Appendix F:
Preliminary Water Quality Management Plan

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Preliminary Engineering Drainage Study

For Shopoff Chula Vista

Prepared For:

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167467

Prepared:

November 2018

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INTERNATIONAL

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Section 1 Project Description and Scope

1.1 Project Data

Project Owner: Shopoff Land Fund V, LP

Project Site Address: 676 Moss Street Chula Vista, CA 91911

APN Number(s): 618-010-26,31,32

Project Location: Latitude: 32.613177
Longitude: 117.087946

Project Site Area: 6.9 acres

Adjacent Streets:

North:	L St.
South:	Moss St.
East:	Broadway
West:	Industrial Blvd.

Adjacent Land Uses:

North:	Commercial
South:	Residential
East:	Commercial/Residential
West:	Commercial

1.2 Scope of Report

This study develops 100-year storm peak flows for the pre and post development conditions to identify the hydrologic and hydraulic effect of the proposed project.

This report does not discuss required water quality measures to be taken on an interim level during construction, nor those necessary to be implemented on a permanent basis. Those discussions can be found under separate cover in the project "Storm Water Pollution Prevention Plan," (SWPPP) and the "Storm Water Quality Management Plan" (SWQMP), respectively. Additionally, this report does not discuss hydromodification mitigation requirements and/or exemptions. That discussion can be found in Attachment 2 of the SWQMP.

1.3 Project Information

The 6.9-acre Shopoff project is located at the corner of Moss St. and Industrial Blvd. in the City of Chula Vista. The project includes a change in site zoning from "limited industrial" to "Dense Residential (R3)". An existing on-site industrial facility will be demolished, along with existing hardscape and replaced with 141 townhome style condominium buildings. Access to the new subdivision will be provided by a new driveway connecting to Moss St.

Based on the Natural Resources Conservation Service's (NRCS) Websoil Survey, the project site is comprised of Huero loam (OhF), with slopes ranging from 2 to 9 percent (hydrologic soil type D).

The Federal Emergency Management Agency (FEMA) has not mapped any Special Flood Hazard Areas (SFHAs) for the project site. The entire project site lies within shaded Zone X, which correlates with areas determined to within the 500-year flood; area of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from the 100-year flood.

1.4 Existing Condition

In the existing condition the site functions as a material and vehicle storage area for several industrial operations. The existing landcover consists of concrete, asphalt concrete, roofing and decomposed granite. Runoff from the project area ultimately discharges the site through Telegraph Canyon Creek. Telegraph Canyon Creek is an underground concrete culvert which runs east to west through the middle of the site. The culvert discharges to the San Diego Bay approximately 0.5 miles west of the site.

Refer to Appendix B for an exhibit detailing the existing condition.

1.5 Proposed Condition

The project proposes a 141-unit residential condominium development connected by 24' private roads. The site is graded to form two drainage basins which are collected by separate curb inlet and storm drain systems. Basin 1 comprises the southern half of the site and is approximately 2.95-acres. Runoff from Basin 1 will discharge to an existing 60" RCP running along the southwest corner of the site. The 60" RCP connects to Telegraph Canyon Creek approximately 100 feet downstream. Basin 2 comprises the northern half of the site and is approximately 3.95-acres. Runoff from Basin 2 is collected by a system of curb inlets and discharges directly into Telegraph Canyon Creek at a point along the western edge of the site.

Refer to Appendix C for an exhibit detailing the proposed condition.

1.6 Offsite Area

The 4.5-acre parcel to the northeast of the project drains to a triple grate inlet located along the northeast project border. This area is partially used as a parking lot for the Sweetwater Union High School District. Approximately a third of the parcel is unpaved open area. This parcel will be included in the hydrologic and hydraulic analysis to document that runoff from the area is not anticipated to impact the proposed development.

Refer to Appendix D for exhibits and calculations for the offsite analyzed area.

Section 2 Study Objectives

The specific objectives of this study are as follows:

- Quantify the existing and proposed 100-year peak flow rates from the project site;
- Quantify the 100-year peak flow rate for the northeast offsite area and document that existing drainage infrastructure hydraulic performance and capacity;
- Demonstrate the proposed improvements will not increase the potential for erosion across the site or downstream.

Section 3 Methodology

3.1 Hydrology

Advanced Engineering Solutions (AES – HydroWIN 2013) was used to model the hydrologic characteristics of the project site and off-site tributary area under pre and post development conditions. This software utilizes the Rational Method and conforms to the hydrologic methodologies outlined in the City of Chula Vista Subdivision Manual Section 3 (2012). The Rational Method is a physically based model that calculates peak flow rates (Q) as a function of runoff coefficients (C), rainfall intensities (I), and drainage areas (A):

$$Q = C * I * A$$

Runoff coefficients (c) were established using Section 3-203.3 of the Subdivision Manual. For the existing condition coefficient of 0.85 was chosen. The value corresponds with the commercial land use per the Subdivision Manual. For the proposed condition a coefficient of 0.75 was chosen for the site. This value corresponds with Dense Residential (R3) as the property is being re-zoned. The proposed improvements will increase the amount of pervious area on site as compared to the existing condition.

Time of concentration and rainfall intensities were developed internally within the AES software. The 'San Diego' AES module was used for this analysis and conforms to the methodologies described in the Subdivision Manual. Refer to Appendices B and C for existing and proposed condition calculations, respectively.

Area delineations were developed using project specific 1-foot contour topography. Off-site delineations were developed using a combination of field survey and USGS topography. Refer to the existing and proposed, on-site hydrologic work maps found in Appendices B and C, respectively. Refer to Appendix D for the off-site analysis.

3.2 Hydraulics

Inlet capacities have been calculated using the County of San Diego methodology outlined in Section 2.3.2.2 of the Drainage Design Manual (2014). The capture capacity of the existing off-site inlet was calculated by analyzing the system under weir and orifice flow conditions. The lower value calculated was used as the design capture capacity.

Autodesk's Hydraflow Express has been used to calculate the capture capacity of various lengths of curb inlet in a sump condition.

Bentley's Flowmaster software has been used to calculate the flow capacity of various sizes of pipe. Flow master utilizes Manning's equation to determine the flow capacity of a pipe given the slope, roughness coefficient, and diameter.

Section 4 Results

4.1 Hydrologic Results

The tables below summarize the hydrologic results under existing and proposed conditions. Calculations are included in Appendices B and C.

Table 4-1. Summary of Pre vs. Post Development Peak Flow Rates

Discharge Location	C -	I (in/hr)	A (ac)	Q_{100} (cfs)
Existing Condition				
Node 120	0.85	6.85	3.05	17.8
Node 220	0.85	5.58	2.28	10.8
Node 320	0.85	6.76	1.57	9.0
Total	**-**	**-**	**6.90**	**37.6**
Proposed Condition				
Node 120	0.75	4.18	3.95	12.4
Node 220	0.75	5.86	2.95	13.0
Total	**-**	**-**	**6.90**	**25.4**

*See Appendix B and C for weighted C value calculations for individual sub-basins

**Increase in flow at Node 220 is internal to the site. Total peak flow leaving the site is reduced in the proposed condition.

Table 4-2. Offsite Area Peak Flow Rate

Discharge Location	C -	I (in/hr)	A (ac)	Q_{100} (cfs)
Offsite Area				
Node 520	0.76	3.37	4.50	10.4

4.2 Hydraulic Results

The table below summarizes the hydraulic results.

Table 4-3. On-Site Hydraulic Summary

Location	Facility	Allowable Ponding (ft.)	Q100 (cfs)	Capture Capacity (cfs)
Offsite Inlet	3'x9' Grate Inlet	0.5	10.4	12.7

Proposed on-site curb inlets will be sized to capture the 100-year storm event with a maximum 0.5 foot ponding depth.

Section 5 Conclusions

Proposed conditions will result in a reduction in the total amount of impervious area on site, as compared to existing conditions, thus reducing project site peak flow. The proposed project will not substantially alter the existing drainage pattern of the site, nor will it have an adverse impact on the potential for erosion.

Section 6 Certification

This Drainage Study has been prepared under the direction of the following Registered Civil Engineer. The Registered Civil Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based. The plans and specifications in this Drainage Study are not for construction purposes; the contractor shall refer to final approved construction documents for plans and specifications.

Jay H. Sullivan RCE 77445 Date

Section 7 References

City of Chula Vista. (2012). *Subdivision Manual.* Chula Vista .

County, S. D. (2014). Hydraulic Design Manual.

County, S. D. (June 2003). *San Diego County Hydrology Manual.*

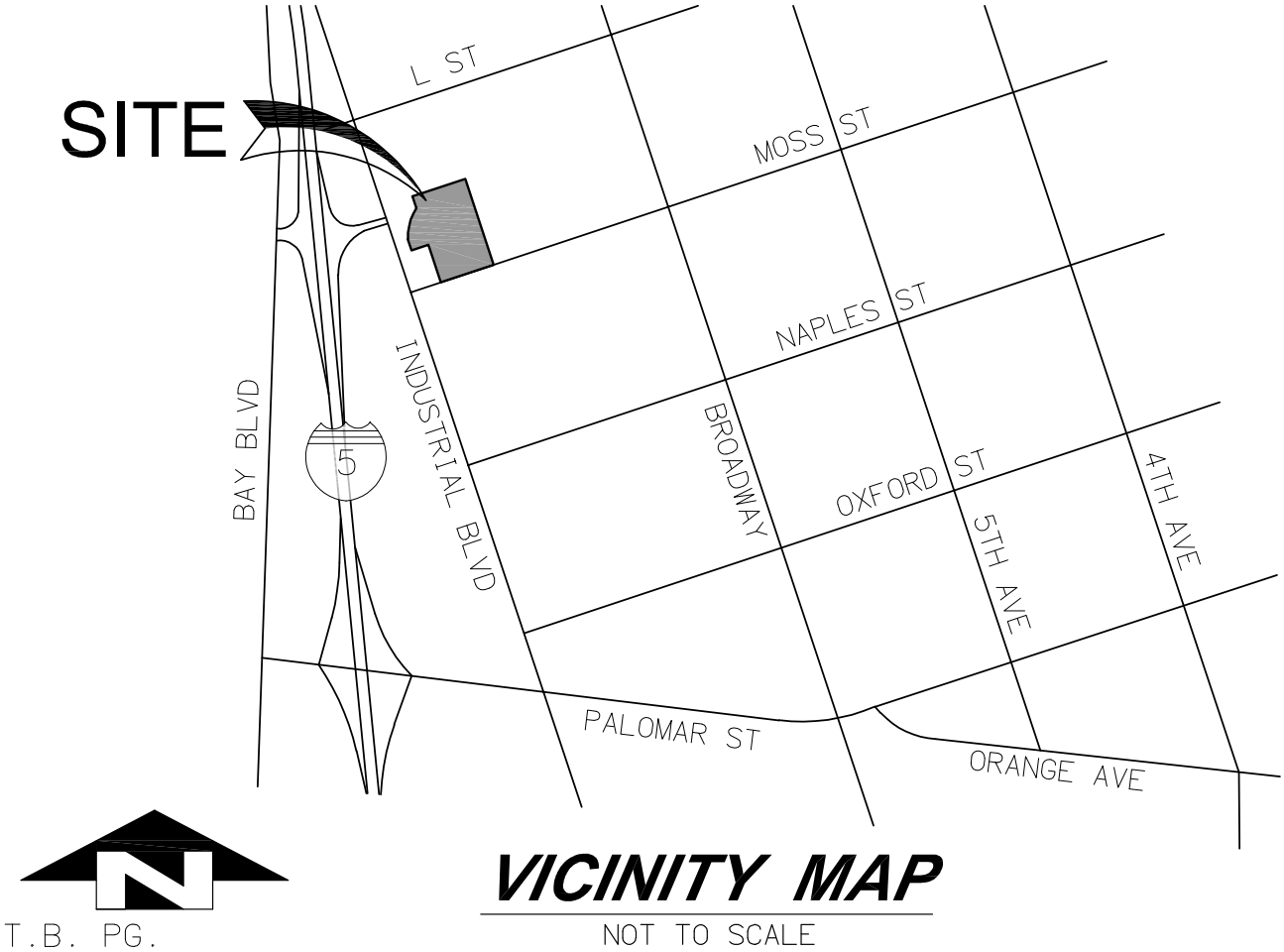
Diego, C. o. (April 1984). *Drainage Design Manual.* San Diego.

Engineering, G. &. (June 2015). *Model BMP Design Manual.* San Diego.

FEMA. (1997). *Flood Insurance Rate Map.* San Diego.

Appendix A – Site Information

Vicinity Map
Rainfall Isopluvials
Chula Vista Subdivision Manual Section 3 Except
FEMA FIRM
NRCS WebSoil Survey



VICINITY MAP

NOT TO SCALE

VICINITY MAP

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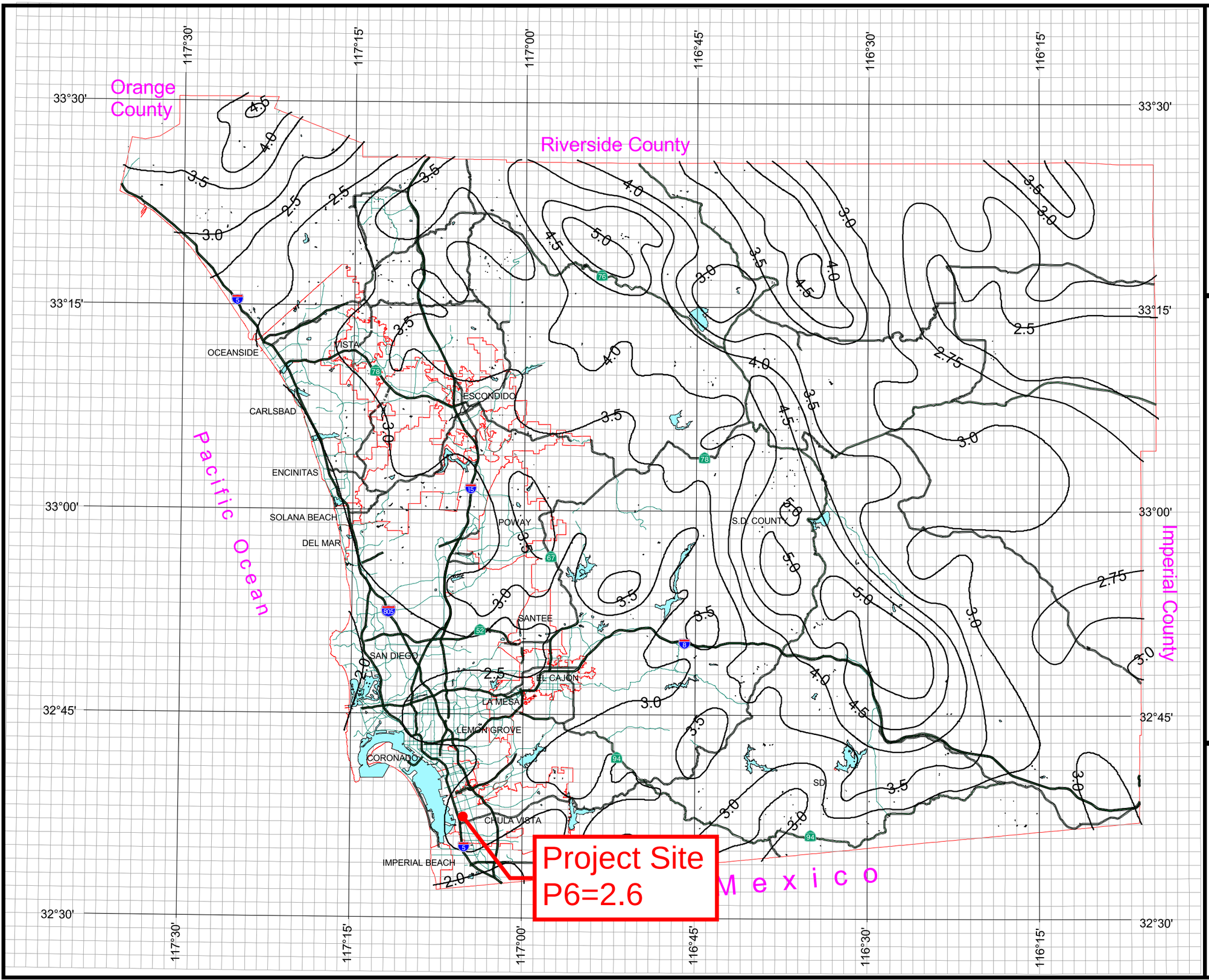
County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

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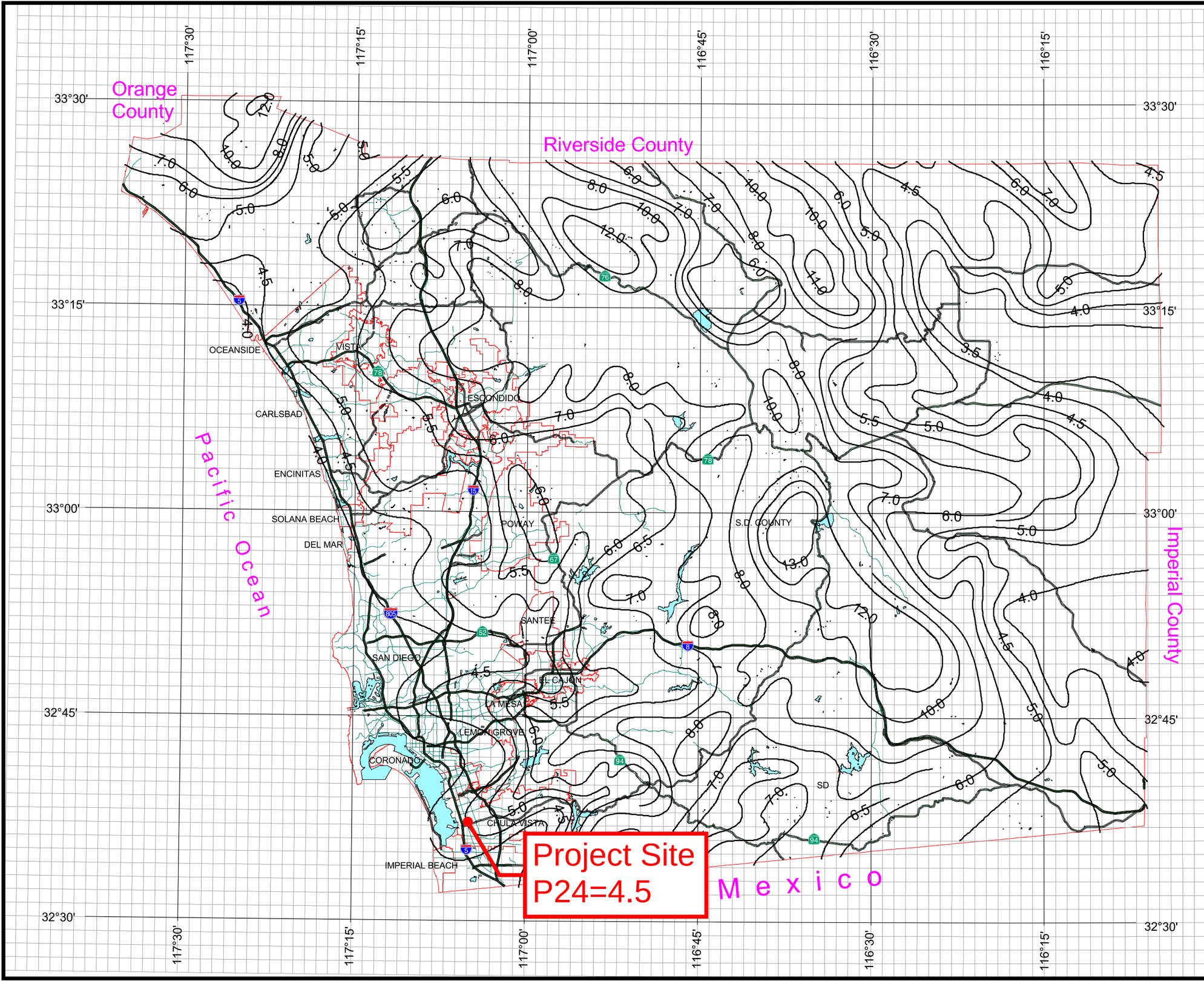
County of San Diego Hydrology Manual

Rainfall Isopluvials



100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
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3 0 3 Miles

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GENERAL DESIGN CRITERIA
SECTION 3-200
HYDROLOGY/DRAINAGE/URBAN RUNOFF

3-203 Hydrology

Developers draining to a river or stream will be required to use the latest adopted County Hydrology Manual to determine the flows expected at a given frequency (Q10, Q50 Q100, etc,) Infill developments will use the following Hydrology requirements. The City Engineer will determine which projects may be considered "infill" projects.

3-203.1 Previously Approved Reports

Runoff quantities; as set forth or derived from the report prepared by Lawrence, Fogg, Florer and Smith titled "A Special Study of Storm Drain Facilities" on file in the office of the City Engineer may be used in the design of drainage facilities in Chula Vista. A hydrologic study prepared and approved at General Development Plan (GDP) or Specific Planning Area (SPA) plan may be used as determined by the City Engineer.

3-203.2

For local drainage basins, storm discharge flow may be estimated based on the Rational Method or the Modified Rational Method. For all lateral and major drainage basins the SCS method, U.S. Army Corps of Engineers HEC-1 computer method or other tabular or computer method may be used upon City Engineer approval.

3-203.3 Rational and Modified Rational Methods

(1) The rational method equation relates storm rainfall intensity (I), a selected runoff coefficient (C) and drainage area (A) to the peak runoff rate (Q):

$$Q = CIA \text{ (Empirical Units)}$$

where:

Q = Peak runoff in cubic feet per second
C = Runoff coefficient
I = Intensity, inches per hours
A = Drainage basin area in acres

Or

$$Q=0.278CIA \text{ (Metric Units)}$$

where:

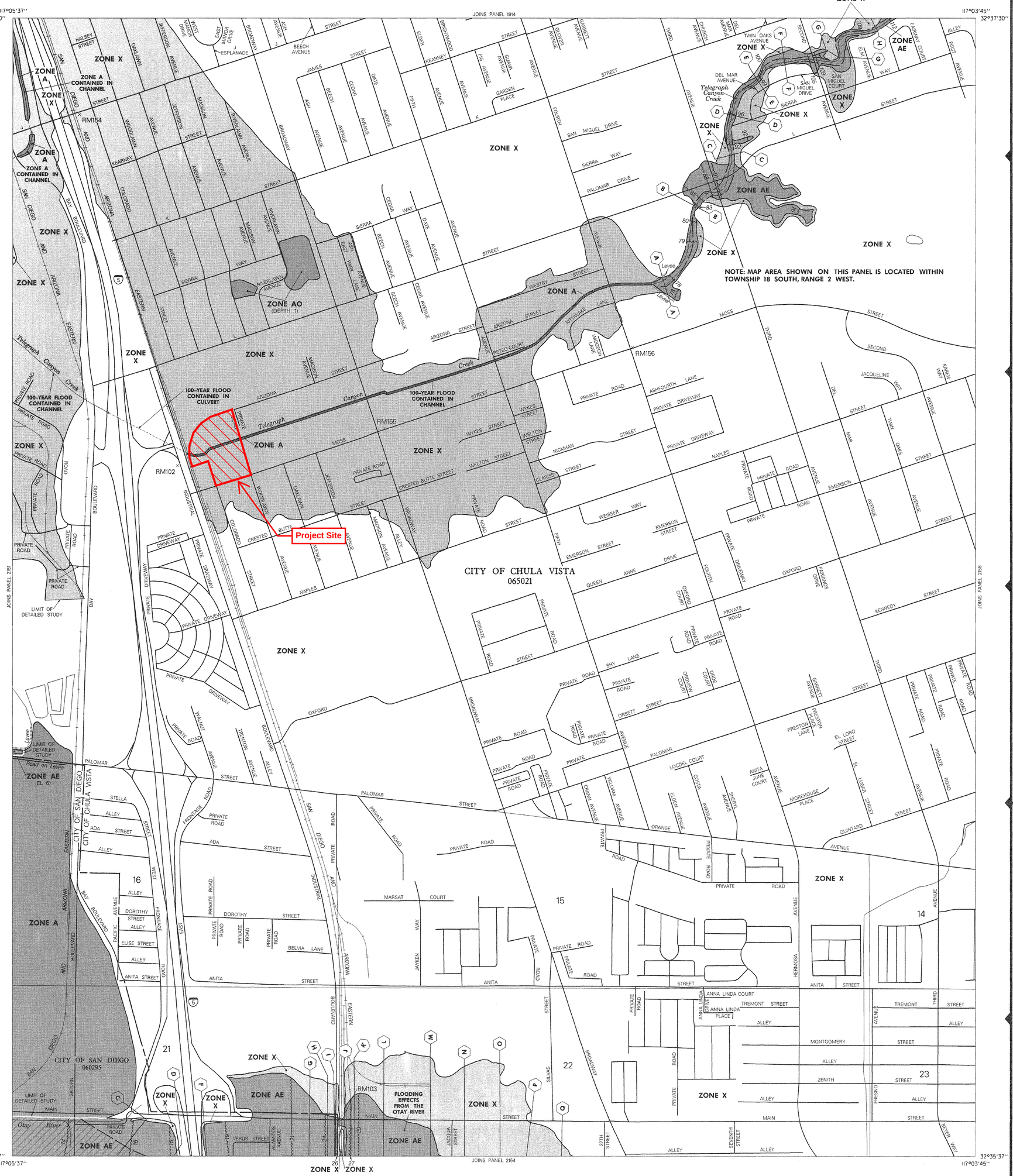
Q = Peak runoff in cubic meters per second
C = Runoff coefficient
I = Intensity in millimeters per second
A = Drainage area in square kilometers

(2) Coefficient of Runoff: Consider probable development. Use highest number of the following values:

a)	Paved Surface	0.90
b)	Commercial Area	0.85
c)	Dense Residential (R2, R3)	0.75

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM102	32.667	USC&GS bronze disk stamped "T 57 1926," located 2.0 miles north along San Diego and Arizona Eastern Railway from the crossing of Palm Avenue at Palm City, 1.5 mile southeast of Chula Vista, 9.5 rails north of the crossing of Moss Street, at Boal Siding, at small wooden bridge 9.06 over a drainage ditch, in the top of the west end of the north concrete abutment, 22.1 feet west of the west rail of the main track, and approximately 1 foot lower than the track.
RM103	43.110	USC&GS railroad spike stamped "U 57," located 0.7 mile north along the San Diego and Arizona Eastern Railway from the crossing of Palm Avenue at Palm City, at the steel bridge over Main Street, in the top of the east end of the north concrete abutment, 4.1 feet east of the east rail, and approximately level with the track.
RM154	17.963	USC&GS standard disk stamped "A 891 1955," 0.3 foot above the ground in the top of a concrete post located at the J Street crossing of the San Diego and Arizona Eastern Railroad, 56.3 feet northeast of the northeast rail, 21 feet southeast of the centerline of J Street, and in line with a row of poles 4 feet below the track and level with the street.
RM155	51.660	San Diego County chiseled 2-inch square located in the west end of concrete head wall on the north side of Moss Street and 50.0 feet east of Broadway.
RM156	87.740	San Diego County chiseled 2-inch square located in the east end curb of a driveway at the northeast corner of Fourth Avenue and Moss Street.



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year floodplain.
- **ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

- Flood Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.
- D — D — Cross Section Line
- (EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.
- RM7 × — Elevation Reference Mark
- ● M2 — River Mile
- 97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and /or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
JUNE 19, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE DATE shown on this map to determine when actuarial rates apply to structures in zones where elevations or depths have been established.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 2152 OF 2375
(SEE MAP INDEX FOR PANELS NOT PRINTED)

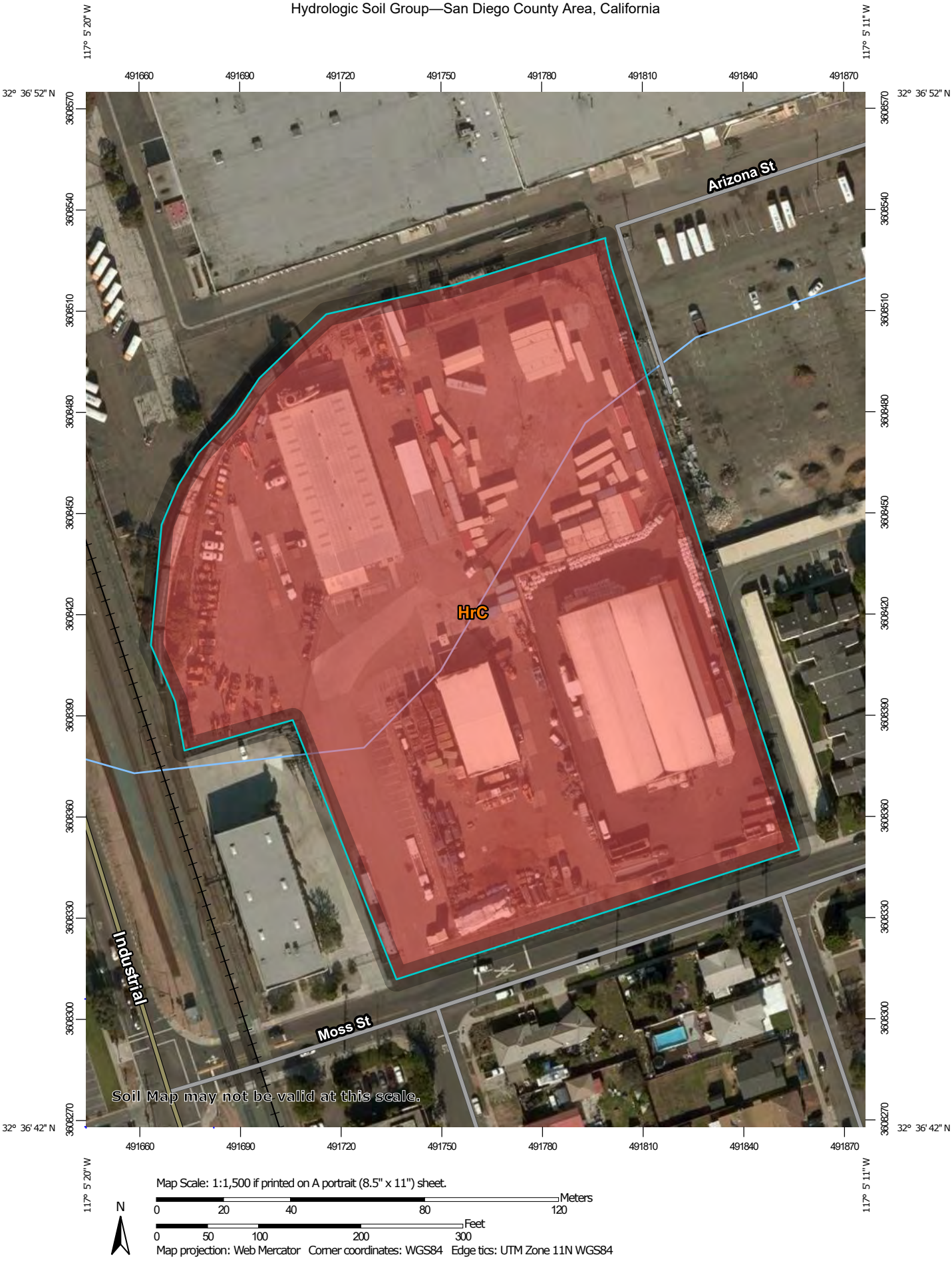
CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
CHULA VISTA, CITY OF	065021	2152	F
SAN DIEGO, CITY OF	060295	2152	F

MAP NUMBER 06073C2152 F

EFFECTIVE DATE: JUNE 19, 1997

Federal Emergency Management Agency

Hydrologic Soil Group—San Diego County Area, California



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 13, Sep 12, 2018

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

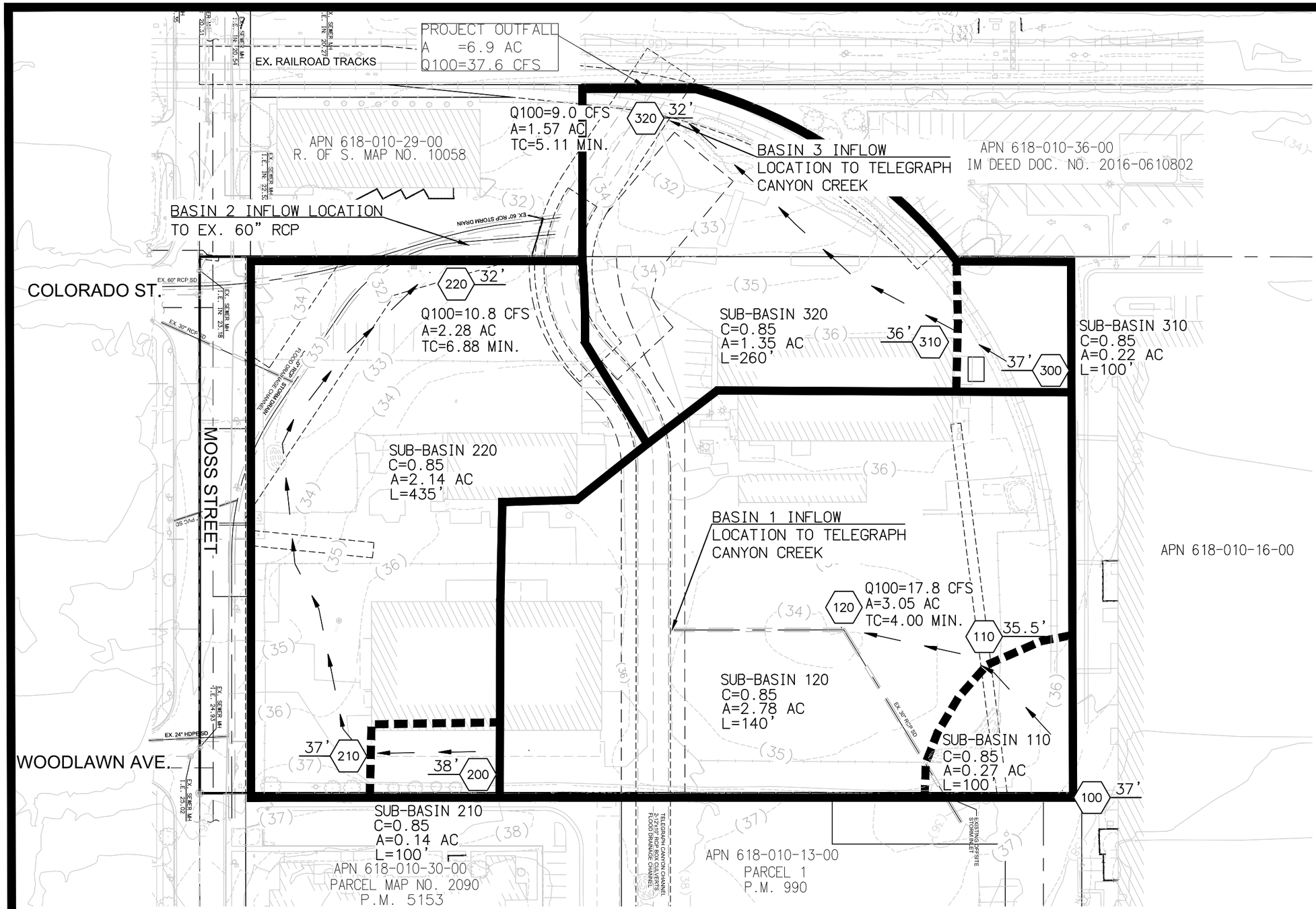
Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

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.

Appendix B – Existing Hydrology

On-Site Hydrologic Work Map
On-site AES Output

Michael Baker
INTERNATIONAL



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- XXX XXX.X HYDROLOGY NODE/ELEVATION

80 40 0 80 160 240

SCALE: 1"=80'

SCALE 1"=80'

SHOPOFF CHULA VISTA
EXISTING CONDITION
HYDROLOGY EXHIBIT

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San Diego, CA 92124
Phone: (858) 614-5000 · MBAKERINTL.COM

H:\PDATA\167467 Shoppoff Chula Vista\cadd\Strmwater\ShopOff EX Hydro Work Map.dwg 11/28/18 - 5:26pm chris.yamaguchi

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
             Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* SHOPOFF                                                                  *
* EXISTING CONDITION HYDROLOGY                                             *
*                                                                          *
 ****************************************************************************

  FILE NAME: C:\AES\SHOP\EX.DAT
  TIME/DATE OF STUDY: 09:16 11/21/2018
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.01
  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    100.00 TO NODE    110.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     37.00
  DOWNSTREAM ELEVATION(FEET) =     35.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.230
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    67.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.57
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.57

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     35.50  DOWNSTREAM(FEET) =     34.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0107
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.05
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   0.77
  Tc(MIN.) =    4.00
  SUBAREA AREA(ACRES) =     2.78       SUBAREA RUNOFF(CFS) =   16.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  TOTAL AREA(ACRES) =        3.0         PEAK FLOW RATE(CFS) =      17.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   3.79
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =     240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      0.00 TO NODE      0.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    210.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     38.00
  DOWNSTREAM ELEVATION(FEET) =     37.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.486
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     37.00  DOWNSTREAM(FEET) =     34.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   435.00   CHANNEL SLOPE =  0.0069
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.575
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.14
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   3.40
  Tc(MIN.) =    6.88
  SUBAREA AREA(ACRES) =     2.14       SUBAREA RUNOFF(CFS) =   10.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  TOTAL AREA(ACRES) =        2.3         PEAK FLOW RATE(CFS) =      10.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   2.74
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      0.00 TO NODE      0.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    310.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     37.00
  DOWNSTREAM ELEVATION(FEET) =     36.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.486
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     36.00  DOWNSTREAM(FEET) =     32.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0154
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
```

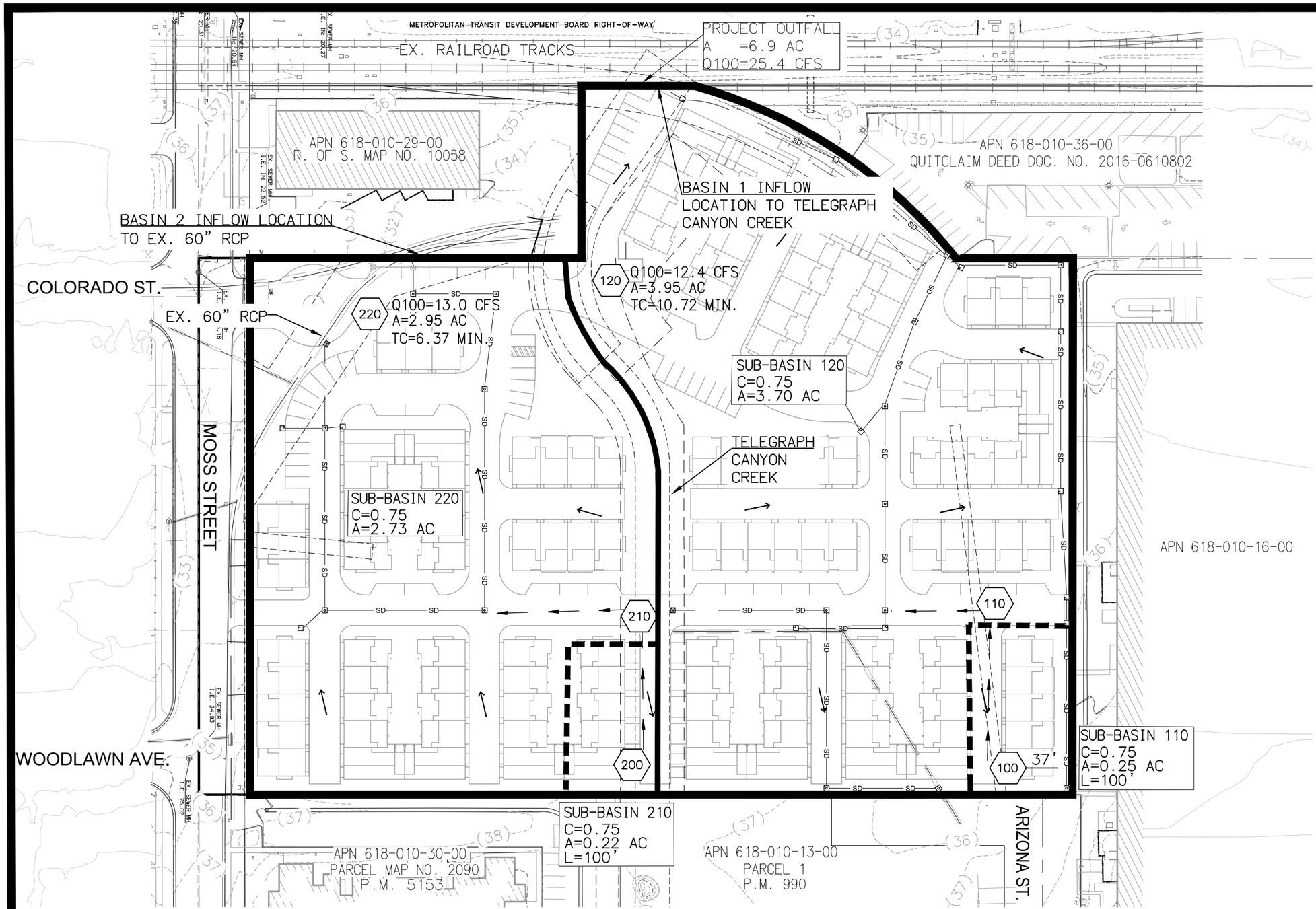
```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.755
USER-SPECIFIED RUNOFF COEFFICIENT = .8500
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.16
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.67
AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.62
Tc(MIN.) =    5.11
SUBAREA AREA(ACRES) =     1.35       SUBAREA RUNOFF(CFS) =    7.75
AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       9.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   3.19
LONGEST FLOWPATH FROM NODE    300.00 TO NODE    320.00 =     360.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        1.6  TC(MIN.) =      5.11
PEAK FLOW RATE(CFS)   =       9.01
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

Appendix C – Proposed Hydrology

On-Site Hydrologic Work Map
On-Site AES Output

Michael Baker
INTERNATIONAL



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- XXX XXX.X HYDROLOGY NODE/ELEVATION

SHOPOFF CHULA VISTA
PROPOSED CONDITION
HYDROLOGY EXHIBIT

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San Diego, CA 92124
Phone: (858) 614-5000 · MBAKERINTL.COM

H:\PDATA\167467 Shoppoff Chula Vista\cadd\Strmwater\ShopOff PR Hydro Work Map.dwg 11/28/18 – 5:46pm chris.yamaguchi

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
             Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* Shopoff                                                                  *
* Proposed Condition Hydrology                                             *
*                                                                          *
 ****************************************************************************

  FILE NAME: C:\AES\SHOP\PR.DAT
  TIME/DATE OF STUDY: 17:38 11/28/2018
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.01
  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    100.00 TO NODE    110.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     37.00
  DOWNSTREAM ELEVATION(FEET) =     35.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.686
```

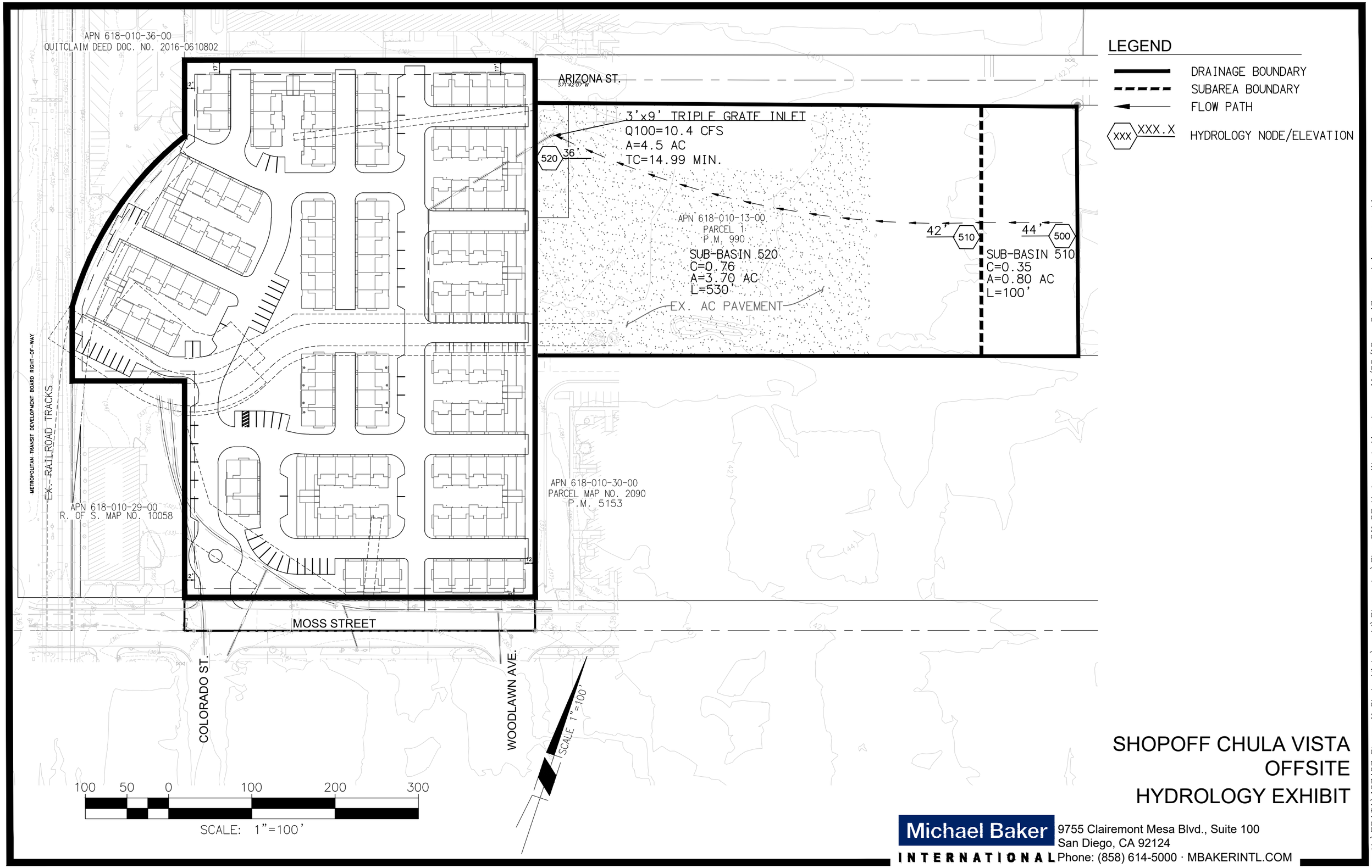
```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    72.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.25   TOTAL RUNOFF(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    120.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   35.00  DOWNSTREAM ELEVATION(FEET) =   33.00
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   6.04   Tc(MIN.) =   10.72
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.188
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.750
  SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =   11.62
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =      12.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.95
  FLOW VELOCITY(FEET/SEC.) =  1.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      0.00 TO NODE      0.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    210.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     37.00
```

```
  DOWNSTREAM ELEVATION(FEET) =     35.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.473
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.850
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   35.00  DOWNSTREAM ELEVATION(FEET) =   33.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   1.90   Tc(MIN.) =    6.37
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.859
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.750
  SUBAREA AREA(ACRES) =    2.73      SUBAREA RUNOFF(CFS) =   12.00
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =      12.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.29
  FLOW VELOCITY(FEET/SEC.) =  2.53   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     350.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.0  TC(MIN.) =      6.37
  PEAK FLOW RATE(CFS)   =      12.96
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix D – Off-Site Hydrology and Hydraulics

Off-Site Hydraulic Work Map
Off-Site AES
Inlet Capacity Spreadsheet

Michael Baker
INTERNATIONAL



SHOPOFF CHULA VISTA OFFSITE HYDROLOGY EXHIBIT

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H:\PDATA\167467 Shoppoff Chula Vista\cadd\Strmwater\ShopOff OS Hydro Work Map.dwg 11/20/18 - 2:47pm chris.yamaguchi

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2013 Advanced Engineering Software (aes)
             Ver. 20.0 Release Date: 06/01/2013  License ID 1264

                           Analysis prepared by:





 ************************** DESCRIPTION OF STUDY **************************
* Shopoff                                                                  *
* Offsite Hydrology                                                        *
*                                                                          *
 ****************************************************************************

  FILE NAME: C:\AES\SHOP\OS.DAT
  TIME/DATE OF STUDY: 10:18 11/20/2018
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.01
  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    500.00 TO NODE    510.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =     44.00
  DOWNSTREAM ELEVATION(FEET) =     42.00
  ELEVATION DIFFERENCE(FEET) =      2.00
```

```
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.584
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    80.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.502
  SUBAREA RUNOFF(CFS) =      1.26
  TOTAL AREA(ACRES) =      0.80   TOTAL RUNOFF(CFS) =      1.26

****************************************************************************
  FLOW PROCESS FROM NODE    510.00 TO NODE    520.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     42.00  DOWNSTREAM(FEET) =     36.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   530.00   CHANNEL SLOPE =  0.0113
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.374
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   5.41
  Tc(MIN.) =   14.99
  SUBAREA AREA(ACRES) =     3.70       SUBAREA RUNOFF(CFS) =    9.49
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.687
  TOTAL AREA(ACRES) =        4.5         PEAK FLOW RATE(CFS) =      10.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   2.07
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    520.00 =     630.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =     14.99
  PEAK FLOW RATE(CFS)   =      10.43
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Inlet Capacities				
County DDM Section 2.3.2.2 Grated Inlets in Sag				
3'x9' Grate Inlet				
Weir Flow				
$Q=C_w*P*d^{2/3}*C_L$		Cw =	3	Weir Coefficient
		P =	24	Inlet Perimeter
		d =	0.5	Available Ponding Depth
		C_L =	0.5	Clogging Factor
Q=	12.7	cfs		
3'x9' Grate Inlet				
Orifice Flow				
$Q=Co*A*(2gd)^{1/2}*C_L$		Co =	0.67	Weir Coefficient
		A =	27	Inlet Area
		d =	0.5	Available Ponding Depth
		C_L =	0.5	Clogging Factor
Q=	51.3	cfs		

12" Pipe Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	1.00	ft
Diameter	1.00	ft
Discharge	3.56	ft^3/s

Results

Discharge	3.56	ft^3/s
Normal Depth	1.00	ft
Flow Area	0.79	ft^2
Wetted Perimeter	3.14	ft
Hydraulic Radius	0.25	ft
Top Width	0.00	ft
Critical Depth	0.81	ft
Percent Full	100.0	%
Critical Slope	0.01032	ft/ft
Velocity	4.54	ft/s
Velocity Head	0.32	ft
Specific Energy	1.32	ft
Froude Number	0.00	
Maximum Discharge	3.83	ft^3/s
Discharge Full	3.56	ft^3/s
Slope Full	0.01000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

18" Pipe Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft
Discharge	10.50	ft^3/s

Results

Discharge	10.50	ft^3/s
Normal Depth	1.50	ft
Flow Area	1.77	ft^2
Wetted Perimeter	4.71	ft
Hydraulic Radius	0.38	ft
Top Width	0.00	ft
Critical Depth	1.25	ft
Percent Full	100.0	%
Critical Slope	0.00977	ft/ft
Velocity	5.94	ft/s
Velocity Head	0.55	ft
Specific Energy	2.05	ft
Froude Number	0.00	
Maximum Discharge	11.30	ft^3/s
Discharge Full	10.50	ft^3/s
Slope Full	0.01000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

24" Pipe Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	2.00	ft
Diameter	2.00	ft
Discharge	22.62	ft^3/s

Results

Discharge	22.62	ft^3/s
Normal Depth	2.00	ft
Flow Area	3.14	ft^2
Wetted Perimeter	6.28	ft
Hydraulic Radius	0.50	ft
Top Width	0.00	ft
Critical Depth	1.69	ft
Percent Full	100.0	%
Critical Slope	0.00946	ft/ft
Velocity	7.20	ft/s
Velocity Head	0.81	ft
Specific Energy	2.81	ft
Froude Number	0.00	
Maximum Discharge	24.33	ft^3/s
Discharge Full	22.62	ft^3/s
Slope Full	0.01000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

30" Pipe Capacity

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Normal Depth	2.50	ft
Diameter	2.50	ft
Discharge	41.01	ft^3/s

Results

Discharge	41.01	ft^3/s
Normal Depth	2.50	ft
Flow Area	4.91	ft^2
Wetted Perimeter	7.85	ft
Hydraulic Radius	0.63	ft
Top Width	0.00	ft
Critical Depth	2.15	ft
Percent Full	100.0	%
Critical Slope	0.00926	ft/ft
Velocity	8.36	ft/s
Velocity Head	1.08	ft
Specific Energy	3.58	ft
Froude Number	0.00	
Maximum Discharge	44.12	ft^3/s
Discharge Full	41.01	ft^3/s
Slope Full	0.01000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Nov 28 2018

4 Foot Curb Inlet

Curb Inlet

Location	=	Sag
Curb Length (ft)	=	4.00
Throat Height (in)	=	1.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

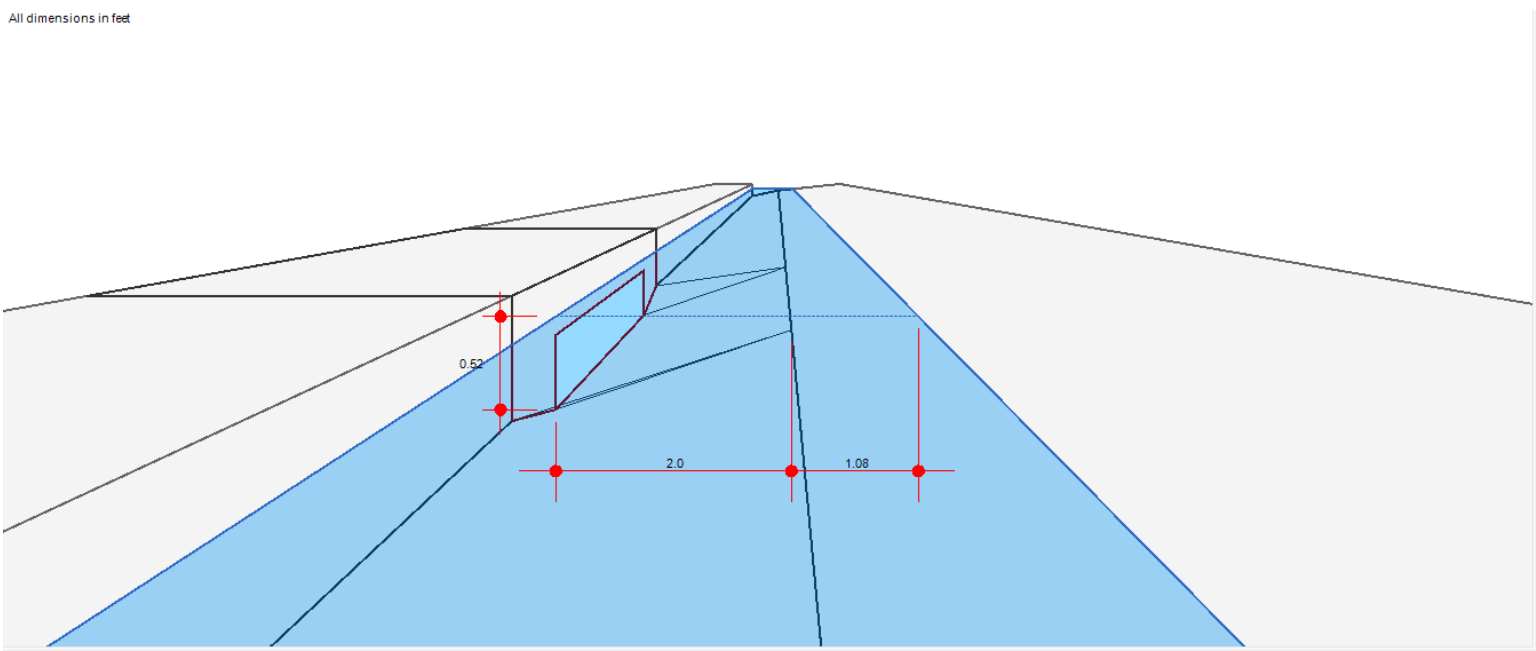
Slope, Sw (ft/ft)	=	0.139
Slope, Sx (ft/ft)	=	0.070
Local Depr (in)	=	2.00
Gutter Width (ft)	=	2.00
Gutter Slope (%)	=	-0-
Gutter n-value	=	-0-

Calculations

Compute by:		Q vs Depth
Max Depth (in)	=	6

Highlighted

Q Total (cfs)	=	1.75
Q Capt (cfs)	=	1.75
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	6.24
Efficiency (%)	=	100
Gutter Spread (ft)	=	3.08
Gutter Vel (ft/s)	=	-0-
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-



Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Nov 28 2018

6 Foot Curb Inlet

Curb Inlet

Location	=	Sag
Curb Length (ft)	=	6.00
Throat Height (in)	=	1.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

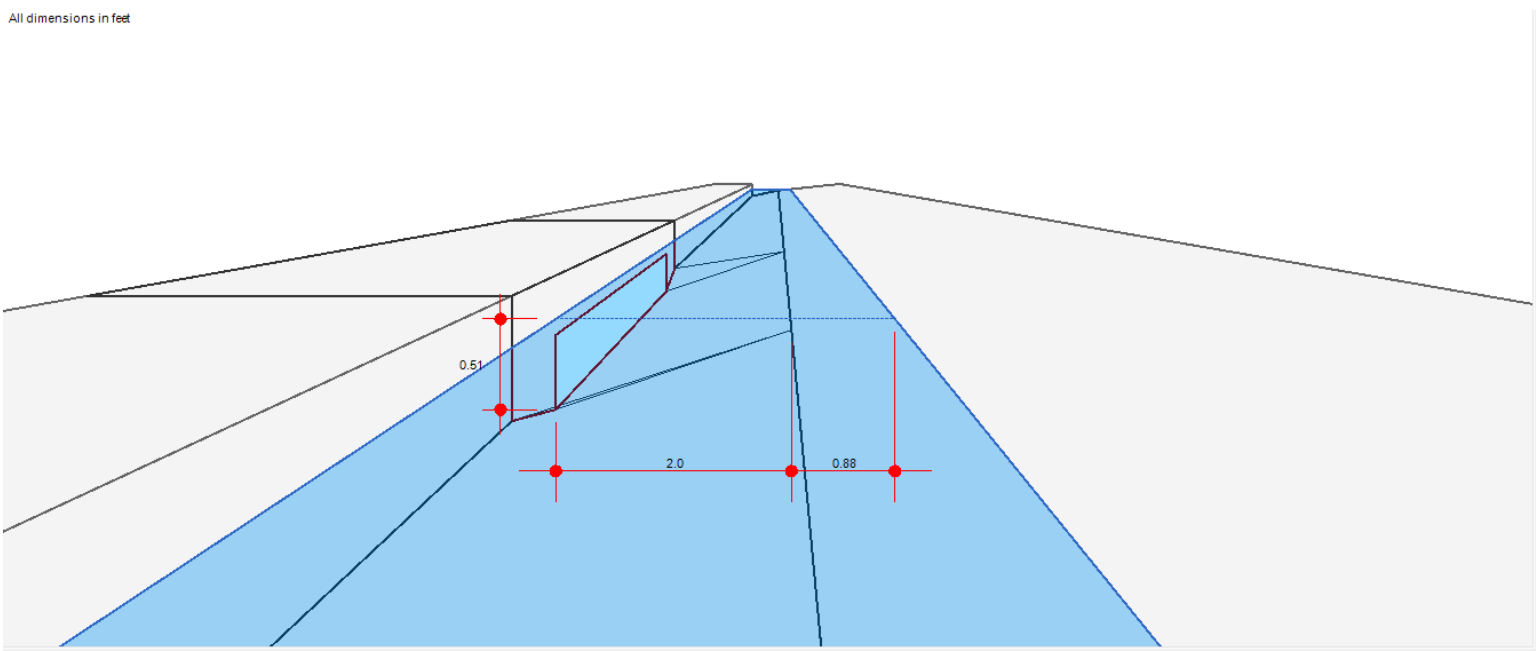
Slope, Sw (ft/ft)	=	0.139
Slope, Sx (ft/ft)	=	0.070
Local Depr (in)	=	2.00
Gutter Width (ft)	=	2.00
Gutter Slope (%)	=	-0-
Gutter n-value	=	-0-

Calculations

Compute by:		Q vs Depth
Max Depth (in)	=	6

Highlighted

Q Total (cfs)	=	2.00
Q Capt (cfs)	=	2.00
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	6.07
Efficiency (%)	=	100
Gutter Spread (ft)	=	2.88
Gutter Vel (ft/s)	=	-0-
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-



Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Nov 28 2018

8 Foot Curb Inlet

Curb Inlet

Location	=	Sag
Curb Length (ft)	=	8.00
Throat Height (in)	=	1.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

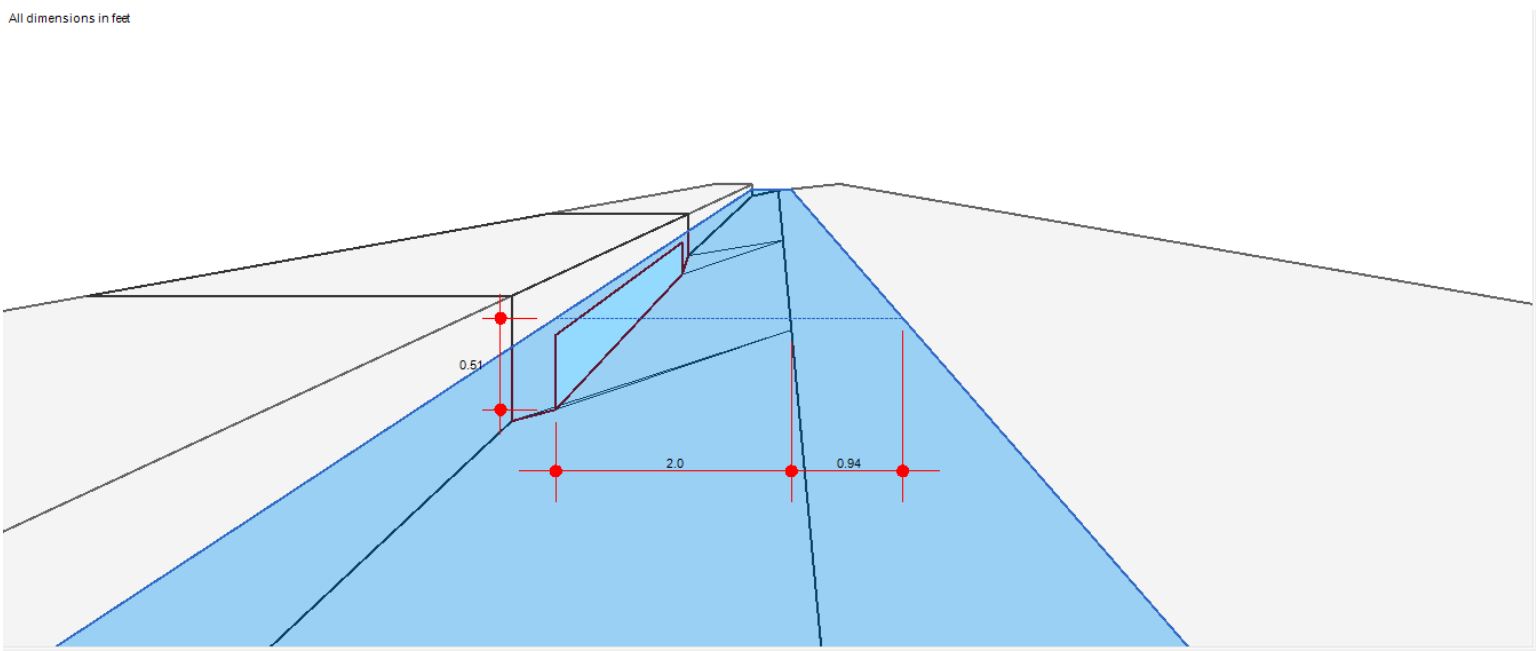
Slope, Sw (ft/ft)	=	0.139
Slope, Sx (ft/ft)	=	0.070
Local Depr (in)	=	2.00
Gutter Width (ft)	=	2.00
Gutter Slope (%)	=	-0-
Gutter n-value	=	-0-

Calculations

Compute by:		Q vs Depth
Max Depth (in)	=	6

Highlighted

Q Total (cfs)	=	2.50
Q Capt (cfs)	=	2.50
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	6.13
Efficiency (%)	=	100
Gutter Spread (ft)	=	2.94
Gutter Vel (ft/s)	=	-0-
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-



Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Nov 28 2018

10 Foot Curb Inlet

Curb Inlet

Location	=	Sag
Curb Length (ft)	=	10.00
Throat Height (in)	=	1.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

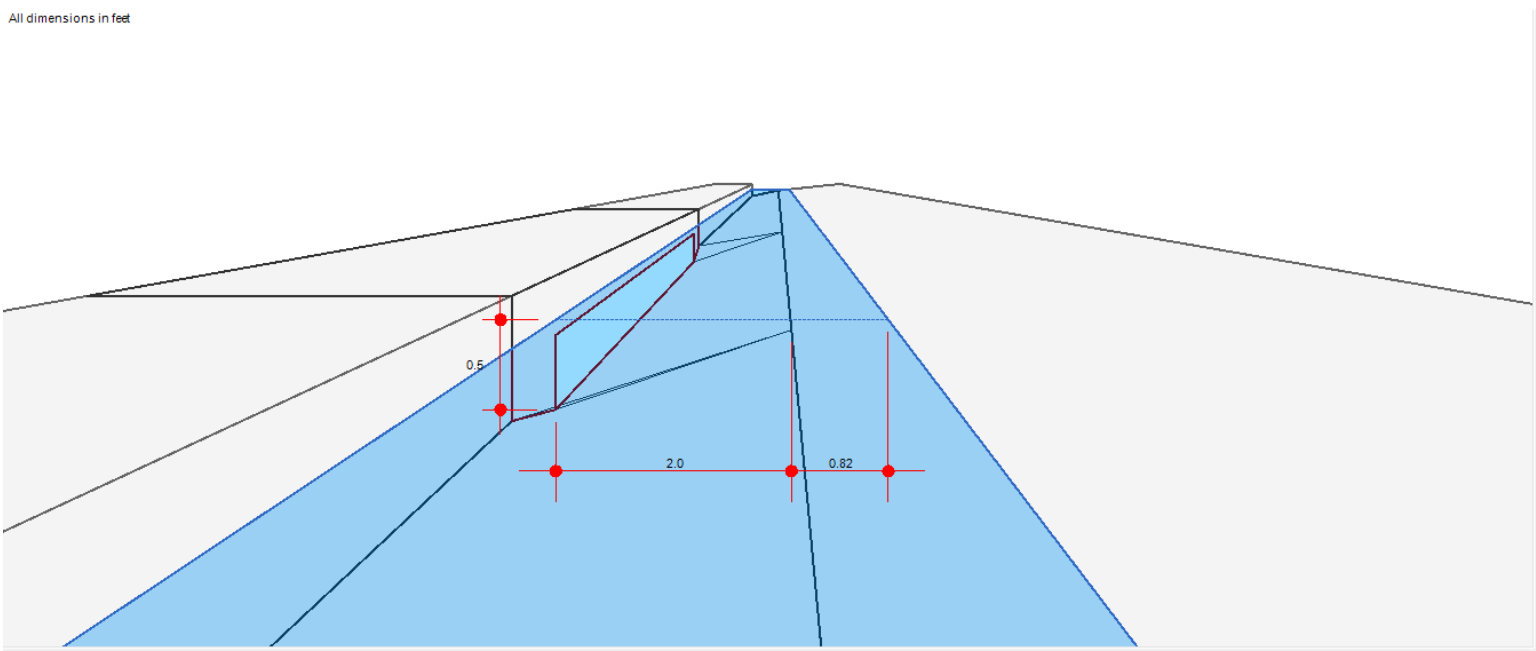
Slope, Sw (ft/ft)	=	0.139
Slope, Sx (ft/ft)	=	0.070
Local Depr (in)	=	2.00
Gutter Width (ft)	=	2.00
Gutter Slope (%)	=	-0-
Gutter n-value	=	-0-

Calculations

Compute by:		Q vs Depth
Max Depth (in)	=	6

Highlighted

Q Total (cfs)	=	2.75
Q Capt (cfs)	=	2.75
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	6.03
Efficiency (%)	=	100
Gutter Spread (ft)	=	2.82
Gutter Vel (ft/s)	=	-0-
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-



PDP SWQMP

PRIORITY DEVELOPMENT PROJECT (PDP)
STORM WATER QUALITY MANAGEMENT PLAN
FOR
Shopoff Chula Vista
APN: 618-010-31-00, 618-010-30-00, 618-010-26-10
Pertmit # Pending
Insert Drawing Number

ENGINEER OF WORK:

_____
JAY SULLIVAN, R.C.E. 77445

PREPARED FOR:
Shopoff Land Fund V
2 Park Plaza, Suite 700
Irvine, CA 92614
(949) 417-1936

PREPARED BY:
Michael Baker International
9755 Clairemont Mesa Blvd
San Diego, CA 92124
(858) 614-5000

DATE: 11/19/2018

_____
Approved By: City of Chula Vista **Date:**

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FORM I-6 Summary of PDP Structural BMPs

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- Attachment 1a: DMA Exhibit
- Attachment 1b: Tabular Summary of DMAs and Design Capture Volume Calculations
- Attachment 1c: Harvest and Use Feasibility Screening (when applicable)
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- Attachment 3a: B Structural BMP Maintenance Thresholds and Actions
- Attachment 3b: Draft Maintenance Agreement (when applicable)

Attachment 4: Copy of Plan Sheets Showing Permanent Storm Water BMPs

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

CERTIFICATION PAGE

Project Name: Shopoff Chula Vista
Permit Application Number: Insert Application #

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 Chula Vista BMP Design Manual, which is based on the requirements of the San Diego Regional Water Quality Control Board Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

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.

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

Jay Sullivan
_____
Print Name

Michael Baker International
_____
Company

_____
Date

Engineer's Seal

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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	11/29/2018	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Click here to enter text.
2	Click here to enter a date.	☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	Click here to enter text.
3	Click here to enter a date.	☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	Click here to enter text.
4	Click here to enter a date.	☐Preliminary Design/ Planning/ CEQA ☐Final Design	Click here to enter text.

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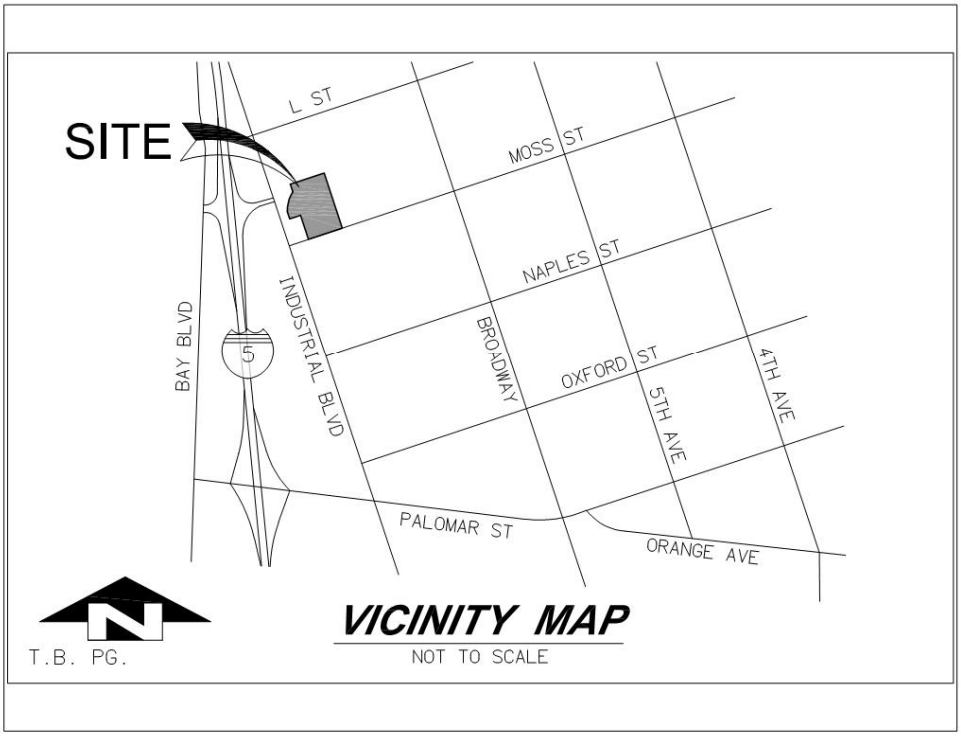
PROJECT VICINITY MAP

Project Name: Shopoff Chula Vista
Permit Application Number: Insert Permit Application Number



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Complete and attach Storm Water Requirements Applicability Checklist (Intake Form) included in Appendix A.1

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Print Form

Storm Water Requirements Applicability Checklist (Intake Form) for All Permit Applications

Public Works Department - Storm Water Management Section April 2016

Project Information

Project Address: 670-80 Moss St. Chula Vista, CA 91911	Project Application Number: Pending
Project Name: Shopoff Chula Vista	APN(s) 618-010-31-00, 618-010-30-00, 618-010
Brief Description of Work Proposed: 141 Resident units, private streets, parking lots and a private park.	

Owner/Contact Information

Name of Person Completing this Form: Jay Sullivan

Role: ☐ Property Owner ☐ Contractor ☐ Architect ☒ Engineer ☐ Other _____

Email: jsullivan@mbakerintl.com Phone: 858-810-1474

Signature: Date Completed:

Answer each section below, starting with Section 1 and progressing through each section. Additional information for determining the requirements is found in the Chula Vista BMP Design Manual available on the City's website at http://www.chulavistaca.gov/departments/public-works/services/storm-water-pollution-prevention/documents-and-reports.

SECTION 1: Storm Water BMP Requirements

Does the project consist of one or both of the following: • Repair or improvements to an existing building or structure that donot alter the size such as: tenant improvements, interior remodeling, electrical work, fire alarm, fire sprinkler system, HVAC work, Gas, plumbing, etc. • Routine maintenance activities such as: roof or exterior structure surface replacement; resurfacing existing roadways and parking lots including digouts, slurry seal, overlay and restriping; repair damaged sidewalks or pedestrian ramps on existing roads without expanding the impervious footprint; routine replacement of damaged pavement, trenching and resurfacing associated with utility work (i.e. sewer, water, gas or electrical laterals, etc.) and pot holing or geotechnical investigation borings.	☐ Yes	Project is **NOT** Subject to Permanent Storm Water BMP requirements, **BUT IS** subject to Construction BMP requirements. Review & sign "Construction Storm Water BMP Certification Statement" on page 2.
	☒ No	Continue to Section 2, page3.

Construction Storm Water BMP Certification Statement

The following stormwater quality protection measures are required by City Chula Vista Municipal Code Chapter 14.20 and the City's Jurisdictional Runoff Management Program.

1. All applicable construction BMPs and non-stormwater discharge BMPs shall be installed and maintained for the duration of the project in accordance with the Appendix K "Construction BMP Standards" of the Chula Vista BMP Design Manual.
2. Erosion control BMPs shall be implemented for all portions of the project area in which no work has been done or is planned to be done over a period of 14 or more days. All onsite drainage pathways that convey concentrated flows shall be stabilized to prevent erosion.
3. Run-on from areas outside the project area shall be diverted around work areas to the extent feasible. Run-on that cannot be diverted shall be managed using appropriate erosion and sediment control BMPs.
4. Sediment control BMPs shall be implemented, including providing fiber rolls, gravel bags, or other equally effective BMPs around the perimeter of the project to prevent transport of soil and sediment offsite. Any sediment tracked onto offsite paved areas shall be removed via sweeping at least daily.
5. Trash and other construction wastes shall be placed in a designated area at least daily and shall be disposed of in accordance with applicable requirements.
6. Materials shall be stored to avoid being transported in storm water runoff and non-storm water discharges. Concrete washout shall be directed to a washout area and shall not be washed out to the ground.
7. Stockpiles and other sources of pollutants shall be covered when the chance of rain within the next 48 hours is at least 50%.

I certify that the stormwater quality protection measures listed above will be implemented at the project described on Intake Form. I understand that failure to implement these measures may result in monetary penalties or other enforcement actions. This certification is signed under penalty of perjury and does not require notarization.

Name: Jay Sullivan, PE, CFM, QSD Title: Project Manager

Signature: _____ Date: _____

Section 2: Determine if Project is a Standard Project or Priority Development Project

1. The project is (select one):

   ☒ New Development

   ☐ Redevelopment (is the creation and/or replacement of impervious surface on an already developed site)

2. Is the project in any of the following categories, (a) through (j)?

a. New development that creates 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	☐ No
b. Redevelopment project that creates and/or replaces 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	☐ No
c. New development or redevelopment of a restaurant that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the entire project site). 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 Code 5812).	☐ Yes	☒ No
d. New development or redevelopment of hillside that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the entire project site). This category includes development on any natural slope that is twenty-five percent or greater.	☐ Yes	☒ No
e. New development or redevelopment of parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the entire project site). 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.	☐ Yes	☒ No
f. New development or redevelopment of Streets, roads, highways, freeways, and driveways that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the entire project site). This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles	☐ Yes	☒ No
g. New development or redevelopment project that creates and/or replaces 2,500 square feet or more of impervious surface (collectively over the entire project site), 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).	☐ Yes	☒ No
h. New development or redevelopment project of automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surface. This category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.	☐ Yes	☒ No
i. New development or redevelopment projects of retail gasoline outlets that creates and/or replaces 5,000 square feet or more of impervious surface or its projected Average Daily Traffic (ADT) of 100 or more vehicles per day.	☐ Yes	☒ No
j. New development or redevelopment that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction.	☐ Yes	☒ No

The project is (select one):

☐ If "No" is checked for every category in Section 2, project is **"Standard Development Project"**. Site design and source control BMP requirements apply. Complete and submit Standard SWQMP (refer to Chapter 4 & Appendix E of the BMP Design Manual for guidance). **Continue to Section 4.**

☐ If "Yes" is checked for **ANY** category in Section 2, project is "**Priority Development Project (PDP)**". **Complete below, if applicable, and continue to Section 3**.

Complete for PDP Redevelopment Projects ONLY:

The total existing (pre-project) impervious area at the project site is: 296,644 ft^2 (A)

The total proposed newly created or replaced impervious area is 249,599 ft^2 (B)

Percent impervious surface created or replaced (B/A)*100: 84 %

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 a PDP**

OR

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

Continue to Section 3

Section 3: Determine if project is PDP Exempt

1. Does the project ONLY include new or retrofit sidewalk, bicycle lane or trails that:
   - Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;
   - Are designed and constructed to be hydraulically disconnected from paved streets or roads? Or;
   - Are designed and constructed with permeable pavements or surfaces in accordance with USEPA Green Streets guidance?

   ☐ **Yes. Project is PDP Exempt.** Complete and submit Standard SWQMP (refer to Chapter 4 of the BMP Design Manual for guidance). **Continue to Section 4.**

   ☒ **No. Next question**

2. Does the project ONLY include retrofitting or redevelopment of existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets standards?

   ☐ **Yes. Project is PDP Exempt.** Complete and submit Standard SWQMP (refer to Chapter 4 of the BMP Design Manual for guidance). **Continue to Section 4.**

   ☒ **No. Project is PDP.** Site design, source control and structural pollutant control BMPs apply. Complete and submit PDP SWQMP (refer to Chapters 4, 5 & 6 of the BMP Design Manual for guidance). **Continue to Section 4.**

SECTION 4: Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the BMP Design Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP), which is administered by the State Water Resource Control Board.

1. Does the project include Building/Grading/Construction permits proposing less than 5,000 square feet of ground disturbance and has less than 5-foot elevation change over the entire project area?

   ☐ Yes; review & sign Construction Storm Water Certification Statement, skip questions 2-4 ☒ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing grading, grubbing, excavation, or other activity that results in ground disturbance of less than one acre and more than 5,000 square feet?

   ☐ Yes. complete & submit Construction Storm Water Pollution Control Plan (CSWPCP), skip questions 3-4 ☒ No; next question

3. Does the project results in disturbance of an acre or more of total land area and are considered regular maintenance projects performed to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (Projects such as sewer/storm drain/utility replacement)

   ☐ Yes. complete & submit Construction Storm Water Pollution Control Plan (CSWPCP), skip question 4 ☒ No; next question

4. Is the project proposing land disturbance greater than or equal to one acre OR the project is part of a larger common plan of development disturbing 1 acre or more?

   ☒ Yes; Storm Water Pollution Prevention Plan (SWPPP) is required. Refer to online CASQA or Caltrans Template. Visit the SWRCB web site at http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

Note: for Projects that result in disturbance of one to five acres of total land area and can demonstrate that there will be no adverse water quality impacts by applying for a Construction Rainfall Erosivity Waiver, may be allowed to submit a CSWPCP in lieu of a SWPPP.

Site Information Checklist For PDPs	Form I-3B (for PDPs)
Project Summary Information	
Project Name	**Shopoff Chula Vista**
Project Address	676-680 Moss St. Chula Vista, CA 91911-1616
Assessor's Parcel Number(s) (APN(s))	618-010-31-00, 618-010-30-00, 618-010-26-10
Permit Application Number	Click here to enter text.
Project Hydrologic Unit	Select One: ☐ Pueblo San Diego (908) ☒ Sweetwater (909) ☐ Otay (910) ☐ Tijuana (911)
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	Hydrologic Unit: Sweetwater Hydrologic Unit: Lower Sweetwater Hydrologic Sub-Area #909.11 Hydrologic Sub-Area Name: Telegraph
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	6.90 Acres (300,564 Square Feet)
Area to be Disturbed by the Project (Project Area)	6.90 Acres (300,564 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	5.73 Acres (249,599 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	1.17 Acres (50,965 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	Decrease by 16 %

Description of Existing Site Condition and Drainage Patterns

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

☒ 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:
The exisiting development is currently classified as a "limited industrial" site. Five industrial businesses currently exist on the project site, namely, Southwest Mobile Storage, Inc. San Diego (storage facility), Kleen Blast (sandblasting services), Hawthorne Cat (building materials supplier), Boat Yard San Diego (boat repair shop) and Safway Services (scaffolding rental service). The site consists of three buildings with heavy machinery and larger storage contaniners. The existing cover is primarily asphalt, concrete and gravel.

Existing Land Cover Includes (select all that apply):

☐ Vegetative Cover
☒ Non-Vegetated Pervious Areas
☒ Impervious Areas

Description / Additional Information:
The site is currently classified as "light industrial" and is almost entirely comprised of impervious area which includes concrete, asphalt and gravel. The only exception to this is the small patch of few trees and vegetation found on the north-western side of the site.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

☐ NRCS Type A
☐ 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
☐ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

☒ Watercourses
☐ Seeps
☐ Springs
☐ Wetlands
☐ None

Description / Additional Information:
The main hydrologic feature of the site is a 12’ wide by 10’ deep double box culvert that meanders underneath the site conveying stormwater along Telegraph Canyon Creek from east to west, ultimately discharging into the San Diego Bay. The double box culvert transitions into a concrete-lined open channel until finally discharging into the San Diego Bay. There also exist multiple inlets (some covered while others utilized) that connect to this underground culvert that can be found on-site.

Description of Existing Site Topography and Drainage

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.

Description / Additional Information:

1) The existing drainage conveyance is urban. The site is serviced by three on-site inlets that collect stormwater and drain into a 12' wide by 10' deep existing double box culvert that runs from east to west underneath the site. The off-site discharge location of the underground culvert is on the western side of the site where the culvert transitions to a concrete-lined open channel until it ultimately discharges to the San Diego Bay, which is linked to the Pacific Ocean.
2) Runoff from offsite is conveyed from one location on the north-east side of the site by way of a triple grate inlet (overall dimensions 3' x 9') where stormwater enters the site underground. The offsite stormwater flow is conveyed into the site through storm drain that connect to the double box culvert which ultimately discharges into the San Diego Bay. The offsite drainage area is 4.5 acres and the 100-yr flow across this area is 10.4cfs. The time of concentration for offsite flow is 14.99 minutes.
3) Refer to 1)
4) Three onsite discharge locations are proposed. Their capacities are to be determined in final engineering.

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:
The project proposes 141 multi-family residential houses along with associated parking spaces, private streets, landscaping and a small private park. The intent of the project is to transform the land use from "limited industrial" to "dense residential".

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):
The proposed impervious features of this project include the multi-family unit houses, private steets, walkways, parking stalls and patios.

List/describe proposed pervious features of the project (e.g., landscape areas):
The proposed pervious features of this project includes approximately 0.37 acres of landscaping in the form of grass, shrub and trees including a small private park for the housing complex.

Does the project include grading and changes to site topography?

☒ Yes

☐ No

Description / Additional Information:

Current elevations on the site range from 37’ (NAVD88) on the north-westerly side of the site, to 32’ on the south-easterly side of the site. The existing hydrology flows are from north-east to west. The site will be flatted in some areas as compared to existing conditions in order to facilitate construction of residential pads. The proposed private streets will be graded to facilitate drainage by crowing. Generally, the site will remain flat and at roughly the same elevations as the existing condition.

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

☒ 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::
No diversion of flow is proposed. Surface improvements are proposed, but compared to existing conditions, the project site runoff will no change as the discharge from the site remains via the double box culvert.

All existing storm drain will be demolished to make room for the development of the multi-family housing units. All proposed on-site storm drain will connect to an exisiting 12’ wide by 10’ deep double box culvert channel that runs underneath the site conveying stormwater along Telegraph Canyon Creek and ultimately discharging north-westerly into the San Diego Bay which is linked to the Pacific Ocean.

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

☒ On-site storm drain inlets
☐ Interior floor drains and elevator shaft sump pumps
☐ Interior parking garages
☐ Need for future indoor & structural pest control
☒ Landscape/Outdoor Pesticide Use
☐ Pools, spas, ponds, decorative fountains, and other water features
☐ Food service
☐ Refuse areas
☐ Industrial processes
☐ Outdoor storage of equipment or materials
☐ Vehicle and Equipment Cleaning
☐ Vehicle/Equipment Repair and Maintenance
☐ Fuel Dispensing Areas
☐ Loading Docks
☐ Fire Sprinkler Test Water
☐ Miscellaneous Drain or Wash Water
☒ Plazas, sidewalks, and parking lots

Description / Additional Information:
Click here to enter text

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):

Onsite stormwater runoff will flow towards inlets across the site, where the stowmwater will be directed towards water quality detention vaults for treatment via a storm drain network.

Project site runoff will be directed to proposed inlets and pipes via precise grading. Sub-grade proprietary BMPs (Bio Clean MWS or similar) will be included for water quality treatment (3 are proposed). After undergoing treatment via the proposed BMPs, project site runoff will be connected to the culvert via proposed storm drain.

All proposed on-site storm drain will connect to an exisiting 12' wide by 10' deep double box culvert channel that runs underneath the site conveying stormwater along Telegraph Canyon Creek and ultimately discharging north-westerly into the San Diego Bay which is linked to the Pacific Ocean.

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
Telegraph Canyon Creek	Nitrogren, Selenium, Benthic Community Effects	Nitrogren, Selenium
San Diego Bay	Nitrogren, Selenium, Benthic Community Effects	Nitrogren, Selenium

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 anticipated 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	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☐	☐	☐
Nutrients	☐	☐	☐
Heavy Metals	☐	☐	☐

Organic Compounds	☐	☐	☐
Trash & Debris	☐	☐	☐
Oxygen Demanding Substances	☐	☐	☐
Oil & Grease	☐	☐	☐
Bacteria & Viruses	☐	☐	☐
Pesticides	☐	☐	☐

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.

☐ 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):

All proposed on-site storm drain will connect to an exisiting 12’ wide by 10’ deep double box culvert channel that runs underneath the site conveying water along Telegraph Canyon Creek and ultimately discharging north-westerly into the San Diego Bay which is linked to the Pacific Ocean.

Therefore, this project is exempt from any Hydromodification Management requirements (refer to HMP Exemption Exhibit).

Critical Coarse Sediment Yield Areas*

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

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:

HMP Exempt.

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.

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:

HMP Exempt.

Discussion / Additional Information: (optional)

HMP Exempt.

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.

Runoff from offsite is conveyed from one location on the north-east side of the site by way of a triple grate inlet (overall dimensions 3’ x 9’) where stormwater enters the site underground through existing storm drain. The offsite stormwater flow is conveyed into the site through storm drain that connect to the double box culvert which ultimately discharges into the San Diego Bay. The existing onsite stormdrain conveying the offsite flow will be demolished and a new network of onsite storm drain will convey the offsite flow. The offsite flow will continue to discharge into the double box culver in the same location as the exisiting storm drain discharge point.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Click here to enter text

Source Control BMP Checklist for All Development Projects (Standard Projects and PDPs)	Form I-4

Project Identification

Project Name: Shopoff Chula Vista

Permit Application Number: Insert Permit Application #

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 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 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	☒Yes	☐No	☐N/A
Discussion / justification if SC-1 not implemented: Click here to enter text			
SC-2 Storm Drain Stenciling or Signage	☒Yes	☐No	☐N/A
Discussion / justification if SC-2 not implemented: Click here to enter text			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☒No	☐N/A
Discussion / justification if SC-3 not implemented: There are no proposed outdoor storage facilities.			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐Yes	☒No	☐N/A
Discussion / justification if SC-4 not implemented: There are no proposed outdoor work area facilities.			

Source Control Requirement	Applied?		
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if SC-5 not implemented: Click here to enter text			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
☐ Onsite storm drain inlets	☒Yes	☐No	☐N/A
☐ Interior floor drains and elevator shaft sump pumps	☐Yes	☐No	☒N/A
☐ Interior parking garages	☐Yes	☐No	☒N/A
☐ Need for future indoor & structural pest control	☒Yes	☐No	☐N/A
☐ Landscape/outdoor pesticide use	☒Yes	☐No	☐N/A
☐ Pools, spas, ponds, decorative fountains, and other water features	☐Yes	☐No	☒N/A
☐ Food service	☐Yes	☐No	☒N/A
☐ 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
☐ Fire sprinkler test water	☐Yes	☐No	☒N/A
☐ Miscellaneous drain or wash water	☐Yes	☐No	☒N/A
☐ Plazas, sidewalks, and parking lots	☒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. Click here to enter text			

Site Design BMP Checklist for All Development Projects (Standard Projects and PDPs)	Form I-5

Project Identification

Project Name: Shopoff Chula Vista

Permit Application Number: Insert Application #

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 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 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	☒Yes	☐No	☐N/A
Discussion / justification if SD-1 not implemented: Click here to enter text			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☐Yes	☐No	☒N/A
Discussion / justification if SD-2 not implemented: Click here to enter text			
SD-3 Minimize Impervious Area	☒Yes	☐No	☐N/A
Discussion / justification if SD-3 not implemented: Click here to enter text			
SD-4 Minimize Soil Compaction	☒Yes	☐No	☐N/A
Discussion / justification if SD-4 not implemented: Click here to enter text			

Form I-5 Page 2 of 2			
Site Design Requirement	**Applied?**		
SD-5 Impervious Area Dispersion	☐Yes	☒No	☐N/A
Discussion / justification if SD-5 not implemented: The proposed project will include areas where stormwater will flow from impervious to pervious areas, however, the stormwater water quality design will not take into account impervious area dispersion.			
SD-6 Runoff Collection	☒Yes	☐No	☐N/A
Discussion / justification if SD-6 not implemented: No runoff collection will be implemented in this project as it is not warranted or necessary.			
SD-7 Landscaping with Native or Drought Tolerant Species	☒Yes	☐No	☐N/A
Discussion / justification if SD-7 not implemented: Click here to enter text.			
SD-8 Harvesting and Using Precipitation	☐Yes	☒No	☐N/A
Discussion / justification if SD-8 not implemented: Typical harvest and re-use strategies are considered impractical for the proposed project based on limited water demand and economic hardships.			

Summary of PDP Structural BMPs	Form I-6 (For PDPs)
Project Identification	
Project Name: Shopoff Chula Vista	
Permit Application Number: Permit Application # Pending	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the 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 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 to certify construction of the structural BMPs (see Section 1.12 of the manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the 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 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.

There are a total of three proposed structural BMPs that serve as water quality vaults for the site. DMAs 1, 2 and 3 will have Biofiltration BMPs and are sized according to the treatment flow rate (Q= 1.5*CIA).

BMPs 1 and 2 service DMA 1 and are in series. Their dimensions are 9' x 21' and 8' x 8', respectively. Meanwhile, BMP 3 services DMA 2 and is 9' x 21'.

The 9' x 21' biofiltration BMP has a design treatement flow rate of 0.693 cfs while the 8 x 8' structure has a treatment flow of 0.230 cfs.

(Continue on page 2 as necessary.)

Form I-6 Page 2 of Insert Total Page #
(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)
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Structural BMP ID No.: BMP 1
Construction Plan Sheet No.: Click here to enter text.
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) ☐ 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: ☒ 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 manual)	Jay Sullivan, PE, CFM 9755 Clairemont Mesa Blvd San Diego, CA 92124 858.614.5000 RCE 77445
Who will be the final owner of this BMP?	HOA
Who will maintain this BMP into perpetuity?	HOA
What is the funding mechanism for maintenance?	The HOA will be responsible for BMP maintenance

Discussion (as needed):

BMP 1 services DMA 1. The water quality vault's dimensions are 9' x 21'. The biofiltration BMP has a design treatement flow rate of 0.693 cfs.

Form I-6 Page 3 of X (Copy as many as needed)
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Structural BMP ID No.: BMP 2
Construction Plan Sheet No.: Click here to enter text.
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) ☐ 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: ☒ 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 manual)	Jay Sullivan, PE, CFM 9755 Clairemont Mesa Blvd San Diego, CA 92124 858.614.5000 RCE 77445
Who will be the final owner of this BMP?	HOA
Who will maintain this BMP into perpetuity?	HOA
What is the funding mechanism for maintenance?	The HOA will be responsible for BMP maintenance

Discussion (as needed):

BMP 2 series DMA 1 and is in series with BMP 1. The water quality vault's dimensions are 8' x 8'. The biofiltration has a design treatment flow rate of 0.230 cfs.

Form I-6 Page 3 of X (Copy as many as needed)
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Structural BMP ID No.: BMP 1
Construction Plan Sheet No.: Click here to enter text.
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) ☐ 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: ☒ 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 manual)	Jay Sullivan, PE, CFM 9755 Clairemont Mesa Blvd San Diego, CA 92124 858.614.5000 RCE 77445
Who will be the final owner of this BMP?	HOA
Who will maintain this BMP into perpetuity?	HOA
What is the funding mechanism for maintenance?	The HOA will be responsible for BMP maintenance

Discussion (as needed):

BMP 3 services DMA 2. The water quality vault's dimensions are 9' x 21'. The biofiltration BMP has a design treatment flow rate of 0.693 cfs.

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

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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.	☒ 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	☒ 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.	☒ 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.	☒ 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	☒ Included

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

The DMA 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 and impervious areas

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

☒ Proposed demolition

☒ Proposed grading

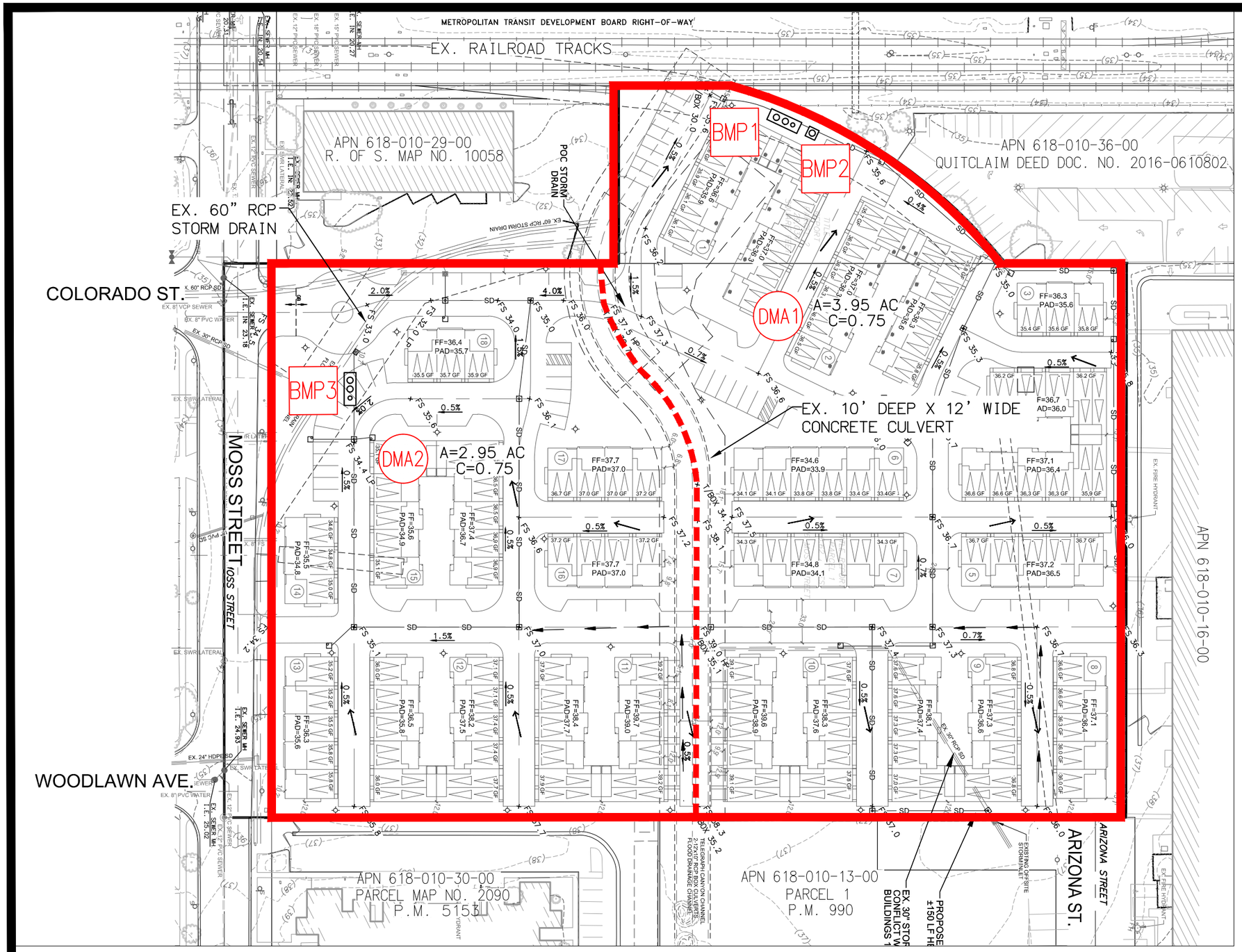
☒ Proposed impervious features

☒ Proposed design features and surface treatments used to minimize imperviousness

☒ 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)

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

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



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- XXX XXX.X — HYDROLOGY NODE/ELEVATION
- DMA 1 — DRAINAGE MANAGEMENT AREA
- BMP 1 — BEST MANAGEMENT PRACTICE (UNDERGROUND WATER QUALITY VAULT)

SITE DESIGN BMPS

1. MINIMIZE IMPERVIOUS AREAS (SD-3)
2. MINIMIZE SOIL COMPACTION (SD-4)
3. RUNOFF COLLECTION (SD-6)
4. LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES (SD-7)

NOTES:

1. THE UNDERLYING HYDROLOGIC SOIL GROUP IS D
2. APPROXIMATE DEPTH TO GROUNDWATER IS APPX 5-10FT
3. EXISTING NATURAL HYDROLOGIC FEATURES: AN EXISTING 10' DEEP X 12' WIDE CONCRETE CULVERT
4. CRITICAL COARSE SEDIMENT YIELD AREAS TO BE PROTECTED: HYDROMODIFICATION EXEMPT

80 40 0 80 160 240

SCALE: 1"=80'

SCALE 1"=80'

SHOPOFF CHULA VISTA
DMA EXHIBIT

Michael Baker INTERNATIONAL
9755 Clairemont Mesa Blvd., Suite 100
San Diego, CA 92124
Phone: (858) 614-5000 · MBAKERINTL.COM

H:\PDATA\167467 Shoppoff Chula Vista\cadd\Strmwater\ShopOff DMA Exhibit.dwg 11/28/18 – 10:33pm Omar.AbuZeineh

Underground Water Quality Vault Sizing

BMPs 1 & 2 - Servicing DMA 1

$$Q = 1.5 * C * I * A$$

Q = Treatment Flow Rate (cfs)
C = Runoff Coefficient
I = Intensity (in/hr)
A = Area (ac)

C = 0.75
I = 0.2 in/hr
A = 3.95 ac

Q = 0.889 cfs

Model #	Dimensions	WetlandMEDIA Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4' x 4'	23 sq. ft.	0.052
MWS-L-4-6	4' x 6'	32 sq. ft.	0.073
MWS-L-4-8	4' x 8'	50 sq. ft.	0.115
MWS-L-4-13	4' x 13'	63 sq. ft.	0.144
MWS-L-4-15	4' x 15'	76 sq. ft.	0.175
MWS-L-4-17	4' x 17'	90 sq. ft.	0.206
MWS-L-4-19	4' x 19'	103 sq. ft.	0.237
MWS-L-4-21	4' x 21'	117 sq. ft.	0.268
MWS-L-6-8	7' x 9'	64 sq. ft.	0.147
MWS-L-8-8	8' x 8'	100 sq. ft.	0.230
MWS-L-8-12	8' x 12'	151 sq. ft.	0.346
MWS-L-8-16	8' x 16'	201 sq. ft.	0.462
MWS-L-8-20	9' x 21'	252 sq. ft.	0.577
MWS-L-8-24	9' x 25'	302 sq. ft.	0.693

BMP 3 - Servicing DMA 2

$$Q = 1.5 * C * I * A$$

Q = Treatment Flow Rate (cfs)
C = Runoff Coefficient
I = Intensity (in/hr)
A = Area (ac)

C = 0.75
I = 0.2 in/hr
A = 2.95 ac

Q = 0.664 cfs

Model #	Dimensions	WetlandMEDIA Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4′ x 4′	23 sq. ft.	0.052
MWS-L-4-6	4′ x 6′	32 sq. ft.	0.073
MWS-L-4-8	4′ x 8′	50 sq. ft.	0.115
MWS-L-4-13	4′ x 13′	63 sq. ft.	0.144
MWS-L-4-15	4′ x 15′	76 sq. ft.	0.175
MWS-L-4-17	4′ x 17′	90 sq. ft.	0.206
MWS-L-4-19	4′ x 19′	103 sq. ft.	0.237
MWS-L-4-21	4′ x 21′	117 sq. ft.	0.268
MWS-L-6-8	7′ x 9′	64 sq. ft.	0.147
MWS-L-8-8	8′ x 8′	100 sq. ft.	0.230
MWS-L-8-12	8′ x 12′	151 sq. ft.	0.346
MWS-L-8-16	8′ x 16′	201 sq. ft.	0.462
MWS-L-8-20	9′ x 21′	252 sq. ft.	0.577
MWS-L-8-24	9′ x 25′	302 sq. ft.	0.693

ATTACHMENT 2

BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

HMP Exempt

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☒ 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

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.

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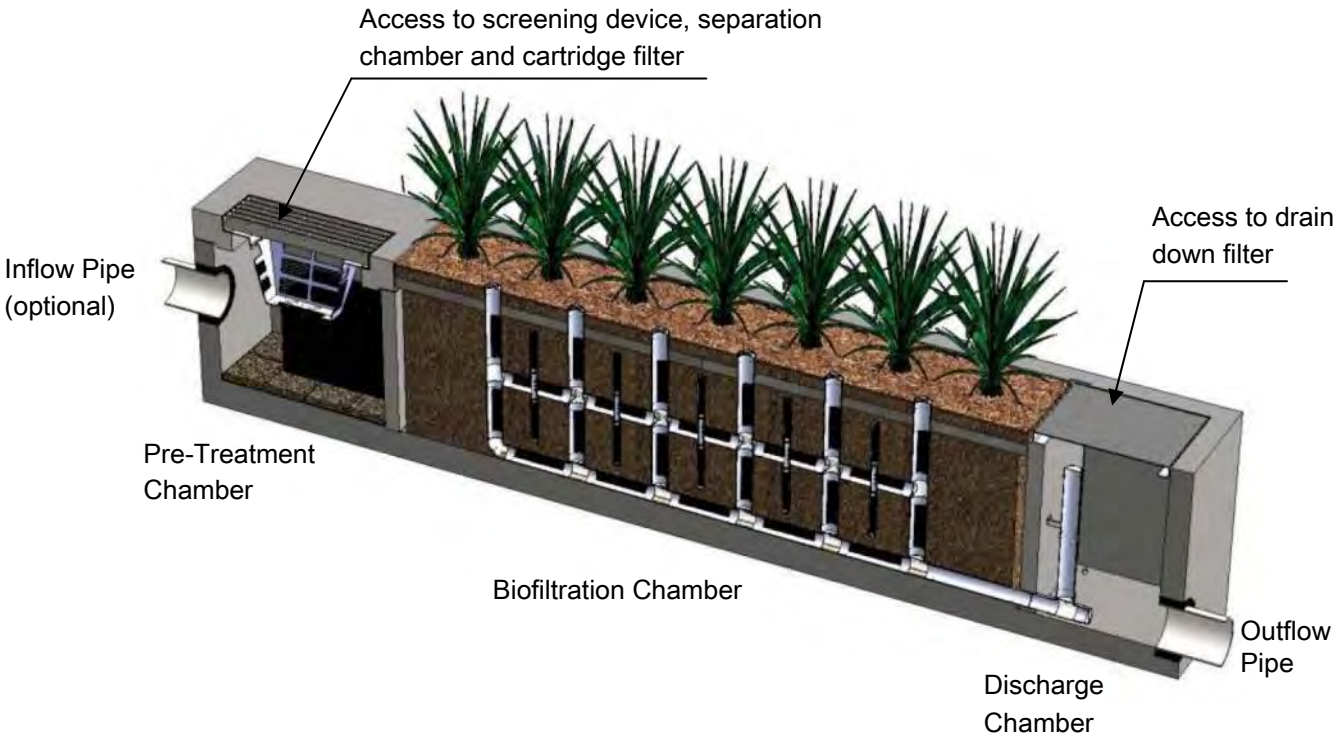
Use BioClean or equivalent

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - (*5 minute average service time*).
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - (*10 minute average service time*).
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - (*10-15 minute per cartridge average service time*).
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - (*5 minute average service time*).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - (*Service time varies*).

System Diagram



Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

Maintenance Procedure Illustration

Screening Device

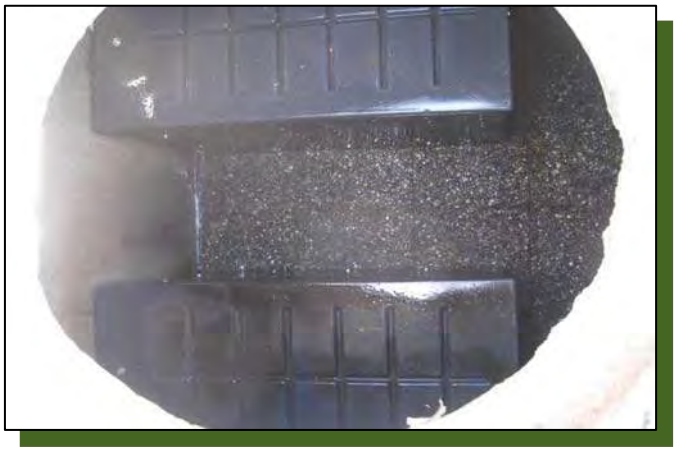
The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.

Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.

Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.



Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.

Inspection Form

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Inspection Report
Modular Wetlands System

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes:

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

Maintenance Report

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Inspector Name _____ Date ____/____/_____ Time _____AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

- As necessary, arrange for appropriate training on proper methods to ensure intended IMP function and effectiveness is achieved, to occur before starting an IMP construction project and provide additional training on-demand during construction.

4.2 IMP Operation, Maintenance and Inspection

To sustain the effectiveness and function of structural IMPs and comply with a project's Maintenance Plan (to be prepared in accordance with chapter 5 of the SUSMP (County of San Diego 2012) regular maintenance and inspections are essential.

Operation and Maintenance

The major goal of IMP operation and maintenance is to ensure that the IMP is meeting the specified design criteria for stormwater flow rate, volume, and water quality control functions. If structural LID systems are not properly maintained, IMP effectiveness can be reduced, resulting in water quality impacts. Routine maintenance and any need-based repairs for a structural IMP must be completed according to schedule or as soon as practical after a problem is discovered. Deferred IMP maintenance could result in detrimental effects on the landscape and increased potential for water pollution and local flooding.

Training should be included in program development to ensure that maintenance staff has the proper knowledge and skills. Most structural IMP maintenance work—such as mowing, removing trash and debris, and removing sediment—is nontechnical and is already performed by property maintenance personnel. More specialized maintenance training might be needed for more sophisticated systems.

Typical IMP maintenance activities include periodic inspection of surface drainage systems to ensure clear flow lines, repair of eroded surfaces, adjustment or repair of drainage structures, soil cultivation or aeration, care of plant materials, replacement of dead plants, replenishment of mulch cover, irrigation, fertilizing, pruning and mowing. Landscape maintenance can have a significant impact on soil permeability and its ability to support plant growth. Most plants concentrate the majority of their small absorbing roots in the upper 6 inches of the soil surface if the surface is protected by a mulch or forest litter. If the soil is exposed or bare, it can become so hot that surface roots will not grow in the upper 8 to 10 inches. The common practice of removing all leaf litter and detritus with leaf blowers creates a hard crusted soil surface of low permeability and high heat conduction. Proper mulching of the soil surface improves water retention and infiltration, while protecting the surface root zone from temperature extremes (Hinman 2005).

In addition to impacting permeability, landscape maintenance practices can adversely affect water quality. Because commonly used fertilizers and herbicides are a source of toxic compounds, use of these substances should be kept to a minimum. Overwatering, which can be a significant contributor to runoff and dry weather flows, should be prevented. Watering should only occur to accommodate plant health and should be adjusted at least four times a year. Whenever practical, use weather-based irrigation controllers and follow real-time evapotranspiration (plant water use) data from the California Irrigation Management Information System (CIMIS) from the Department of Water Resources. Organic methods for fertilizers and pest control (including Integrated Pest Management) should be used.

General maintenance activities for the two major categories of structural facilities (infiltration and biofiltration/filtration) are as follows:

Infiltration IMPs

- Mowing and maintaining upland vegetated areas if applicable.
- Cleaning and removing debris after major storm events.
- Cleaning out accumulated sediment.
- Repairing or replacing stone aggregate.
- Maintaining inlets and outlets.
- Removing accumulated sediment from forebays or sediment storage areas when 50 percent of the original volume has been lost.

Biofiltration and Filtration IMPs

- Removing trash and debris from control openings.
- Watering and mowing vegetated areas.
- Removing and replacing all dead and diseased vegetation.
- Stabilizing eroded side slopes and bottom.
- Repairing erosion areas.
- Mulching void areas if needed.
- Maintaining inlets and outlets.
- Repairing leaks from the sedimentation chamber or from deteriorating structural components.
- Removing the top few inches of media and cultivating the surface when the filter bed is clogged.
- Cleaning out accumulated sediment from the filter bed once depth exceeds approximately one-half inch or when the filter layer no longer draws down within 24 hours.

In regions where dry and wet seasons are clearly distinguished, as is the case in San Diego County, conducting special maintenance activities before spring and fall storms can help to prevent increased erosion. If an IMP does not meet the specified design criteria, it must be repaired, improved, or replaced before a wet season starts. Any accumulated sediment and trash should be removed to maximize the performance of the facility throughout the following wet season. Any disturbed area that is not actively being graded must be fully protected from erosion.

Detailed descriptions of operation and maintenance for specific types of LID IMPs are in Appendix A and general maintenance issues are presented in the following sections.

Maintenance activities for bioretention units should focus on the major system components, especially landscaped areas. Bioretention landscape components should blend over time through plant and root growth, organic decomposition, and natural soil horizon development. Those biological and physical processes over time will lengthen the facility's life span and reduce the need for extensive maintenance.

Irrigation of vegetated areas might be needed during the plant establishment period. During extended drought, temporary supplemental irrigation could be used to maintain plant vitality. Irrigation frequency will depend on the season and type of vegetation. Native plants generally require less irrigation than

4.2.7 Sand Filter

The primary maintenance requirement for sand filters is to remove trash, accumulated sediment, and media contaminated with hydrocarbons. If the filter does not drain within 48 hours, or if sediment has accumulated to a depth of 6 inches, the top layer (1 to 3 inches) of sand (media) must be replaced.

4.2.8 Cisterns and Rain Barrels

General maintenance activities for cisterns and rain barrels are similar to the routine periodic maintenance for on-site drinking water wells. The primary maintenance requirement is to inspect the tank and distribution system and test any backflow-prevention devices. Rain barrels require minimal maintenance several times a year and after major storms to prevent any clogging. Cisterns also require inspections for clogging and structural soundness twice a year, including inspection of all debris and vector control screens. If a first-flush diverter is used, it should be dewatered and cleaned between each significant storm event. Self-cleaning filters and screens, such as the ones shown in Figure 4-11, can help prevent debris from entering the cistern and reduce maintenance. Accumulated sediment in the tank must be removed at least once a year.

Figure 4-11. Self-cleaning inlet filters.

4.2.9 Vegetated Swales

The maintenance objectives for vegetated systems include optimizing filtration and stormwater conveyance capacity. To meet those objectives, a dense, healthy vegetative cover must be maintained in the channel. Maintenance activities involve mowing, controlling weeds, irrigating during drought conditions, reseeding bare areas, and clearing debris and blockages. Manage vegetation on a regular schedule during the growth season to maintain adequate coverage. Accumulated sediment should also be removed manually to avoid concentrated flow. Minimize fertilizer and pesticide application, possibly to periods of plant establishment only. Irrigation might be needed to maintain plant vitality, especially during plant establishment or in periods of extended drought. Irrigation frequency will depend on the season and type of vegetation. Native plants require less irrigation than nonnative plants and should be incorporated into site designs where feasible.

Initial Training of Responsible individuals

Following completion of construction, the biofiltration basins will be maintained by the contractor for two years, except for routine policing of trash, which will be done by the Property Owners Association (POA). During the 2-year period, the POA landscape maintenance crew will coordinate to meet with the contractor's personnel on-site during maintenance. At these times, the contractor's personnel will demonstrate proper maintenance procedures.

Landscape and Open Space

In the natural landscape, most soils infiltrate a high percentage of rainwater through a complex web of organic and biological activities that build soil porosity and permeability. Roots reach into the soil and separate particles of clay, insects excavate voids in the soil mass, roots decay leaving networks of macro pores, leaves fall and form a mulch over the soil surface, and earthworms burrow and ingest organic detritus to create richer, more porous soil. These are just a few examples of the natural processes that occur within the soil.

Maintenance of a healthy soil structure through the practice of retaining or restoring native soils where possible and using soil amendments where appropriate can improve the land's ability to filter and slowly release stormwater into drainage networks. Construction practices such as decreasing soil compaction, storing topsoil on-site for use after construction, and chipping wood for mulch as it is cleared for the land can improve soil quality and help maintain healthy watersheds. Practices that reduce erosion and help retain water on-site include incorporating organic amendments into disturbed soils after construction, retaining native vegetation, and covering soil during revegetation.

Subtle changes in grading can also improve infiltration. Landscape surfaces are conventionally graded to have a slight convex slope. This causes water to run off a central high point into a surrounding drainage system, creating increased runoff. If a landscape surface is graded to have a slightly concave slope, it will hold water. The infiltration value of concave vegetated surfaces is greater in permeable soils. Soils of heavy clay or underlain with hardpan provide less infiltration value. In these cases, concave vegetated surfaces must be designed as retention/detention basins, with proper outlets or under drains to an interconnected system.

Maintenance Needs for Stormwater Systems

All landscape treatments require maintenance. Landscapes designed to perform stormwater management functions are not necessarily more maintenance intensive than highly manicured conventional landscapes. A concave lawn requires the same mowing, fertilizing, and weeding as a convex one and often less irrigation because more rain is filtered into the underlying soil. Sometimes infiltration basins may require a different kind of maintenance than conventionally practiced.

Typical maintenance activities include periodic inspection of surface drainage systems to ensure clear flow lines, repair of eroded surfaces, adjustment or repair of drainage structures, soil cultivation or aeration, care of plant materials, replacement of dead plants, replenishment of mulch cover, irrigation, fertilizing, pruning and mowing. In addition, dead or stressed vegetation may indicate chemical dumping. Careful observation should be made of these areas to determine if such a problem exists.

Landscape maintenance can have a significant impact on soil permeability and its ability to support plant growth. Most plants concentrate the majority of their small absorbing roots in the

upper 6 in. of the soil surface if a mulch or forest litter protects the surface. If the soil is exposed or bare, it can become so hot that surface roots will not grow in the upper 8 to 10 in. The common practice of removing all leaf litter and detritus with leaf blowers creates a hard-crusted soil surface of low permeability and high heat conduction. Proper mulching of the soil surface improves water retention and infiltration, while protecting the surface root zone from temperature extremes.

In addition to impacting permeability, landscape maintenance practices can have adverse effects on water quality. Because commonly used fertilizers and herbicides are a source of organic compounds, it is important to keep these practices to a minimum, and prevent overwatering. When well maintained and designed, landscaped concave surfaces, infiltration basins, swales and bioretention areas can add aesthetic value while providing the framework for environmentally sound, comprehensive stormwater management systems.

Roof Runoff Controls

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

One method of addressing roof runoff is to direct roof downspouts to rain barrels. A rain barrel is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

Efficient Irrigation

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.

- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.
- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
    - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
    - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
    - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
    - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Storm Drain Signage

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.
- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Biofiltration Basin

An biofiltration basin is a shallow impoundment that is designed to infiltrate stormwater. Biofiltration basins use the natural filtering ability of the soil to remove pollutants in stormwater runoff. Infiltration facilities store runoff until it gradually exfiltrates through the soil and eventually into the water table. This practice has high pollutant removal efficiency and can also help recharge groundwater, thus helping to maintain low flows in stream systems. Infiltration basins can be challenging to apply on many sites, however, because of soils requirements. In addition, some studies have shown relatively high failure rates compared with other management practices.

The list below highlights the assumed maintenance regime for an biofiltration basin:

- First year after planting
    - Adequate water is crucial to plant survival and temporary irrigation will be needed unless rainfall is adequate until plants mature
- As needed
    - Prune and weed to maintain appearance
    - Stabilize or replace mulch when erosion is evident
    - Remove trash and debris
    - Mow filter strip
    - Renew mulch to replace that which has decomposed
    - Replace vegetation whenever percent cover of acceptable vegetation falls below 90 percent or project specific performance requirements are not met. If vegetation suffers for no apparent reason, consult with horticulturist and/or test soil as needed
- Semi-annually
    - Inspect inflow and outflow for clogging and remove any sediment and debris build-up
    - Vegetation should be inspected to evaluate their health and replanted as appropriate to meet project goals
    - Remove any dead or severely diseased vegetation
- Annually in spring
    - Cut back and remove previous year's plant material and remove accumulated leaves.

RECORDING REQUESTED BY:

City of Santee, CA

AFTER RECORDING MAIL TO:

City Clerk
City of Santee
10601 Magnolia Avenue
Santee, CA 92071-1266

ABOVE SPACE FOR RECORDER'S USE

AGREEMENT TO PERFORM STORM WATER FACILITIES MAINTENANCE

NO RECORDATION FEE REQUIRED; THIS DOCUMENT IS
EXEMPT FROM RECORDING FEES PURSUANT
TO CALIFORNIA GOVERNMENT CODE SECTIONS 6103 AND 27383

DOCUMENTARY TRANSFER TAX DUE $ 0

Assessor's Parcel No._____ Project No._____

This AGREEMENT for the maintenance and repair of certain Storm Water Management Facilities is entered into between _____ _____ (hereinafter referred to as "Owner") and the City of Santee (hereinafter referred to as "City") for the benefit of the City, the successors in interest to the City, and the public generally.

RECITALS

A. Owner is the owner of certain real property located in the City of Santee, California, more particularly described in Exhibit "A" hereto (hereinafter referred to as the "Property"), and has proposed that the Property be developed as _____(insert brief description of type of project, e.g., "a 100 unit residential

subdivision”) _____ in accordance with applications for Tentative Map No. ___ _____, Development Review No. _____, Conditional Use Permit No. _____, Grading Permit No. _____ which are on file with the City. This Agreement is required as a condition of approval for such development as set forth in Resolution Nos. _____ _____.

B. In accordance with the City of Santee’s Storm Water Management and Discharge Control Ordinance, (Santee Municipal Code, Chapter 13.42), the City of Santee Subdivision Ordinance, the City of Santee Zoning Ordinance, the City of Santee Grading Ordinance and/or other ordinances or regulations of the City which regulate land development and urban runoff, Owner has prepared and submitted to the City, a site specific Storm Water Quality Management Plan (hereinafter the SWQMP), prepared by _____ and dated _ _____ which is on file with the City’s Department of Development Services. The SWQMP proposes that storm water runoff from the Property be treated by the use of various storm water management facilities which are identified in the SWQMP as “Best Management Practices” or “BMP’s”:

The precise location and extent of the BMP’s are described and shown in the SWQMP. The SWQMP specifies the frequency, manner, and standards by which the BMP’s must be repaired and maintained in order to retain their effectiveness, as set forth in the Operation and Maintenance Section included in the SWMP.

C. The information contained in the SWQMP and the Owner’s representation that the BMP’s will be maintained pursuant to the SWQMP have been relied upon by City in approving Owner’s development applications. It is the purpose of this Agreement to assure that the BMP’s are maintained in perpetuity, by creating obligations which are enforceable against the Owner and the Owner’s successors in interest in the Property. It is intended that these obligations be enforceable notwithstanding other provisions related to BMP maintenance which are provided by law.

AGREEMENT

NOW, THEREFORE, for consideration of City’s approval of the above development applications and the mutual covenants set forth herein, IT IS HEREBY AGREED AS FOLLOWS:

1. **Maintenance of Storm Water Management Facilities.** Owner agrees, for itself and its successors in interest, to all or any portion of the Property, to comply in all respects with the requirements of the Storm Water Management

and Discharge Control Ordinance and the SWQMP with regard to the maintenance of all BMP's as designated in the SWQMP, and in particular agrees to perform, at its sole cost, expense and liability, the following "Maintenance Activities": all inspections, cleaning, repairs, servicing, maintenance and other actions specified in the SWQMP, with respect to all of the BMP's listed at Recital "B" above, at the times and in the manner specified in the SWQMP as it currently exists or may be amended or modified as provided herein. Owner shall initiate, perform and complete all Maintenance Activities at the required time, without request or demand from City or any other agency. Owner further agrees that "Maintenance Activities" shall include replacement or modification of the BMP's in the event that the BMP fails to provide the necessary water quality treatment, it is found that the BMP was not installed correctly, or in the event that the BMP is not functioning as intended. Replacement shall be with an identical type, size and model of BMP, except that:

(a) The City Engineer may authorize substitution of an alternative BMP if he or she determines that it will function as good or better than the failed BMP. The City requires that proposed modifications be submitted for review and approval prior to making any changes in the field, and that the Storm Water Quality Management Plan be revised or amended and resubmitted for approval; and

(b) Pursuant to Section 13.42.070 of the Storm Water Management and Discharge Control Ordinance, any discharge that would result in or contribute to a violation of the City's NPDES Permit and any amendment, revision or re-issuance thereof, either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the owner(s) causing or responsible for the discharge. Owner agrees that if the BMP, in the judgment of the Director of Development Services indicates that the BMP in use is inappropriate or inadequate to the circumstances and has or may result in a violation of water quality standards, the BMP must be modified or replaced with an upgraded BMP to prevent any actual or potential violation.

2. **Annual Inspection and Certification by Owner**

Owner agrees to provide documentation of BMP maintenance as required for the City to ensure that all storm water BMPs are properly maintained and are functioning as intended, in compliance with the site specific Storm Water Quality Management Plan. Owner shall provide annual certification that BMPs have been properly maintained for the time period of S*eptember 1 to August 31, each year. This documentation is due to the City* prior to September 15th of each year. Structural BMPs for which annual certification is required includes, but is not limited to: drainage inserts; detention basins; hydrodynamic separators; swales; filters;

bioretention facilities; and Low Impact Development Integrated Management Practices (LID IMPs).

3. **Notices.** Owner further agrees that it shall, prior to transferring ownership of any land on which any of the above BMP's are located, and also prior to transferring ownership of any such BMP, provide clear written notice of the above maintenance obligations associated with that BMP to the transferee. The Storm Water Quality Management Plan and all associated records must also be provided to all subsequent owners upon transfer of property title.

4. **City's Right to Perform Maintenance.** It is agreed that City shall have the right, but not the obligation, to elect to perform any or all of the Maintenance Activities if, in the City's sole judgment, Owner has failed to perform the same. It is recognized and understood that the City makes no representation that it intends to or will perform any of the Maintenance Activities, and any election by the City to perform any of the Maintenance Activities, shall in no way relieve Owner of its continuing maintenance obligations under this agreement. If the City elects to perform any of the Maintenance Activities, it is understood that the City shall be deemed to be acting as the agent of the Owner and said work shall be without warranty or representation by City as to safety or effectiveness, shall be deemed to be accepted by Owner "as is", and shall be covered by Owner's indemnity provisions below.

If the City performs any of the Maintenance Activities, after City has served written notice to the Owner to perform the same, and the Owner has failed to do so within a reasonable time stated in the City's written notice, then Owner shall pay all of the City's costs incurred in performing the Maintenance Activities within sixty days of receipt of an invoice for those costs.

5. **Right of Entry and Inspection by City.** Owner hereby grants to City a perpetual right of entry over, under and across Owner's Property, for purposes of accessing the BMP's and performing inspection of the BMP's or any of the Maintenance Activities related to maintenance of the BMP's. City shall have the right, at any time and without prior notice to Owner, to enter upon any part of said area as may be necessary or convenient for such purposes. Owner shall at all times maintain the Property so as to make the City's access clear and unobstructed. City is required to perform periodic inspection of Structural BMPs. Owner agrees to pay reasonable fees levied by the City on Owners of BMPs for the costs of managing the BMP inspection and maintenance tracking program.

6. **Administration of Agreement for City.** City hereby designates its Department of Development Services with responsibility and authority to administer this Agreement on behalf of City. Any notice or communication related to the

implementation of this Agreement desired or required to be delivered to City shall be addressed to:

Director of Development Services
City of Santee
10601 Magnolia Avenue
Santee, CA 92071

The City Engineer is also granted authority to enter into appropriate amendments to this Agreement on behalf of City, provided that the amendment is consistent with the purposes of this Agreement as set forth above.

7. **Defense and Indemnity.** City shall not be liable for, and Owner and its successors in interest shall defend and indemnify City and the employees and agents of City, against any and all claims, demands, liability, judgments, awards, fines, mechanic's liens or other liens, labor disputes, losses, damages, expenses, charges or costs of any kind or character, including attorneys' fees and court costs (hereinafter collectively referred to as "CLAIMS"), related to this Agreement and arising either directly or indirectly from any act, error, omission or negligence of Owner, Owner's successors, or their contractors, licensees, agents, servants or employees, including, without limitation, claims caused by the concurrent negligent act, error or omission, whether active or passive of City. Owner shall have no obligation, however, to defend or indemnify City from a claim if it is determined by a court of competent jurisdiction that such claim was caused by the sole negligence or willful misconduct of City. Nothing in this Agreement, in the City's approval of the subdivision or other applications or plans and specifications, or inspection of the work, is intended to acknowledge responsibility for any such matter, and City shall have absolutely no responsibility or liability therefore unless otherwise provided by applicable law.

8. **Common Interest Developments.** If the Property is developed as a "Common Interest Development" as defined in Civil Code section 1351(c) which will include membership in or ownership of an "Association" as defined in Civil Code section 1351(a), then the following provisions of this Paragraph 7 shall apply during such time as the Property is encumbered by a "Declaration" as defined in Civil Code section 1351(h), and the Common Area, as "Common Area" is defined in Civil Code section 1351(b), of the Property is managed and controlled by the Association:

(a) The Association, through its Board of Directors, shall assume full responsibility to perform the MAINTENANCE ACTIVITIES pursuant to this Agreement, and shall undertake all actions and efforts necessary to accomplish the MAINTENANCE ACTIVITIES, including but not limited to,

levying regular or special assessments against each member of the Association sufficient to provide funding for the MAINTENANCE ACTIVITIES, conducting a vote of the membership related to such assessments if required by law. In the event insufficient votes have been obtained to authorize an assessment, the Association shall seek authority from a court of competent jurisdiction for a reduced percentage of affirmative votes necessary to authorize the assessment, re-conducting the vote of the membership in order to obtain the votes necessary to authorize an assessment, and the Association shall take all action authorized by the Declaration or California law to collect delinquent assessments, including but not limited to, the recording and foreclosure of assessment liens.

(b) No provision of the Declaration, nor any other governing document of the Association or grant of authority to its members, shall grant or recognize a right of any member or other person to alter, improve, maintain or repair any of the Property in any manner which would impair the functioning of the BMP's to manage drainage or storm water runoff as described in the SWQMP. In the event of any conflict between the terms of this Agreement and the Declaration or other Association governing documents, the provisions of this Agreement shall prevail.

9. **Agreement Binds Successors and Runs With the Property.** It is understood and agreed that the terms, covenants and conditions herein contained shall constitute covenants running with the land and shall be binding upon the heirs, executors, administrators, successors and assigns of Owner and City, shall be deemed to be for the benefit of all persons owning any interest in the Property (including the interest of City or its successors in the easement granted herein). It is the intent of the parties hereto that this Agreement shall be recorded and shall be binding upon all persons purchasing or otherwise acquiring all or any lot, unit or other portion of the Property, who shall be deemed to have consented to and become bound by all the provisions hereof.

10. **Owner's Continuing Responsibilities Where Work Commenced or Permit Obtained.** Notwithstanding any other provision of this Agreement, no transfer or conveyance of the Property or any portion thereof shall in any way relieve Owner of or otherwise affect Owner's responsibilities for installation or maintenance of BMP's which may have arisen under the ordinances or regulations of City referred to in Recital B above, or other federal, state or local laws, on account of Owner having obtained a permit which creates such obligations or having commenced grading, construction or other land disturbance work.

11. **Amendment and Release.** The terms of this Agreement may be modified only by a written amendment approved and signed by the Director of

Development Services and by the Owner or Owner's successor(s) in interest. This Agreement may be terminated and Owner and the Property released from the covenants set forth herein, by a Release which City may execute if it determines that another mechanism will assure the ongoing maintenance of the BMP's or that it is no longer necessary to assure such maintenance.

12. **Agreement is Intended to Supplement Not Supercede.** This Agreement is intended to supplement and not supercede the requirements of the Chapter 13.42 of the Santee Municipal Code – Storm Water Management and Discharge Control. The requirements listed herein are in addition to the requirements set forth in the Code including Civil Actions and Enforcement Powers established under the Code.

13. **Governing Law and Severability.** This Agreement shall be governed by the laws of the State of California. Venue in any action related to this Agreement shall be in the Superior Court of the State of California, County of San Diego, East County Division. In the event that any of the provisions of this Agreement are held to be unenforceable or invalid by any court of competent jurisdiction, the validity, and enforceability of the remaining provisions shall not be affected thereby.

IN WITNESS WHEREOF, the parties have executed this Agreement on the _____ day of _____, 201__.

CITY OF SANTEE:

By: _____
Melanie Kush
Acting Director of Development Services

OWNERS:

By:_____
(sign here)

_____
(print name here)

_____
(title of signatory)

By:_____
(sign here)

_____
(print name here)

_____
(title of signatory)

(All OWNERS must sign)

(Proper notary acknowledgment of execution by OWNER must be attached.)

(President or vice-president **and** secretary or assistant secretary must sign for corporations. If only one officer signs, the corporation must attach a resolution certified by the secretary or assistant secretary under corporate seal empowering that officer to bind the corporation.)

CITY OF SANTEE
CERTIFICATE OF ACCEPTANCE
FOR
AGREEMENT TO PERFORM STORM WATER FACILITIES MAINTENANCE

This AGREEMENT by and between the City of Santee, a municipal corporation, and _____ is accepted for recording by the undersigned officers on behalf of the City of Santee pursuant to authority granted by Resolution No. 148-89 of the Santee City Council adopted on August 9, 1989.

Date:_____ By:_____
Melanie Kush
Acting Director of Development Services

CITY CLERK'S OFFICE:

STATE OF CALIFORNIA)
COUNTY OF SAN DIEGO) ss.
CITY OF SANTEE)

On _____ , before me, Patsy Bell, CMC, City Clerk, personally appeared Melanie Kush, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity as Development Services Director, and that by his signature on the instrument the person, or entity upon behalf of which the person acted, executed the instrument on behalf of the City of Santee.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____
Patsy Bell
CMC, City Clerk

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Indicate which items are included behind this cover sheet:

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

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

☒ **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).

ATTACHMENT 4

Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

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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.

TENTATIVE MAP - CHULA VISTA PARCEL MAP NO. 18-_____

676 MOSS STREET

IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, CALIFORNIA

GENERAL NOTES

1. GROSS AREA: 7.29 ACRES
2. NET AREA: 6.49 ACRES (0.35 AC MOSS ST. RIGHT-OF-WAY DEDICATION)
3. TOTAL NUMBER OF LOTS: 1
4. PRESENT ZONING: ILP (LIMITED INDUSTRIAL PRECISE PLAN)
5. PROPOSED ZONING: R-3 (HIGH DENSITY RESIDENTIAL/APARTMENT RESIDENTIAL ZONE)
6. PRESENT USE: INDUSTRIAL FABRICATION, REPAIR AND SALVAGE
7. PROPOSED USE: MULTI-FAMILY DWELLING UNITS (CONDOMINIUM COMPLEX) 20.4 DU/AC
8. INTENDED OCCUPANCY USE: RESIDENTIAL R-2 (CONDOS)
9. 1 FOOT CONTOUR INTERVAL
10. TOPOGRAPHIC SOURCE: SHOWN CREATED BY BRENNER & ASSOC. LAND SURVEYOR ALTA/NSPS LAND TITLE SURVEY, DATE: OCT. 22, 2018.
11. PRIVATE STREETS A THRU M ARE PROPOSED AS A PRIVATE STREET TO BE MAINTAINED BY HOA.
12. SEWER: PROJECT PROPOSES ONE SEWER CONNECTION TO THE EXISTING SEWER MAIN IN MOSS STREET AT THE SOUTHEAST CORNER OF THE SITE. A SECOND SEWER CONNECTION IS PROPOSED IN INDUSTRIAL BOULEVARD AT THE WEST END OF THE SITE. THE PROJECT PROPOSES TO CONSTRUCT ON-SITE PRIVATE SEWER MAIN IN THE ON-SITE STREETS AND WILL CONNECT TO EXISTING PUBLIC SEWER MAIN.
13. WATER: WATER WILL BE SERVED FROM EXISTING PUBLIC WATER LINE IN MOSS STREET. PROJECT WILL CONSTRUCT NEW PUBLIC WATER MAIN IN A STREET, B STREET & C STREET TO PROJECT ENTRANCE ALONG WITH NEW FIRE HYDRANTS, METERS AND FIRE SPRINKLER SERVICE LATERALS.
14. STORM DRAINAGE: STORM WATER RUNOFF WILL COLLECT ON-SITE AND DRAIN INTO BIO-RETENTION STRUCTURES THROUGHOUT THE SITE. OVERFLOW DRAINAGE WILL DISCHARGE TO PRIVATE STREET DRAINS. FROM THERE IT WILL FLOW INTO A PROPOSED STORM DRAIN SYSTEM AND DISCHAGE INTO THE EXISTING TELEGRAPH CANYON DOUBLE (10 FOOT X 12 FOOT) BOX CULVERT.
15. PHASING - PROJECT MAY BE IMPLEMENTED IN SEVERAL PHASES WITHOUT REGARD TO SEQUENCE.
16. SEE SHEET 3 PRELIMINARY GRADING PLAN FOR PROPOSED GRADING CONCEPT.
17. ELECTRICAL, TELEPHONE AND CABLE TV: ALL SERVICES TO THE SITE WILL BE PROVIDED FROM MOSS STREET.

EXISTING EASEMENTS

◇	DESCRIPTION	DISPOSITION	DOC. #
5	PUBLIC HIGHWAY - SAN DIEGO LANDS, INC	TO REMAIN	BK. 863, PG. 128, 9/16/21
7	PUBLIC UTILITY EASEMENT - SDGE	TO BE QUITCLAIMED	INSTR. 74-154472 , 6/11/74
8	PUBLIC UTILITY EASEMENT - SDGE	TO BE QUITCLAIMED	INSTR. 74-232956, 8/27/74
9	RAILROAD EASEMENT - SD, AZ & EASTERN RAILWAY CO.	TO BE QUITCLAIMED	INSTR. 77-302949 , 7/27/77
10	FLOOD DRAINAGE CHANNEL EASEMENT	TO REMAIN	INSTR. 79-044389, 1/29/79
11	FLOOD DRAINAGE CHANNEL EASEMENT	TO REMAIN	INSTR. 83-199081, 6/14/83
12	PUBLIC UTILITY EASEMENT - SDGE	TO REMAIN	INSTR. 85-341634, 9/17/85
13	FLOOD DRAINAGE CHANNEL EASEMENT	REMOVE PORTION	INSTR. 89-011720, 1/10/89
14	FLOOD DRAINAGE CHANNEL EASEMENT	REMOVE PORTION	INSTR. 89-011721, 1/10/89

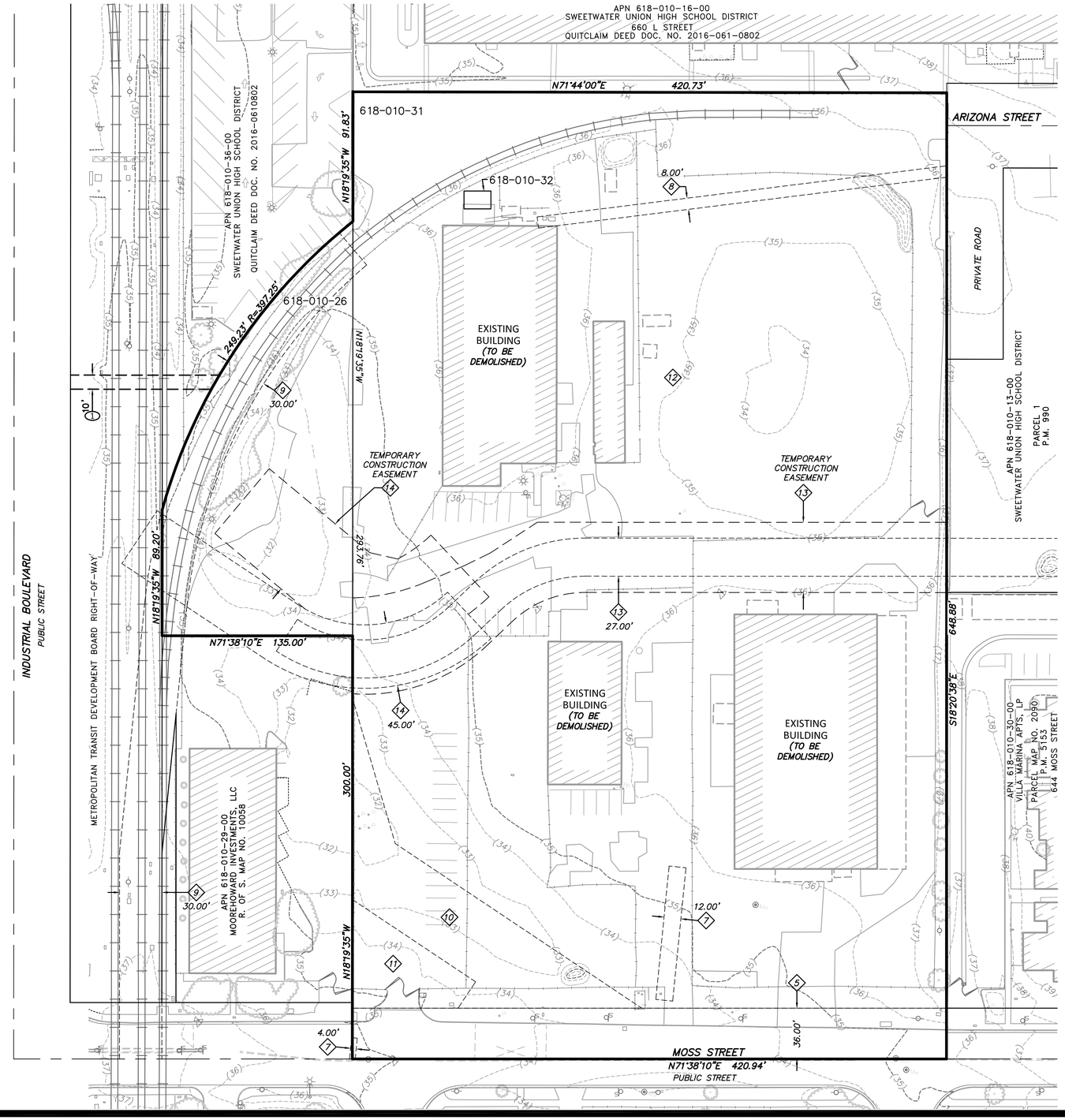
EASEMENTS AND RESTRICTIONS (PER FIRST AMERICAN TITLE INSURANCE COMPANY PRELIMINARY REPORT ORDER NUMBER NCS-886424-SD UPDATED AND AMENDED JUNE 7, 2018.
EASEMENTS PLOTTED PER BRENNER & ASSOC. LAND SURVEYORS ALTA/NSPS LAND TITLE SURVEY, DATED OCTOBER 22, 2018.

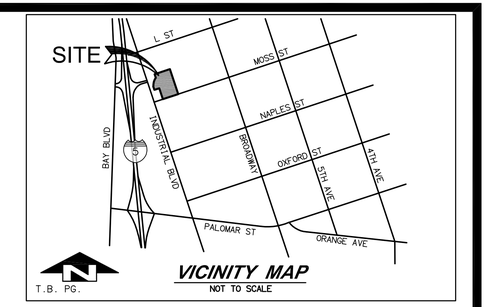
PROPOSED EASEMENTS

◯	DESCRIPTION
1	10' SEWER EASEMENT

LEGEND

- PROPERTY LINE
- EX. LOT LINE
- STREET CENTERLINE
- EX. EASEMENT
- EX. TEMPORARY CONSTRUCTION EASEMENT
- PROP. EASEMENT
- EX. BUILDING
- EX. MANHOLE
- EX. POST
- EX. VALVE
- EX. MANHOLE
- EX. SIGN
- EX. FIRE HYDARANT
- EX. TREE





ASSESSOR PARCEL NUMBER

618-010-26, 618-010-30 & 618-010-31

BASIS OF BEARINGS

NORTH 18°22'05" WEST BEING THE BEARING OF THE CENTERLINE OF BROADWAY PER RECORD OF SURVEY MAP NO. 9615.

BENCHMARK

THE BASIS OF ELEVATIONS FOR THIS SURVEY IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) PER NATIONAL GEODETIC SURVEY BENCHMARK DESIGNATION; FOUND WELL MONUMENT AT CENTERLINE INTERSECTION OF MOSS STREET AND BROADWAY, STAMPED "RCE 32133".

LYING WITHIN QUARTER SECTION 165 OF RANCHO LA NACION, TOWNSHIP 18 SOUTH, RANGE 2 WEST, CITY OF CHULA VISTA, SAN DIEGO COUNTY, CALIFORNIA.

ELEVATION: 54.15 (NAVD88)

FLOOD ZONE:

ZONE A AND ZONE X
INSURANCE RATE MAP NUMBER 06073C2152 F
DATE JUNE 11, 2004.

PROJECT AREA SUMMERY:

EXISTING LOT AREA:
618-010-26: 0.67 AC
618-010-31: 6.61 AC
618-010-32: 240 SF
TOTAL 7.29 AC

PROPOSED LOT USE:
1 LOT FOR CONDOMINIUM PURPOSES

PROPOSED RIGHT-OF-WAY DEDICATION:
MOSS STREET: 0.35 AC

PROPOSED LOT AREA:
ONE LOT: 6.94 AC

SITE ADDRESS:

676 MOSS STREET
CHULA VISTA, CA 91911

OWNER/APPLICANT:

SHOPOFF LAND FUND V, LP
MATTHEW BRADY
2 PARK PLAZA, SUITE 700
IRVINE, CA 92614
(949) 417-1936

PLANNER/ENGINEER

MICHAEL BAKER INTERNATIONAL
BRIAN STUP. P.E.
9755 CLAIREMONT MESA BLVD.
SAN DIEGO, CA. 92124
(858) 614-5000

REGISTERED PROFESSIONAL ENGINEER
BRIAN D. STUP
No. 58259
Exp.
CIVIL
STATE OF CALIFORNIA

BRIAN STUP, R.C.E. DATE

SHEET INDEX

C-1 TENTATIVE PARCEL MAP
C-2 TENTATIVE PARCEL MAP
C-3 CONCEPT GRADING PLAN
C-4 CONCEPT GRADING PLAN
C-5 CONCEPT UTILITY PLAN
C-6 FIRE ACCESS PLAN

SCALE 1"=40'

40 20 0 40 80 120
SCALE: 1"=40'

Michael Baker INTERNATIONAL
9755 Clairemont Mesa Blvd.
San Diego, CA 92124
Phone: (858) 614-5000
MBAKERINTL.COM

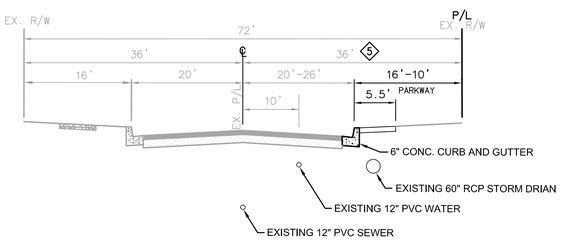
H:\PDATA\167467 SHOPPOFF CHULA VISTA\CADD\PLANNING\DLV\167467-C-1-TM.DWG BUTTS, KIMBERLY 11/28/2018 6:06 PM

TENTATIVE MAP - CHULA VISTA PARCEL MAP NO. 18-_____

676 MOSS STREET

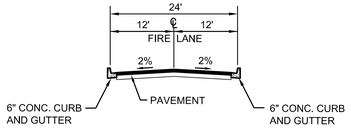
IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, CALIFORNIA

TYPICAL STREET SECTIONS



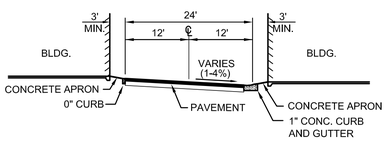
EXISTING MOSS ST.
W/ PROPOSED WIDENING

N.T.S.



TYPICAL SECTION
24' PRIVATE ACCESS DRIVE

N.T.S.



TYPICAL SECTION
24' PRIVATE ACCESS DRIVE

N.T.S.

LEGAL DESCRIPTION

REAL PROPERTY IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

APN 618-010-31:

ALL THAT PORTION OF THE EAST HALF OF THE SOUTHWEST QUARTER OF QUARTER SECTION 165 LYING SOUTHERLY OF THE NORTHERLY 638 FEET OF EVEN WIDTH, AND LYING EASTERLY OF THE WESTERLY 240 FEET EVEN WIDTH THEREOF, ALL BEING LOCATED IN THE RANCHO DE LA NACION, IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 166 MADE BY MORRILL, FILED IN THE OFFICE OF COUNTY RECORDER OF SAN DIEGO COUNTY.

APN 618-010-26:

THAT PORTION OF THE SOUTHWEST QUARTER OF QUARTER SECTION 165 OF RANCHO DE LA NACION, IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 166, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 11, 1869, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHEASTERLY LINE OF THE SOUTHWESTERLY 240.00 FEET OF THE NORTHEASTERLY HALF OF THE SOUTHWESTERLY QUARTER OF SAID QUARTER SECTION 165, DISTANT THEREON NORTH 18° 19' 00" WEST, 300.00 FEET FROM THE CENTER LINE OF MOSS STREET (80.00 FEET WIDE); THENCE ALONG SAID NORTHEASTERLY LINE, BEING PARALLEL WITH AND DISTANT 150.00 FEET NORTHEASTERLY, MEASURED AT RIGHT ANGLES, FROM THE ORIGINAL LOCATED CENTER LINE OF SAN DIEGO AND ARIZONA EASTERN RAILWAY COMPANY'S MAIN TRACT (SAN DIEGO-SAN YSIDRO), NORTH 18° 19' 00" WEST, 293.76 FEET TO A POINT IN THE ARC OF A NON-TANGENT 397.25 FOOT RADIUS CURVE, CONCAVE SOUTHEASTERLY, A RADIAL LINE OF SAID CURVE BEARS NORTH 56° 55' 53" WEST TO SAID POINT; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 35° 56' 48" A DISTANCE OF 249.23 FEET TO AN INTERSECTION WITH A LINE WHICH IS PARALLEL WITH AND DISTANT NORTHEASTERLY 15.00 FEET, MEASURED AT RIGHT ANGLES FROM THE CENTER LINE OF SAID MAIN TRACK; THENCE ALONG LAST SAID PARALLEL LINE SOUTH 18° 19' 00" EAST, 89.11 FEET TO A POINT DISTANT THEREON NORTH 18° 19' 00" WEST, 300.00 FEET FROM THE CENTER LINE OF SAID MOSS STREET; THENCE PARALLEL WITH SAID CENTER LINE, NORTH 71° 41' 00" EAST, 135.00 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION OF SAID PROPERTY LYING BELOW A DEPTH OF 500.00 FEET MEASURED VERTICALLY FROM THE CONTOUR OF THE SURFACE THEREOF; PROVIDED, HOWEVER, THAT GRANTOR, ITS SUCCESSORS AND ASSIGNS, SHALL NOT HAVE THE RIGHT FOR ANY PURPOSE WHATSOEVER TO ENTER UPON, INTO OR THROUGH THE SURFACE OF THE PROPERTY GRANTED HEREIN OR ANY PART THEREOF LYING BETWEEN SAID SURFACE AND 500.00 FEET BELOW SAID SURFACE.

UTILITY PROVIDERS

ELECTRICITY & GAS
SAN DIEGO GAS & ELECTRIC
800-411-7343

SEWER
CITY OF CHULA VISTA
619-397-6000

WATER
SWEETWATER AUTHORITY
760-597-3100

STORM DRAIN
CITY OF CHULA VISTA
619-397-6000

CALTRANS
760-639-6177

TELEPHONE
AT&T
855-327-0860

CABLE TV
TIME WARNER CABLE
714-903-4000

TRASH/REFUSE
REPUBLIC SERVICES
619-421-9400

SCHOOL DISTRICT
CHULA VISTA ELEMENTARY
SCHOOL DISTRICT
619-425-9600

SWEETWATER UNION HIGH
SCHOOL DISTRICT
619-691-5500

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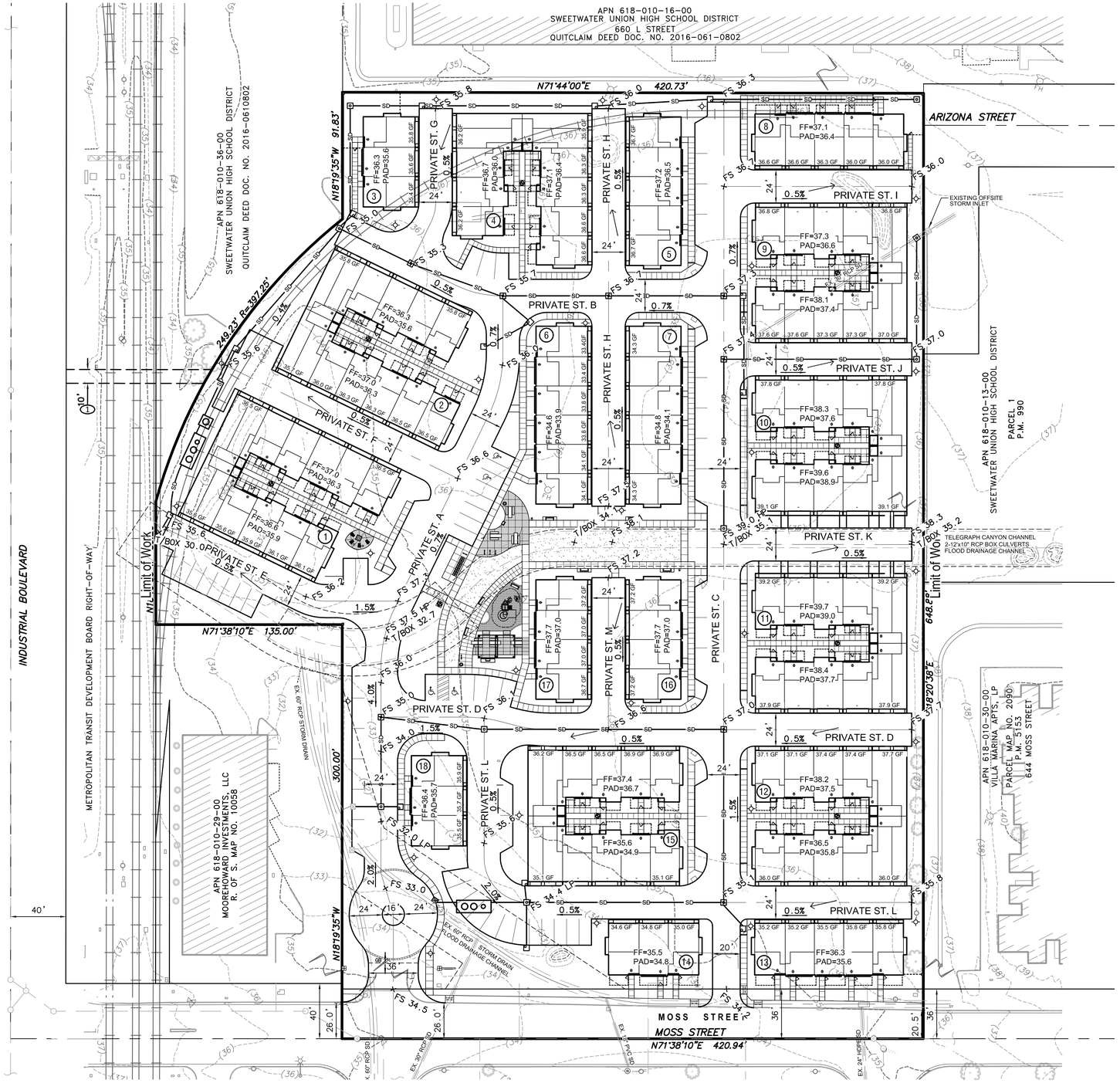
CONCEPTUAL GRADING PLAN

TENTATIVE MAP - CHULA VISTA PARCEL MAP NO. 18-_____

676 MOSS STREET

IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, CALIFORNIA



GRADING TABULATIONS

ONSITE GRADING

TOTAL AREA OF ONSITE TO BE GRADED:	6.49 AC.
% OF TOTAL SITE TO BE GRADED:	100 %
AMOUNT OF CUT:	0 CUBIC YARDS
AMOUNT OF FILL:	10,000 CUBIC YARDS
AMOUNT OF EXPORT:	0 CUBIC YARDS
AMOUNT OF IMPORT:	10,000 CUBIC YARDS
REMEDIAL GRADING EXPORT:	15,000 CUBIC YARDS

NOTE: QUANTITIES SHOWN DO NOT INCLUDE EXCAVATION FOR BUILDING FOOTINGS, UTILITY TRENCHING AND ADJUSTMENTS DUE TO BULKING/SHRINKAGE.

LEGEND

	PROPERTY LINE
	STREET CENTERLINE
	EX. EASEMENT
	PROP. EASEMENT
18	BUILDING NUMBER
(36)	EX. CONTOUR
	EX. STORM DRAIN
SD	STORM DRAIN
	BIO-RETENTION STRUCTURE
× T/BOX	TOP OF EX. BOX CULVERT
FF	FINISH FLOOR
× FS	FINISH SURFACE
GF	GARAGE FLOOR
	GRADE BREAK
× FS 35.1	SPOT ELEVATION
0.5%	DIRECTION OF FLOW
	STORM DRAIN CLEANOUT
	CURB INLET

SCALE: 1"=40'

C-3

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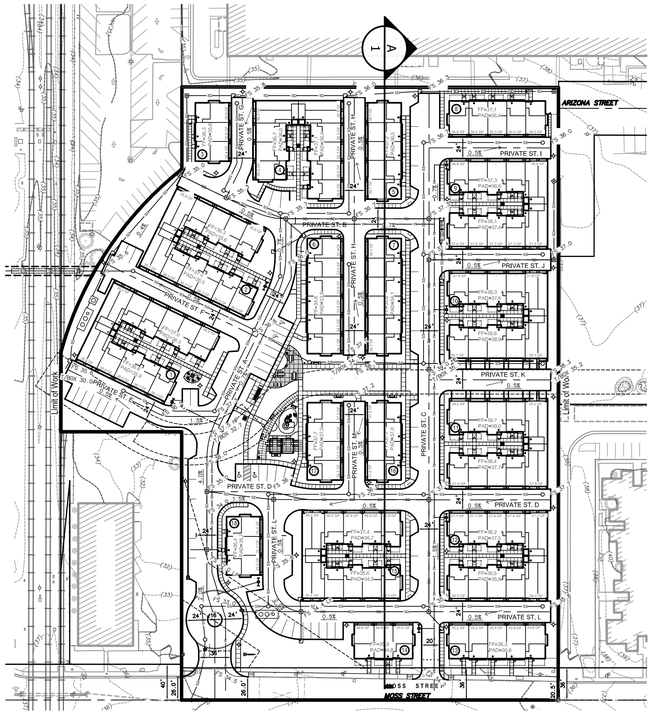
CONCEPTUAL GRADING PLAN

TENTATIVE MAP - CHULA VISTA PARCEL MAP NO. 18-_____

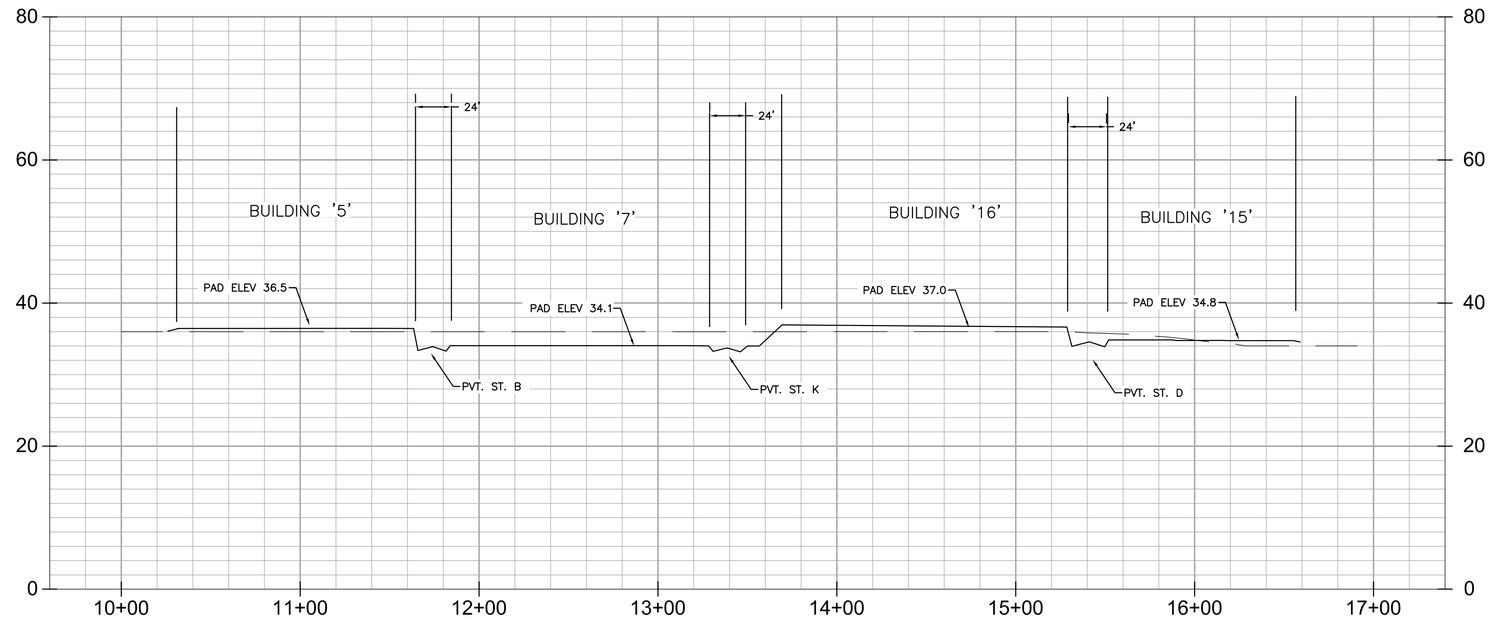
676 MOSS STREET

IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, CALIFORNIA



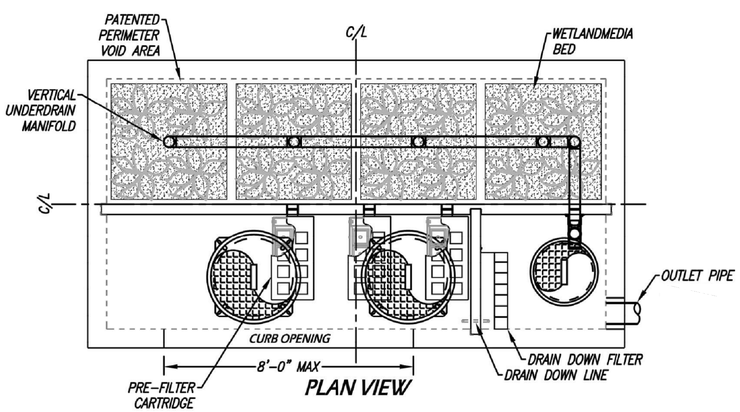
80 40 0 80 160 240

SCALE: 1"=80'

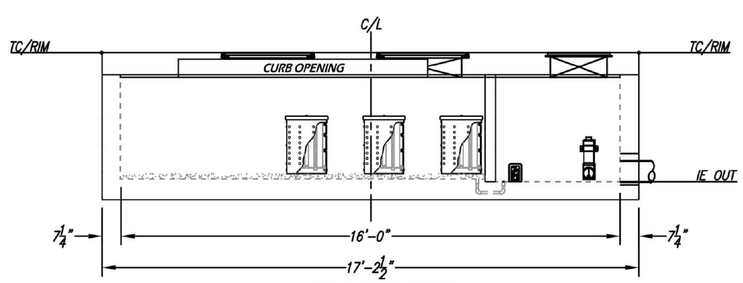


CROSS SECTION 'A'

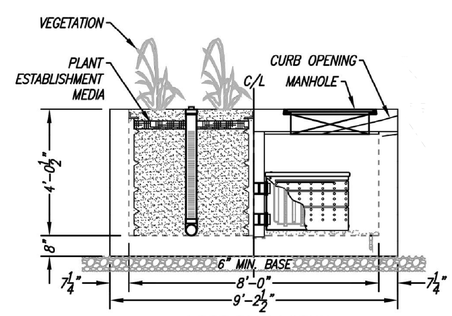
SCALE: HORIZ 1"=40'
VERT 1"=10'



PLAN VIEW



ELEVATION VIEW



LEFT END VIEW

BIOFILTRATION/PRETREATMENT

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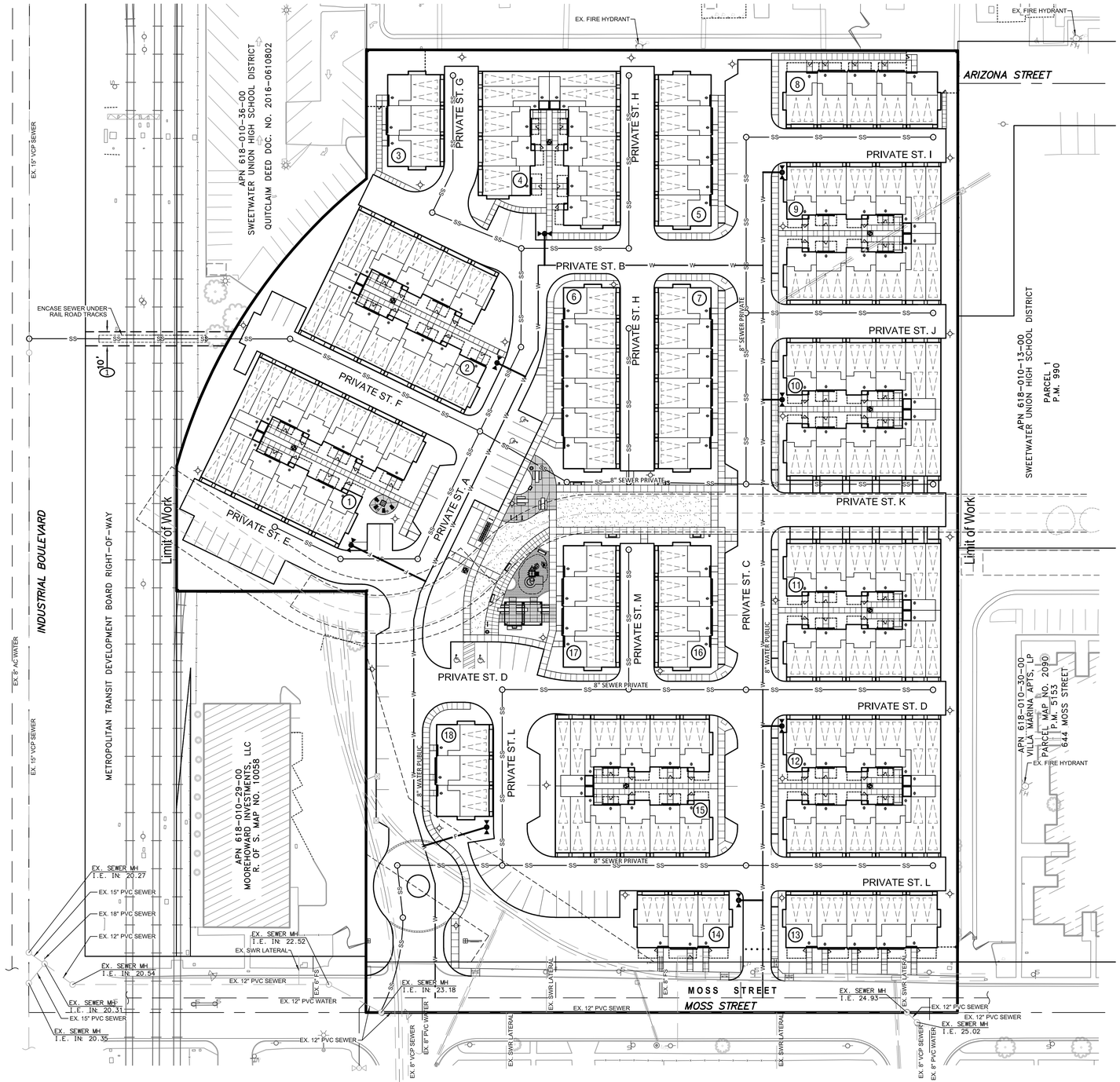
CONCEPTUAL UTILITY PLAN

TENTATIVE MAP - CHULA VISTA PARCEL MAP NO. 18-_____

676 MOSS STREET

IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, CALIFORNIA



LEGEND

EXISTING		PROPOSED
	SUBDIVISION BOUNDARY	
	EASEMENT	
	SEWER LINE	
	WATER LINE	
	STORM DRAIN	
	FIRE HYDRANT	
	SEWER MANHOLE	
	SEWER CLEANOUT	
	CATCH INLET	
	BIO-RETENTION STRUCTURE	
	PRIVATE STREET LAMP	

SCALE 1"=40'

40 20 0 40 80 120

SCALE: 1"=40'

C-5

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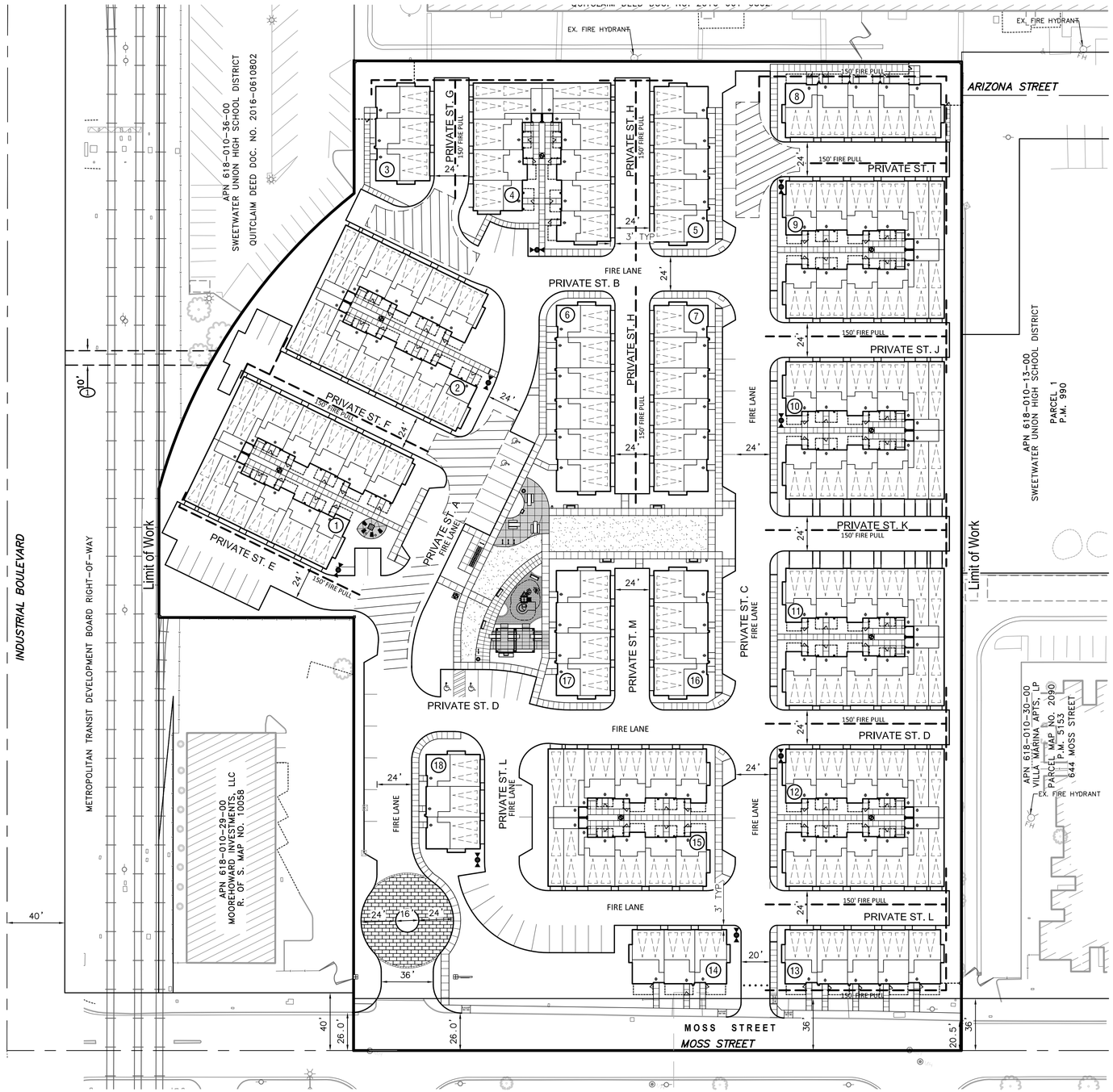
FIRE ACCESS PLAN

TENTATIVE MAP - CHULA VISTA PARCEL MAP NO. 18-_____

676 MOSS STREET

IN THE CITY OF CHULA VISTA, COUNTY OF SAN DIEGO, CALIFORNIA



PROJECT SUMMARY:

SITE APN: 618-010-26, 618-010-30 & 618-010-31

TOTAL SITE AREA: 7.29 ACRES

SEE CONCEPTUAL SITE PLAN (SHEET SP-1) FOR THE FOLLOWING INFORMATION:

- TOTAL PROPOSED UNITS
- PARKING REQUIREMENTS
- OPEN SPACE REQUIREMENTS
- LOT COVERAGE

SCALE 1"=40'

40 20 0 40 80 120

SCALE: 1"=40'

C-6

NOVEMBER 29, 2018

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ATTACHMENT 5

Copy of Project's Drainage Report

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ATTACHMENT 6

Copy of Project's Geotechnical and Groundwater Investigation Report

Attach project’s geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.