SIEVE OPENING U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed
PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded
PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

FIGURE: BL1

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PROJECT: DRILLER: SHEET: of

CTE JOB NO: DRILL METHOD: DRILLING DATE:

LOGGED BY: SAMPLE METHOD: ELEVATION:

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING LOG LEGEND DESCRIPTION	Laboratory Tests
0								Block or Chunk Sample	
								Bulk Sample	
5								Standard Penetration Test	
10								Modified Split-Barrel Drive Sampler (Cal Sampler)	
								Thin Walled Army Corp. of Engineers Sample	
15								Groundwater Table	
								Soil Type or Classification Change	
20								? ? ? ? ? ? ? Formation Change [(Approximate boundaries queried (?)]	
					"SM"			Quotes are placed around classifications where the soils exist in situ as bedrock	
25									

FIGURE: BL2

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PROJECT:	Santee Hotel	SUBCONTRACTOR:	BAJA Exploration	SHEET:	1 of 1
CTE JOB NO:	4830.2200060.0000	EQUIPMENT:	CME-75: 8" Hollow Stem Auger	DRILLING DATE:	2/9/2023
LOGGED BY:	DJT	SAMPLE METHOD:	N/A	ELEVATION:	~338'

BORING: P-1

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0								AC: 0-3" AB: 3"-9"	
1						SM		**QUATERNARY PREVIOUSLY-PLACED FILL (Qppf):** Medium dense, slightly moist, brown, fine- to medium-grained Silty Sand.	
2						CH		Medium stiff, slighlty moist, dark gray Clay.	
3									
4						CL		Stiff, slighlty moist, dark gray Sandy Clay.	
5									
6								Total Depth: 5' No Groundwater Encountered Backfilled with Soil Cuttings	
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

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PROJECT:	Santee Hotel	SUBCONTRACTOR:	BAJA Exploration	SHEET:	1 of 1
CTE JOB NO:	4830.2200060.0000	EQUIPMENT:	CME-75: 8" Hollow Stem Auger	DRILLING DATE:	2/9/2023
LOGGED BY:	DJT	SAMPLE METHOD:	N/A	ELEVATION:	~338'

BORING: P-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0								AC: 0-3" AB: 3"-9"	
1						SM		**QUATERNARY PREVIOUSLY-PLACED FILL (Qppf):** Medium dense, slightly moist, brown, fine- to medium-grained Silty Sand.	
2						CH		Medium stiff, slighlty moist, dark gray Clay.	
3									
4								Total Depth: 3.5' No Groundwater Encountered Backfilled with Soil Cuttings	
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

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PROJECT:	Santee Hotel	SUBCONTRACTOR:	BAJA Exploration	SHEET:	1 of 1
CTE JOB NO:	4830.2200060.0000	EQUIPMENT:	CME-75: 8" Hollow Stem Auger	DRILLING DATE:	2/9/2023
LOGGED BY:	DJT	SAMPLE METHOD:	N/A	ELEVATION:	~336'

BORING: P-3

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0								AC: 0-3"	
1								AB: 3"-9"	
2						SM		**QUATERNARY PREVIOUSLY-PLACED FILL (Qppf):** Medium dense, slightly moist, brown, fine- to medium-grained Silty Sand.	
3						CL		Medium stiff to stiff, slighlty moist, gray-brown Sandy Clay.	
4						SM		**QUATERNARY ALLUVIUM AND COLLUVIUM (Qu):** Medium dense, slightly moist, brown, fine-grained Silty Sand.	
5								Total Depth: 5'	
6								No Groundwater Encountered	
7								Backfilled with Soil Cuttings	
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

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PROJECT:	Santee Hotel	SUBCONTRACTOR:	BAJA Exploration	SHEET:	1 of 1
CTE JOB NO:	4830.2200060.0000	EQUIPMENT:	CME-75: 8" Hollow Stem Auger	DRILLING DATE:	2/9/2023
LOGGED BY:	DJT	SAMPLE METHOD:	N/A	ELEVATION:	~336'

BORING: P-4

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0								AC: 0-3"	
1								AB: 3"-9"	
2						SM		**QUATERNARY PREVIOUSLY-PLACED FILL (Qppf):** Medium dense, slightly moist, brown, fine- to medium-grained Silty Sand.	
3						CL		Medium stiff to stiff, slighlty moist, gray-brown Sandy Clay.	
4								Total Depth: 3.5'	
5								No Groundwater Encountered	
6								Backfilled with Soil Cuttings	
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

Project: Santee Hotel

Project No.: 4830.2200060.000 Tables P-1

Percolation Field Data and Calculated Rates

P-1 **Total Depth:** **56 inches**

Time	Test Interval Time (minutes)	Test Refill Depth /Inches	Water Level Initial/Start Depth /Inches	Water Level End/Final Depth /Inches	Incremental Water Level Change (inches)	Percolation Rate inches/minute	Percolation Rate inches/hour
8:00:00	Initial	None	36.00	initial	-		
8:30:00	30	NO	36.00	36.00	0.00	0.000	0.000
9:00:00	30	NO	36.00	36.00	0.00	0.000	0.000
9:30:00	30	NO	36.00	36.00	0.00	0.000	0.000
10:00:00	30	NO	36.00	36.00	0.00	0.000	0.000
10:30:00	30	NO	36.00	36.00	0.00	0.000	0.000
11:00:00	30	NO	36.00	36.00	0.00	0.000	0.000
11:30:00	30	NO	36.00	36.00	0.00	0.000	0.000
12:00:00	30	NO	36.00	36.00	0.00	0.000	0.000
12:30:00	30	NO	36.00	36.00	0.00	0.000	0.000
13:00:00	30	NO	36.00	36.00	0.00	0.000	0.000
13:30:00	30	NO	36.00	36.00	0.00	0.000	0.000
14:00:00	30	NO	36.00	36.00	0.00	0.000	0.000

P-2 **Total Depth:** **40 inches**

Time	Test Interval Time (minutes)	Test Refill Depth /Inches	Water Level Initial/Start Depth /Inches	Water Level End/Final Depth /Inches	Incremental Water Level Change (inches)	Percolation Rate inches/minute	Percolation Rate inches/hour
8:00:00	Initial	None	19.75	initial	-		
8:30:00	30	NO	19.75	19.75	0.000	0.000	0.000
9:00:00	30	NO	19.75	19.75	0.000	0.000	0.000
9:30:00	30	NO	19.75	19.75	0.000	0.000	0.000
10:00:00	30	NO	19.75	19.75	0.000	0.000	0.000
10:30:00	30	NO	11.00	19.75	8.750	0.292	17.500
11:00:00	30	NO	19.75	19.75	0.000	0.000	0.000
11:30:00	30	NO	19.75	19.75	0.000	0.000	0.000
12:00:00	30	NO	19.75	19.75	0.000	0.000	0.000
12:30:00	30	NO	19.75	19.75	0.000	0.000	0.000
13:00:00	30	NO	19.75	19.75	0.000	0.000	0.000
13:30:00	30	NO	19.75	19.75	0.000	0.000	0.000
14:00:00	30	NO	19.75	19.75	0.000	0.000	0.000

P-3					Total Depth:	59 inches	
Time	Test Interval Time	Test Refill	Water Level Initial/Start	Water Level End/Final	Incremental Water Level Change	Percolation Rate	Percolation Rate
	(minutes)	Depth /Inches	Depth /Inches	Depth /Inches	(inches)	inches/minute	inches/hour
8:05:00	Initial	None	39.25	initial	-		
8:35:00	30	NO	39.25	39.25	0.00	0.000	0.000
9:05:00	30	NO	39.25	39.25	0.00	0.000	0.000
9:35:00	30	NO	39.25	39.25	0.00	0.000	0.000
10:05:00	30	NO	39.25	39.25	0.00	0.000	0.000
10:35:00	30	NO	39.25	39.25	0.00	0.000	0.000
11:05:00	30	NO	39.25	39.25	0.00	0.000	0.000
11:35:00	30	NO	39.25	39.25	0.00	0.000	0.000
12:05:00	30	NO	39.25	39.25	0.00	0.000	0.000
12:35:00	30	NO	39.25	39.25	0.00	0.000	0.000
13:05:00	30	NO	39.25	39.25	0.00	0.000	0.000
13:35:00	30	NO	39.25	39.25	0.00	0.000	0.000
14:05:00	30	NO	39.25	39.25	0.00	0.000	0.000

P-4					Total Depth:	42 inches	
Time	Test Interval Time	Test Refill	Water Level Initial/Start	Water Level End/Final	Incremental Water Level Change	Percolation Rate	Percolation Rate
	(minutes)	Depth /Inches	Depth /Inches	Depth /Inches	(inches)	inches/minute	inches/hour
8:05:00	Initial	None	22.50	initial	-		
8:35:00	30	NO	22.50	22.50	0.00	0.000	0.000
9:05:00	30	NO	22.50	22.50	0.00	0.000	0.000
9:35:00	30	NO	22.50	22.50	0.00	0.000	0.000
10:05:00	30	NO	22.50	22.50	0.00	0.000	0.000
10:35:00	30	NO	22.50	22.50	0.00	0.000	0.000
11:05:00	30	NO	22.50	22.50	0.00	0.000	0.000
11:35:00	30	NO	22.50	22.50	0.00	0.000	0.000
12:05:00	30	NO	22.50	22.50	0.00	0.000	0.000
12:35:00	30	NO	22.50	22.50	0.00	0.000	0.000
13:05:00	30	NO	22.50	22.50	0.00	0.000	0.000
13:35:00	30	NO	22.50	22.50	0.00	0.000	0.000
14:05:00	30	NO	22.50	22.50	0.00	0.000	0.000

Percolation Rate Conversion P-1

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	36.00
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	36.00
Total Depth of Test Hole,	D_T =	56

H_o =	20	in
H_f =	20	in
$\Delta H = \Delta D$ =	0	in
H_{avg} =	20	in
I_t =	0.000	in/hr

Percolation Rate Conversion P-2

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	19.75
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	19.75
Total Depth of Test Hole,	D_T =	40

H_o =	20.25	in
H_f =	20.25	in
$\Delta H = \Delta D$ =	0	in
H_{avg} =	20.25	in
I_t =	0.000	in/hr

Percolation Rate Conversion P-3

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	39.25
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	39.25
Total Depth of Test Hole,	D_T =	59

H_o =	19.75	in
H_f =	19.75	in
$\Delta H = \Delta D$ =	0	in
H_{avg} =	19.75	in
I_t =	0.000	in/hr

Percolation Rate Conversion P-4

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	22.50
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	22.50
Total Depth of Test Hole,	D_T =	42

H_o =	19.5	in
H_f =	19.5	in
$\Delta H = \Delta D$ =	0	in
H_{avg} =	19.5	in
I_t =	0.000	in/hr

TABLE

RESULTS OF PERCOLATION TESTING WITH 2.0 FACTOR OF SAFETY APPLIED

Test Location	Test Depth (inches)	Case	Soil Type* (USCS Classification)	Percolation Rate (inches per hour)	Infiltration Rate (inches per hour)	Infiltration Rate with FOS of 2 Applied (inches per hour)
P-1	56	non-sandy	Qppf	0.000	0.000	0.000
P-2	40	non-sandy	Qppf	0.000	0.000	0.000
P-3	59	non-sandy	Qu	0.000	0.000	0.000
P-4	42	non-sandy	Qppf	0.000	0.000	0.000

ATTACHMENT B

WORKSHEET I-8

Worksheet I-8 : Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet I-8	
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: Percolation tests were performed in Clayey soils, with no infiltration observed on site over a period of six hours. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Worksheet I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration If any answer from row 1-4 is "No", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		No Full

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Worksheet I-8 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: Percolation tests were performed in Clayey soils, with no infiltration observed on site over a period of six hours. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			

Worksheet I-8 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration. If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.		No Infil

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings

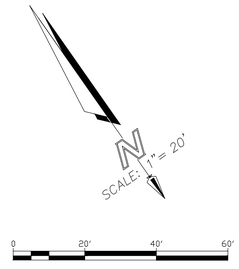
ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

X Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	**Contents**	**Checklist**
Attachment 2a	Hydromodification Management Exhibit (Required)	☐ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☐ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☐ Not performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☐ Included ☐ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☐ Not required because BMPs will drain in less than 96 hours



PREPARED BY:

LANDMARK CONSULTING
Planning Engineering Surveying
9555 Genesee Avenue, Suite 200
San Diego, CA 92121, (858) 587-8070

CITY OF SANTEE

HOME2 HOTEL

TOWN CENTER PARKWAY

HMP Exempt Mapping Exhibit

ATTACHMENT 1

SHEET NO. 1 OF 1

FILE: P:\0348-1 SANTEE HOME2 HOTEL\E REPORTS AND ANALYSIS\SWQMP\CAD\348-1 HMP EXEMPT MAPPING.DWG PLOTTED: 7/5/2022 12:37:59 PM

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

- ☐ Underlying hydrologic soil group
- ☐ Approximate depth to groundwater
- ☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☐ Critical coarse sediment yield areas to be protected
- ☐ Existing topography
- ☐ Existing and proposed site drainage network and connections to drainage offsite
- ☐ Proposed grading
- ☐ Proposed impervious features
- ☐ Proposed design features and surface treatments used to minimize imperviousness
- ☐ Point(s) of Compliance (POC) for Hydromodification Management
- ☐ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- ☐ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

ATTACHMENT 3
Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	X Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Maintenance Agreement (when applicable)	X Included ☐ Not Applicable

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

X Preliminary Design / Planning / CEQA level submittal:

Attachment 3a must identify:

- ☒ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

☐ **Final Design level submittal:**

Attachment 3a must identify:

- ☐ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b shall include a draft maintenance agreement in the local jurisdiction's standard format (PDP applicant to contact the [City Engineer] to obtain the current maintenance agreement forms).

STRUCTURAL BMP MAINTENANCE - BIOFILTRATION BASIN

BMP Identifier	Inspection Activities	Frequency
BF-1-1 AND BF-1-7	• Check for accumulated litter and debris • Inspect plant health and for bare spots • Check for overgrowth • Check for standing water and ponding that does not drain within 96 hrs of a storm event • Inspect riser and outlet structure (if applicable) • Check for any erosion due to concentrated flow.	-Two Times per year, at beginning and end of wet season -After any storm event with greater than 0.5" of precipitation.

Indicator	Threshold	Action Required
Accumulated litter and Debris	3" of accumulation (top of riser only 12" above grade)	Remove and dispose of material
Bare Spots, unhealthy vegetation	When noticeable bare spots are present, or significant plant loss	Replant and reseed per original plans.
Overgrown vegetation	Plant growth has obstructed riser structure.	Trim to below riser structure or original plans.
Standing water in basin	Ponding does not completely drain in 96 hrs.	Remove any accumulated sediments along riser. Inspect outlet structure and repair as necessary. Engineered soil within basin may need to be replaced.
Damage to riser and outlet structure (if applicable)	Any visible damage to riser or outlet structure	Repair and replace as necessary.
Evidence of soil erosion	Channelization within BMP is evident.	Add stone protections to flow inlets. Regrade to original plans.

Table 1: BMP inspection activities for Modular Wetland BMPs

BMP Identifier	Inspection Activities	Frequency
MOD-1, MOD-2,	• Check for accumulated litter and debris • Inspect plant health and for bare spots • Inspect curb opening for any debris or blockage • Inspect drain downlines within vault for any blockages or clogs • Check for build up or clogging of pre-filter cartridges. • Check for overgrowth • Check for standing water and ponding that does not drain within 96 hrs of a storm event within outlet vault. • Inspect riser and outlet structure (if applicable)	-Two Times per year, at beginning and end of wet season -After any storm event with greater than 0.5" of precipitation.

Table 2: BMP thresholds that trigger required maintenance of Modular Wetlands

Indicator	**Threshold**	**Action Required**
Accumulated litter and Debris in curb opening	Any visible debris blocking/clogging opening	Remove all debris
Cartridges Clogged with debris	Excessive build up of sediments	Refer to Modular Wetlands Maintenance Manual in Appendix A
Accumulated litter and Debris in vault	6" of accumulation (top of riser only 18" above grade)	Remove and dispose of material Refer to Modular Wetlands Maintenance Manual in Appendix A
Bare Spots, unhealthy vegetation	When noticeable bare spots are present, or significant plant loss	Replant and reseed per original plans. Refer to Modular Wetlands Maintenance Manual in Appendix A
Overgrown vegetation	Plant growth has obstructed riser structure.	Trim to below riser structure or original plans. Refer to Modular Wetlands Maintenance Manual in Appendix A
Standing water in vault	Ponding does not completely drain in 96 hrs.	Remove any accumulated sediments along riser. Inspect outlet structure and repair as necessary. Engineered soil within basin may need to be replaced.
Damage to riser and outlet structure (if applicable)	Any visible damage to riser or outlet structure	Repair and replace as necessary.
Evidence of soil erosion	Channelization within BMP is evident.	Add stone protections to flow inlets. Regrade to original plans.

TABLE 1 – INSPECTION ACTIVITIES

BMP IDENTIFIERS	INSPECTION ACTIVITIES	FREQUENCY
STREET TREES – TW-1	CHECK FOR TREE HEALTH CHECK FOR ACCUMULATED DEBRIS CHECK FOR PONDING WATER	MIN. MONTHLY/AS NEEDED MONTHLY/AFTER 0.5IN OR GREATER STORM EVENT MONTHLY/AFTER 0.5IN OR GREATER STORM EVENT

TABLE 2 – MAINTENANCE THRESHOLDS AND ACTION TRIGGERS

INDICATOR	THRESHOLD	ACTION REQUIRED
TREE HEALTH	UNHEALTHY ROOTS, LEAVES, POOR ESTABLISHMENT	ROUTINE MAINTENANCE, WATERING, PRUNING
DEAD OR DISEASED TREE	PRESENCE OF DISEASED OR DEAD TREE	REMOVE TREE AND REPLANT WITH SAME SPECIES TO ORIGINAL DESIGN
DEBRIS ACCUMULATION	3" OF ACCUMULATION OR BLOCKAGE OF CURB CUTS OR PERFORATED BREATHER TUBE	REMOVE AND DISPOSE OF ALL ACCUMULATED DEBRIS
VEGETATION OVERGROWTH	PLANT GROWTH OBSTRUCTED CURB CUTS/BREATHER TUBES	TRIM TO BELOW CURB OR BREATHER TUBE OPENING OR TO ORIGINAL DESIGN

ATTACHMENT 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

- ☐ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☐ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☐ Details and specifications for construction of structural BMP(s)
- ☐ Signage indicating the location and boundary of structural BMP(s) as required by the [City Engineer]
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- ☐ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- ☐ All BMPs must be fully dimensioned on the plans
- ☐ When proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number shall be provided. Photocopies of general brochures are not acceptable.

PRELIMINARY GRADING PLAN FOR SANTEE HOME2 HOTEL

LEGEND

	SYMBOL	QTY
PROJECT BOUNDARY		
EXISTING EASEMENT		
EXISTING WATER	6"W	
EXISTING SEWER	S	
EXISTING INLET/CB AND SD		
EXISTING SIDEWALK		
PROPOSED BUILDING		
PROPOSED STORM DRAIN	OR	250 LF, 350 LF
PROPOSED CATCH BASIN/INLET		1 EA
PROPOSED SIDEWALK		3,000 SF
PROPOSED MODULAR WETLAND SYSTEM		2 EA
PROPOSED BIOFILTRATION BASIN		2 EA
PROPOSED AC PAVEMENT		20,000 SF
PROPOSED TREE WELL		1 EA
PROPOSED GRATE INLET		1 EA
PROPOSED FIRE HYDRANT		1 EA

LEGAL DESCRIPTION

PARCEL 4 OF PARCEL MAP NO. 18857, IN THE CITY OF SANTEE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY ON DECEMBER 10, 2001 AS FILE NO. 2001-0904572 OF OFFICIAL RECORDS, AND THOSE CERTAIN EASEMENTS FOR INGRESS, EGRESS, PARKING, UTILITIES, DRAINAGE AND OTHER PURPOSES AS CONTAINED IN A DOCUMENT ENTITLED "OPERATION AND EASEMENT AGREEMENT" DATED DECEMBER 18, 2001 BY AND BETWEEN TARGET CORPORATION AND VESTAR/KIMCO SANTEE, L.P., RECORDED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY ON DECEMBER 18, 2001 AS FILE NO. 2001-0930462.

ASSESSOR'S PARCEL NUMBER

381-052-04-00

DEVELOPMENT SUMMARY

1. GROSS PROJECT AREA: 70,562 SF (1.62 AC)
2. NUMBER OF EXISTING LOTS: 1
3. NUMBER OF PROPOSED LOTS: 1
4. EXISTING ZONING: TOWN CENTER
5. PROPOSED ZONING: TOWN CENTER
6. GENERAL PLAN LAND USE DESIGNATION: TOWN CENTER
7. EXISTING LAND USE: PARKING LOT
8. PROPOSED LAND USE: 4-STORY HOTEL WITH POOL, OUTDOOR AMENITY AREA AND SURFACE PARKING
9. NUMBER OF UNITS: 97 GUEST ROOMS
10. SETBACKS:
    - FRONT 10'
    - STREET SIDE YARD 5'
    - INTERIOR SIDE 5'
    - REAR 5'
11. PARKING PROVIDED
    - STANDARD PARKING SPACE: 62
    - ADA ACCESSIBLE PARKING PACE: 4
    - MOTORCYCLE: 1
    - EV CHARGING: 4
    - CLEAN AIR VANPOOL: 16
    - OFFSITE PARKING (SHARED): 23
12. BICYCLE (SHORT TERM): 6

ENGINEER OF WORK

LANDMARK CONSULTING
9555 GENESEE AVE. SUITE 200
SAN DIEGO, CA 92121
(858) 587-8070

BY: _____ DATE:
DAVID YEH

OWNER/SUBDIVIDER

EXCEL HOTEL GROUP
10174 OLD GROVE RD, SUITE 200
SAN DIEGO, CA 92131
(858) 621-4908
BY: _____ DATE:
NEIL PATEL

PROJECT ADDRESS

381 TOWN CENTER PARKWAY
SANTEE, CA 92071

EASEMENT NOTES

5 AN EASEMENT FOR WATER AND INCIDENTAL PURPOSES THERETO AS DEDICATED AND DELINEATED ON THE PARCEL MAP RECORDED IN PARCEL MAP NO. 18857. (PLOTTED HEREON)

6 AN EASEMENT FOR PEDESTRIAN ACCESS, LANDSCAPE MAINTENANCE AND INCIDENTAL PURPOSES THERETO AS DEDICATED AND DELINEATED ON THE PARCEL MAP RECORDED IN PARCEL MAP NO. 18857. (PLOTTED HEREON)

7 AN EASEMENT FOR SEWER AND INCIDENTAL PURPOSES THERETO AS DEDICATED AND DELINEATED ON THE PARCEL MAP RECORDED IN PARCEL MAP NO. 18857. (PLOTTED HEREON)

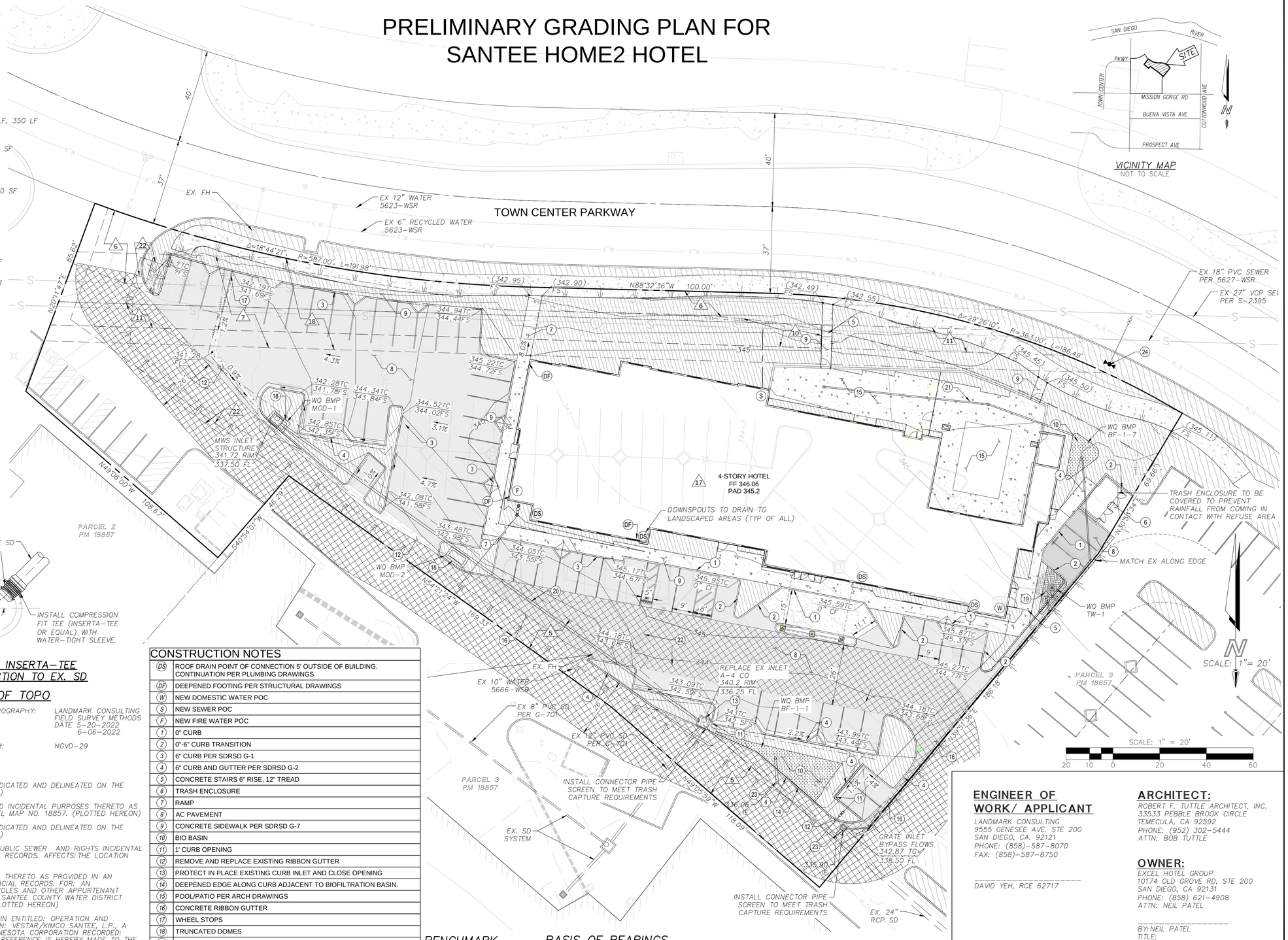
10 AN EASEMENT IN FAVOR OF SANTEE COUNTY WATER DISTRICT FOR A PUBLIC SEWER AND RIGHTS INCIDENTAL THERETO, RECORDED 3/16/1959 IN BOOK 7549 PAGE 293, OF OFFICIAL RECORDS. AFFECTS: THE LOCATION OF SAID EASEMENT IS SET FORTH THEREIN.(PLOTTED HEREON)

11 AN EASEMENT FOR PURPOSES HEREIN STATED, AND RIGHTS INCIDENTAL THERETO AS PROVIDED IN AN INSTRUMENT RECORDED: 4/17/1959 AS DOCUMENT NO. 76604, OF OFFICIAL RECORDS. FOR: AN UNDERGROUND SEWER LINE, LATERALS OR SERVICE LINES, SEWER MANHOLES AND OTHER APPURTENANT UNDERGROUND STRUCTURES AND INCIDENTAL PURPOSES IN FAVOR OF: SANTEE COUNTY WATER DISTRICT AFFECTS: THE LOCATION OF SAID EASEMENT IS SET FORTH THEREIN.(PLOTTED HEREON)

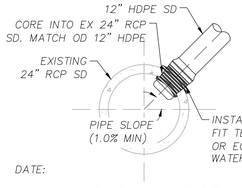
17 AN INSTRUMENT, UPON THE TERMS AND CONDITIONS CONTAINED THEREIN ENTITLED: OPERATION AND EASEMENT AGREEMENT DATED: 12/18/2001 EXECUTED BY AND BETWEEN: VESTAR/KIMCO SANTEE, L.P., A CALIFORNIA LIMITED PARTNERSHIP AND TARGET CORPORATION, A MINNESOTA CORPORATION RECORDED: 12/18/2001, AS INSTRUMENT NO. 2001-930462 OF OFFICIAL RECORDS REFERENCE IS HEREBY MADE TO THE ABOVE DOCUMENT FOR FULL PARTICULARS. SAID MATTER AFFECTS THE HEREIN DESCRIBED LAND AND OTHER LAND. REFERENCE IS HEREBY MADE TO THE ABOVE DOCUMENT FOR FULL PARTICULARS. (PLOTTED HEREON)

18 AN EASEMENT IN FAVOR OF LAKESIDE SANITATION DISTRICT FOR SEWER LINES AND RIGHTS INCIDENTAL THERETO, RECORDED 1/22/2002 AS INSTRUMENT NO. 2002-51672, OF OFFICIAL RECORDS. AFFECTS: THE LOCATION OF SAID EASEMENT IS SET FORTH THEREIN. (PLOTTED HEREON)

22 AN EASEMENT IN FAVOR OF PADRE DAM MUNICIPAL WATER DISTRICT FOR UNDERGROUND WATER PIPELINES, MAIN SEWER LINES, INGRESS AND EGRESS AND RIGHTS INCIDENTAL THERETO, RECORDED 9/8/2003 AS INSTRUMENT NO. 2003-1091894, OF OFFICIAL RECORDS. AFFECTS: THE LOCATION OF SAID EASEMENT IS SET FORTH THEREIN. SAID MATTER AFFECTS THE HEREIN DESCRIBED LAND AND OTHER LAND. (PLOTTED HEREON)



VICINITY MAP
NOT TO SCALE



DETAIL: INSERTA-TEE CONNECTION TO EX. SD

SOURCE OF TOPO

DATE: SOURCE OF TOPOGRAPHY: LANDMARK CONSULTING FIELD SURVEY METHODS DATE 5-20-2022 6-06-2022

VERTICAL DATUM: NGVD-29

CONSTRUCTION NOTES

DS	ROOF DRAIN POINT OF CONNECTION 5' OUTSIDE OF BUILDING. CONTINUATION PER PLUMBING DRAWINGS
DF	DEEPENED FOOTING PER STRUCTURAL DRAWINGS
W	NEW DOMESTIC WATER POC
S	NEW SEWER POC
F	NEW FIRE WATER POC
1	0" CURB
2	0"-6" CURB TRANSITION
3	6" CURB PER SDRSD G-1
4	6" CURB AND GUTTER PER SDRSD G-2
5	CONCRETE STAIRS 6" RISE, 12" TREAD
6	TRASH ENCLOSURE
7	RAMP
8	AC PAVEMENT
9	CONCRETE SIDEWALK PER SDRSD G-7
10	BIO BASIN
11	1' CURB OPENING
12	REMOVE AND REPLACE EXISTING RIBBON GUTTER
13	PROTECT IN PLACE EXISTING CURB INLET AND CLOSE OPENING
14	DEEPENED EDGE ALONG CURB ADJACENT TO BIOFILTRATION BASIN.
15	POOL/PATIO PER ARCH DRAWINGS
16	CONCRETE RIBBON GUTTER
17	WHEEL STOPS
18	TRUNCATED DOMES
19	MODULAR WETLAND UNIT
20	PROP 18" HDPE SD
21	PROP 6" SD AND AREA DRAINS
22	RELOCATE REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) TO RAISED ISLAND
23	CONNECT TO EX SD WITH INSERT-A-TEE
24	FH W/ TWO 2-1/2" PORTS & ONE 4" PORT WITH ALL BRONZE CONSTRUCTION AND PAINTED FIRE HYDRANT YELLOW.

BENCHMARK

STATION 2075 PER ROS 11252. LEAD PLUG & BRASS TAG "I" EASTERLY OF THE E'LY PCR @ SE COR MISSION GORGE RD. & OLIVE LANE. ELEV 337.97 (NGVD 29)

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM, CCS83, ZONE 6, BASED LOCALLY ON CONTROL STATIONS P473 AND P472 NAD 83(NSRS2011) EPOCH 2017.50. ALL BEARINGS SHOWN ON THIS MAP ARE GRID. QUOTED BEARINGS AND DISTANCES FROM REFERENCE MAPS OR DEEDS ARE AS SHOWN PER THAT RECORD REFERENCE. ALL DISTANCES SHOWN ARE GROUND DISTANCES UNLESS SPECIFIED OTHERWISE. GRID DISTANCES, MAY BE OBTAINED BY MULTIPLYING THE GROUND DISTANCE BY A COMBINATION FACTOR OF 0.99997433. CALCULATIONS ARE MADE AT A FOUND M-10 WELL MONUMENT WITH BRASS DISC STAMPED RCE 31138 ON THE CENTERLINE OF TOWNE CENTER PARKWAY, ±197' E'LY OF THE CENTERLINE OF RIVERVIEW PKWY, WITH COORDINATES OF: N: 1886976.2230', E: 6337902.3680', USING AN ELEVATION OF 342.70'.

ENGINEER OF WORK/ APPLICANT

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_____
DAVID YEH, RCE 62717

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ATTN: BOB TUTTLE

OWNER:

EXCEL HOTEL GROUP
10174 OLD GROVE RD, STE 200
SAN DIEGO, CA 92131
PHONE: (858) 621-4908
ATTN: NEIL PATEL

_____
BY: NEIL PATEL
TITLE:

PROJECT NAME: SANTEE HOME2 HOTEL

DATE PREPARED: 7/8/2022

SHEET TITLE: PRELIMINARY GRADING PLAN

SHEET 1 OF 1

NO.	DATE	REVISION
1	10-24-2022	1
2		
3		

C-1