DRAINAGE STUDY

FOR

SANTEE COMMUNITY CENTER

10129 Riverwalk Drive
Santee, CA 92071

February 2025

Prepared for
City of Santee
10601 Magnolia Ave.
Santee, CA 92071
(619) 258-4100

Prepared by
PSOMAS

401 B Street
Suite 1600
San Diego, CA 92101
Psomas Project No. 5HMC010100

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1.0 Project Data

Table 1 - Project Data

Project Name/Number	Santee Community Center
Project Location	10129 Riverwalk Drive Santee, CA 92071
Project Type and Description	Santee Community and parking lot
Total Project Site Area (acres)	2.31 acres
Total New Impervious Surface Area	47,063 square feet
Total Replaced Impervious Surface Area	64,220 square feet
Total Pre-Project Impervious Surface Area	64,220 square feet (45.7%)
Total Post-Project Impervious Surface Area	111,283 square feet (77.1%)
Net Impervious Area	47,063 square feet (increase)
Design Storm Frequency and Depth	2.5 inches (100-year, 6-hour) 5.0 inches (100-year, 24-hour)

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2.0 Engineer's Declaration Statement

I, Sarah Curran, as the Engineer of Record, hereby take responsible charge for the information included within this Drainage Report. I declare that this report has been prepared in accordance with the applicable City of Santee standards and regulations.

Sarah Curran, PE RCE #C69620

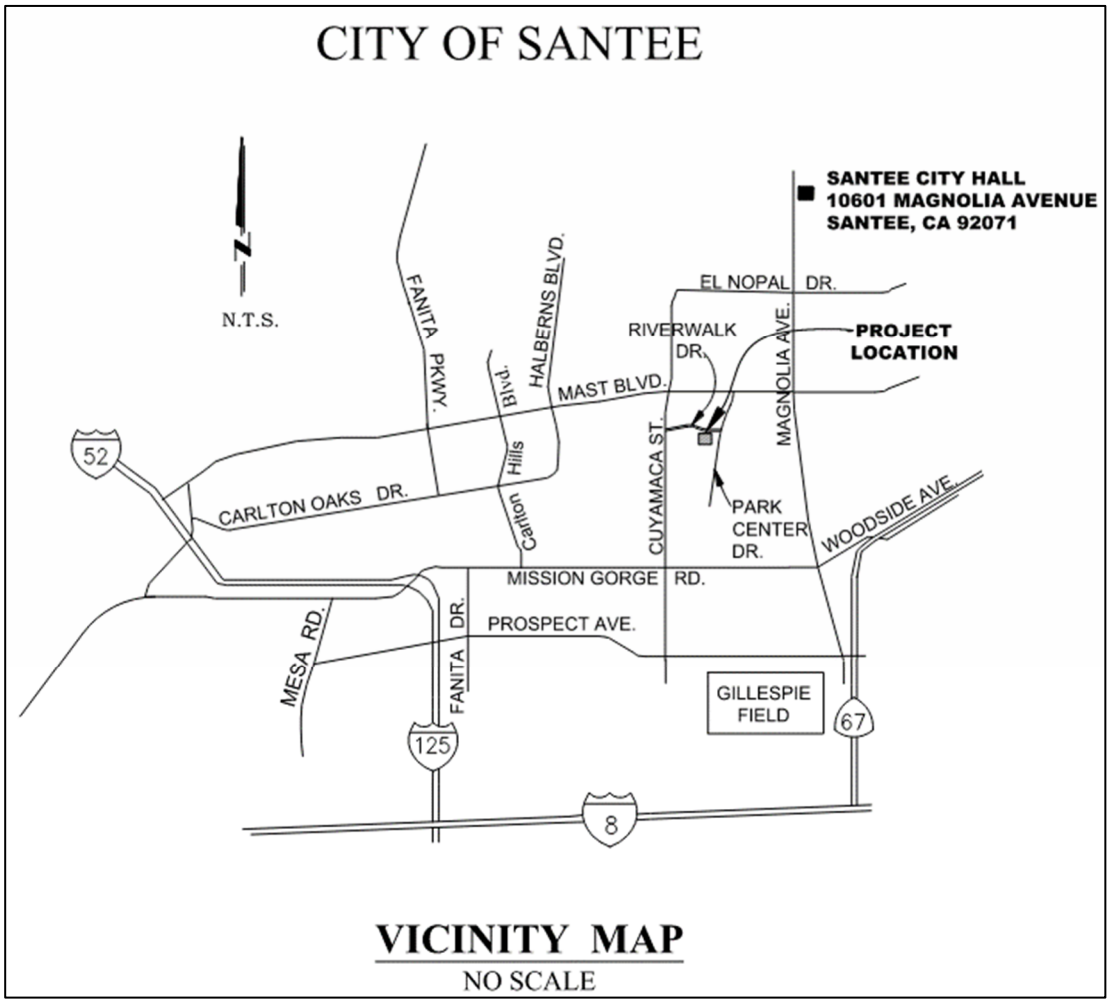
3.0 Setting

3.1 Project Description and Location

This project proposes a new community center to be constructed on City-owned property in the Santee Town Center Community Park adjacent to an existing City-owned YMCA facility located at 10123 Riverwalk Drive. The project will include dedicated facilities for teens and seniors, lobby space, multi-purpose rooms, administrative offices and storage, occupying approximately 12,500 square feet as well as a new parking lot to be located just north of the existing YMCA facility. The project's site improvements will include complimentary drought tolerant landscape architecture, storm water compliance, environmental documentation, realignment of adjacent parking facilities and replacement of displaced parking and accessibility compatibility with adjacent features.

The vicinity map for the project site is illustrated in Figure 1.

Figure 1-Project Vicinity Map



4.0 Hydrologic Method and Criteria

4.1 Existing Conditions and Drainage

The site currently consists of a parking lot and landscape area along the southern portion of the site. Existing drainage is conveyed via surface flow through the project site from the northwest end of the parking lot to the south. Runoff is then conveyed via two existing earthen swales then discharged into Woodglen Vista Creek and ultimately flows to the San Diego River.

The site of the new parking lot currently consists of a grass area that drains to three existing grate inlets that convey the drainage via storm drain pipe to the west then discharges into Woodglen Vista Creek.

4.2 Proposed Site Layout, Grading, and Drainage

The proposed site features one building and two covered outdoor event spaces. The project will also redesign a portion of the existing parking lot and create a new parking lot to replace the displaced parking. The site has drainage inlets in the landscaped areas and area drains in the plazas. There are three biofiltration basins located along the southern edge of the site. Drainage of the site is conveyed via catch basins and roof drainage is piped to the biofiltration basins and will then discharge into Woodglen Vista Creek. From the creek, the water will flow to the San Diego River. Offsite flows from the northern portion of the existing parking lot with be intercepted by a new cross gutter at the north end of the project site and conveyed to the existing earthen swale, bypassing the proposed treatment basins, and ultimately discharging into Woodglen Vista Creek similarly to the pre-development condition.

The drainage for the new parking lot is conveyed via surface flow to three biofiltration basins located in the landscaped areas of the parking lot. This drainage will then discharge into Woodglen Vista Creek and ultimately flow to the San Diego River.

The site has been evaluated for flooding risk using the FEMA Flood Insurance Rate Map (Panel 1651G) provided within the Maps section of this report. The site is within Zone X, which encompasses areas outside of the 0.2% annual chance floodplain. The area south of the site within Woodglen Vista Creek falls within the Zone AE which includes areas that are subject to the 1% annual chance of flood and have base flood elevations determined. For this area directly south of the site, the base flood elevation is determined to be approximately 339 feet. The finish floor of the proposed Community Center building is set at 350.5 feet, which lies above the required 1’ increase above the base flood elevation.

4.3 Rational Method Analysis

The proposed hydrology was modeled using the San Diego County Hydrology Manual Rational Method. The Rational Method formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (Tc), expressed as follows:

Q = C I A

Where:

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

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

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

A = drainage area contributing to the design location, in acres

In accordance with the manual, calculations consist of both the 100-year return period, 24-hour duration storm and the 100-year, 6-hour duration storm, applying a Type II storm. According to the isopluvial maps the 100-year, 24-hour rainfall depth for Santee, CA is 5.0 inches; and the depth of the 6-hour storm is 2.5 inches. The runoff coefficients were determined based on the soil type of the native soil, and the percent impervious according to equation:

C = 0.90 x (% Impervious) + Cp x (1 - % Impervious)

Where: Cp = Pervious Coefficient Runoff Value for the soil type C = 0.30 in/hr

5.0 Hydrologic Results

The 100-year, 6-hour peak flow rates for the pre-project and post-project conditions based on the Rational Method results are provided in Table 4.1. The project area is approximately 4.02 acres.

Table 4.1 – Summary of Existing and Proposed Peak Discharge Rates

Drainage Basin ID	Existing Condition		Proposed Condition	
	Area (acres)	100-yr, 6-hr Peak Flow Rate (cfs)	Area (acres)	100-yr, 6-hr Peak Flow Rate (cfs)
Basin 1A	3.78	18.4	2.00	10.1
Basin 1B			0.61	3.2
Basin 1C			0.17	0.8
Basin 1D			0.38	1.9
Basin 1E			0.46	2.5
Basin 1F			0.16	0.8
Basin 2A	1.39	4.0	0.40	1.9
Basin 2B			0.28	1.6
Basin 2C			0.71	3.4

The peak run-off calculations provided within Appendix A and B demonstrate that unmitigated run-off rates are increased in the proposed condition, as compared to the existing condition. This is a result of increases in impervious area runoff. The project specific SWQMP includes the hydromodification design of permanent storm water management BMPs that are intended to mitigate for the increase in run-off, consistent with the City of Santee BMP Design Manual.

6.0 Hydraulic Methodology and Criteria

6.1 Criteria

Hydraulic calculations were performed in conformance with the San Diego County Hydraulic Design Manual, dated September 2014 and the City of Santee's Public Works Standards, dated September 1982.

6.2 Storm Drain Design

Pipe sizes were calculated using Manning's equation, with an additional 30% sizing factor to account for losses. The major proposed storm drains will be constructed of reinforced concrete pipe (RCP) and the area drains will be constructed using polyvinyl chloride (PVC). The Manning's roughness coefficient "n" used for the hydraulic calculations for RCP/PVC is 0.013. The Manning's Equation calculation spreadsheet that was used for the pipe sizing is located in Appendix C.

6.3 Energy Dissipater Design

Energy dissipaters (i.e. riprap) at the storm drain outfalls will be specified using the San Diego Regional Standard Drawings ("D" Series) drawing number D-40, which provides rock classifications for design velocities entering riprap outfalls.

7.0 Hydraulic Results

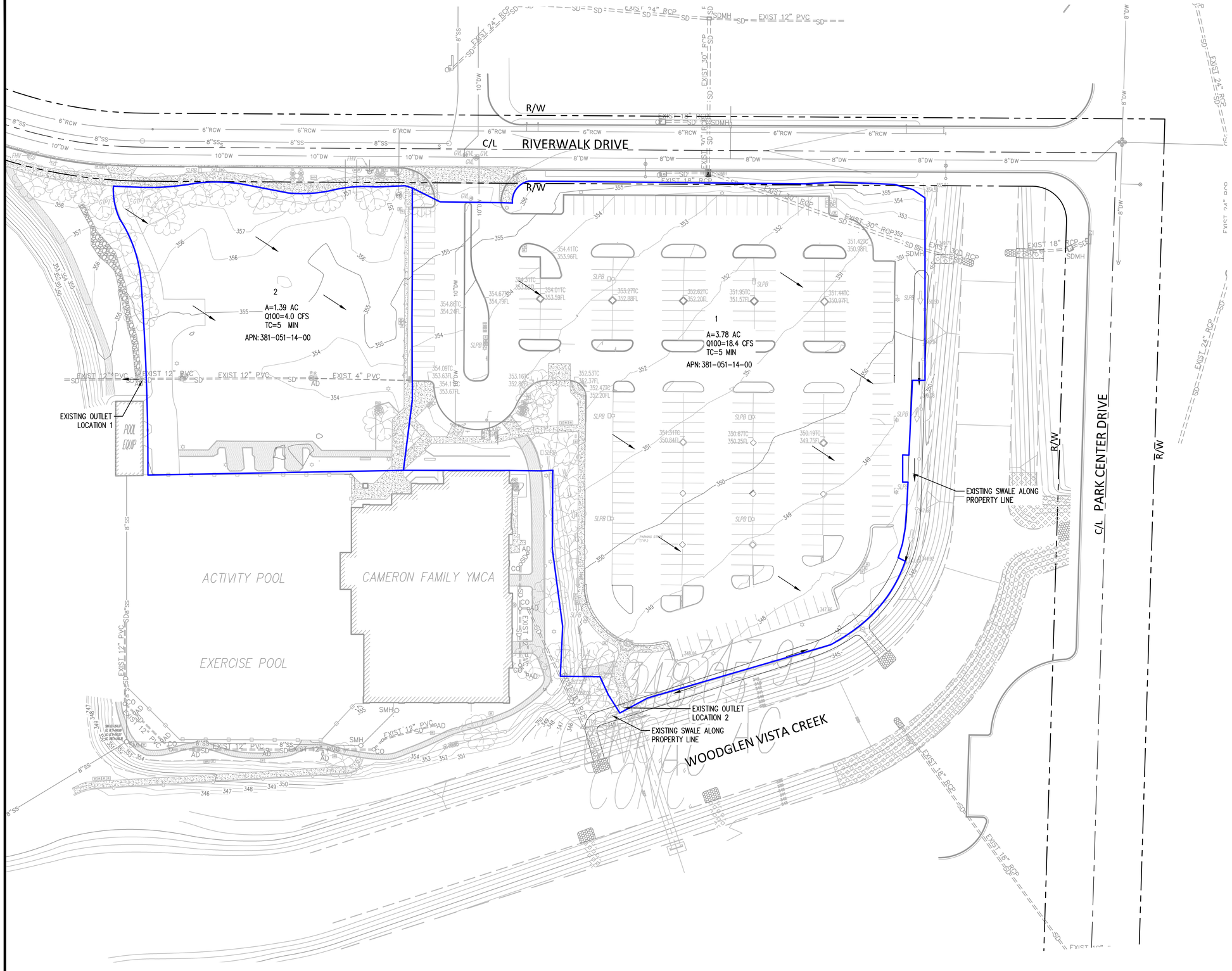
7.1 Storm Drain Results

See storm drain pipe sizing calculations in Appendix C.

8.0 Conclusion

The design of the stormwater control measures, and other stormwater pollution control are in accordance with the current edition of the San Diego County Project Clean Water's Stormwater Technical Guide and the California Stormwater Quality Association (CASQA).

MAPS



LEGEND

- CURB RAMP
- CONCRETE CROSS GUTTER/RIBBON GUTTER
- SIDEWALK UNDERDRAIN
- CATCH BASIN
- CLEANOUT
- X% — SLOPE ARROW
- 500 — NEW CONTOUR
- x 505.50 — NEW SPOT ELEVATION
- 500 — EXISTING CONTOUR (PER AERIAL SURVEY, ACCURACY OF ± 0.5')
- 000.00 — EXISTING ELEVATION (PER FIELD SURVEY, ACCURACY OF ± 0.1')
- 500.0 — EXISTING SPOT ELEVATION (PER AERIAL SURVEY, ACCURACY OF ± 0.5')
- 740 — NEW CONTOUR LINE
- DAYLIGHT LINE
- SAWCUT LINE
- RIDGE — RIDGE LINE
- CONCRETE CURB
- CONCRETE CURB AND GUTTER
- PUBLIC UTILITIES EASEMENT LINE
- DRAINAGE FLOW ARROW
- DRAINAGE AREA BOUNDARY
- XX — SUBCATCHMENT IDENTIFICATION

A=AREA (ACRES)
Q=6-HOUR, 100-YEAR STORM EVENT (CFS)
TC=TIME OF CONCENTRATION (MIN)

NORTH 1" = 20'

20' 0' 20' 40' 60'

GRAPHIC SCALE
1 INCH = 20 FEET

SANTEE COMMUNITY CENTER

PRE-DEVELOPMENT DRAINAGE CONDITION

FIGURE A1

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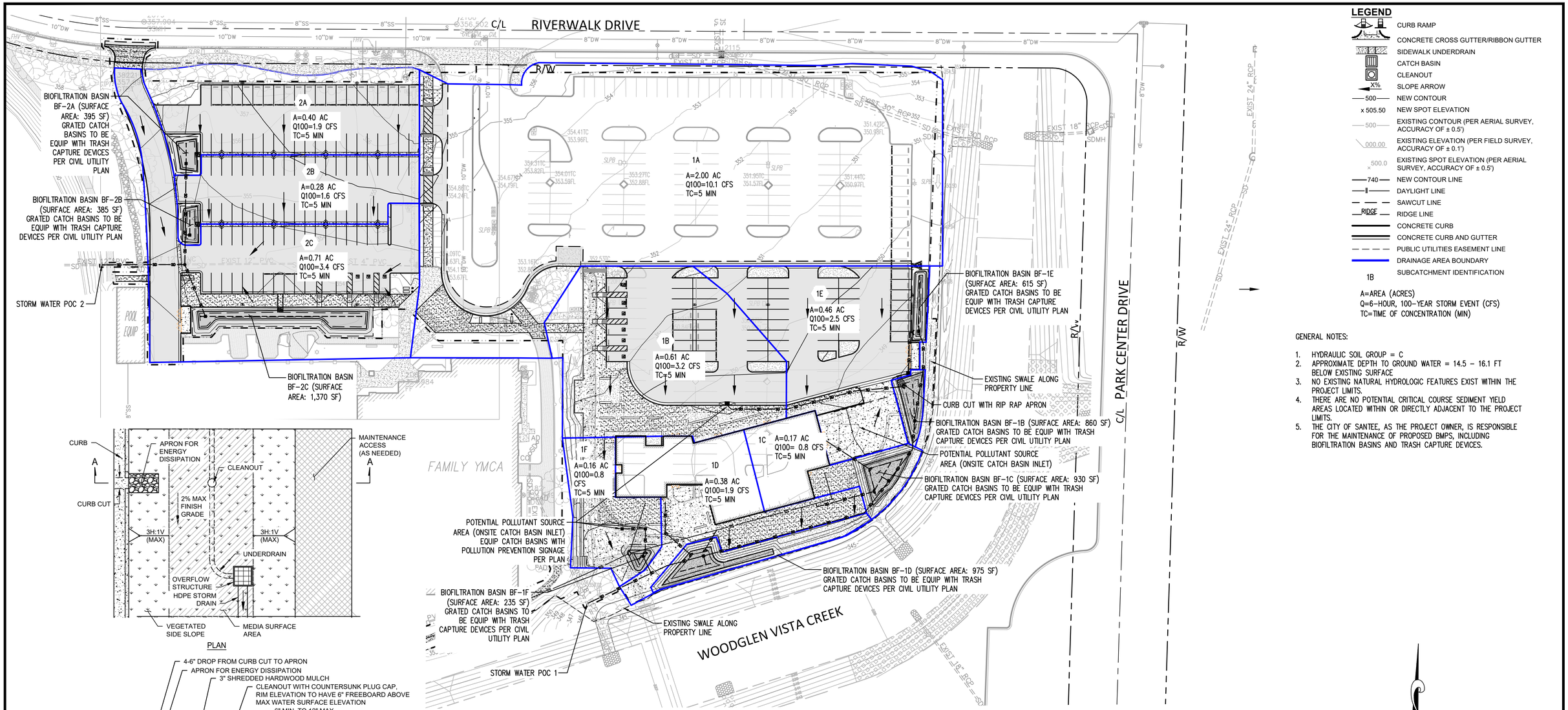

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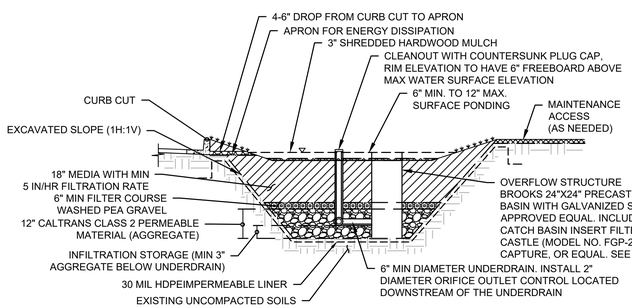
- RIDGE RIDGE LINE
- CONCRETE CURB
- CONCRETE CURB AND GUTTER
- PUBLIC UTILITIES EASEMENT LINE
- DRAINAGE AREA BOUNDARY
- 1B SUBCATCHMENT IDENTIFICATION

A=AREA (ACRES)
Q=6-HOUR, 100-YEAR STORM EVENT (CFS)
TC=TIME OF CONCENTRATION (MIN)

GENERAL NOTES:

1. HYDRAULIC SOIL GROUP = C
2. APPROXIMATE DEPTH TO GROUND WATER = 14.5 – 16.1 FT BELOW EXISTING SURFACE
3. NO EXISTING NATURAL HYDROLOGIC FEATURES EXIST WITHIN THE PROJECT LIMITS.
4. THERE ARE NO POTENTIAL CRITICAL COURSE SEDIMENT YIELD AREAS LOCATED WITHIN OR DIRECTLY ADJACENT TO THE PROJECT LIMITS.
5. THE CITY OF SANTEE, AS THE PROJECT OWNER, IS RESPONSIBLE FOR THE MAINTENANCE OF PROPOSED BMPS, INCLUDING BIOFILTRATION BASINS AND TRASH CAPTURE DEVICES.

PLAN

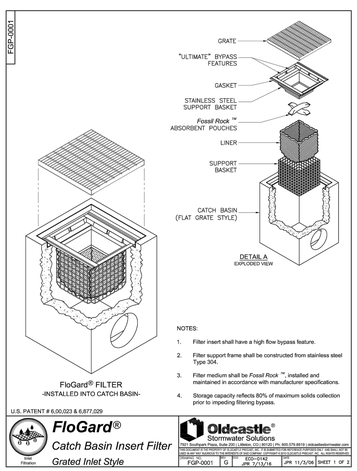


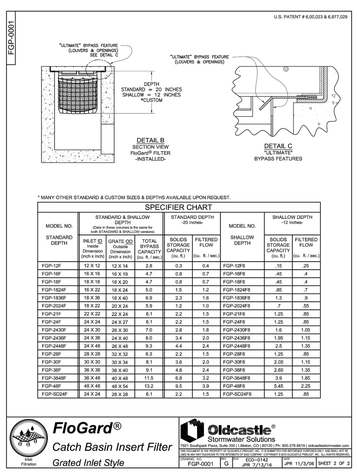
SECTION A-A

BIOFILTRATION PROTECTION DURING CONSTRUCTION:

1. PREVENT OVER-COMPACTION OF NATIVE SOILS IN AREAS OF THE BASIN WHERE INFILTRATION WILL OCCUR. DELINEATE THE BIOFILTRATION AREA AND KEEP CONSTRUCTION TRAFFIC OFF. PROTECT SOILS WITH FENCING, PLYWOOD, ETC.
2. PROVIDE EROSION CONTROL IN THE CONTRIBUTING DRAINAGE AREAS OF THE DESIGNATED BIOFILTRATION AREA. STABILIZE UPSLOPE AREAS.
3. DRAINAGE SHOULD BE DIRECTED AWAY FROM BIORETENTION FACILITIES UNTIL UPSLOPE AREAS ARE STABILIZED. THE CONCENTRATION OF FINES COULD PREVENT POST-CONSTRUCTION INFILTRATION AND CAUSE DESIGN FAILURE.
4. IF DRAINAGE IS TO BE ALLOWED THROUGH THE FACILITY DURING CONSTRUCTION LEAVE OR BACKFILL AT LEAST 6 INCHES ABOVE THE FINAL GRADE. TEMPORARILY COVER THE UNDERDRAIN WITH PLASTIC OR FABRIC. LINE OR MULCH THE BIOFILTRATION AREA.
5. BIORETENTION FACILITIES SHOULD REMAIN OUTSIDE THE LIMIT OF DISTURBANCE TO PREVENT SOIL COMPACTION BY HEAVY EQUIPMENT. PROTECT BIORETENTION AREAS WITH SILT FENCE AND CONSTRUCTION FENCING.
6. VERIFY INSTALLATION OF UNDERDRAIN IS CORRECT PRIOR TO PLACING SOIL.

FOR REFERENCE ONLY
BIOFILTRATION BASIN DETAIL
N.T.S.





MODEL NO. STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data in these columns is the same for both STANDARD & SHALLOW versions) INLET (I) Inside Dimension (Inch x Inch)	GRATE (G) Outside Dimension (Inch x Inch)	TOTAL BYPASS CAPACITY (cu. ft. / sec.)	STANDARD DEPTH ~20 inches~ SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)	MODEL NO. SHALLOW DEPTH	SHALLOW DEPTH ~12 inches~ SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)
FGP-12F	12 X 12	12 X 14	2.8	0.3	0.4	FGP-12F8	.15	.25
FGP-15F	15 X 15	15 X 15	4.7	0.8	0.7	FGP-15F8	.45	.4
FGP-18F	18 X 18	18 X 20	4.7	0.8	0.7	FGP-18F8	.45	.4
FGP-1824F	18 X 18	18 X 24	5.0	1.0	1.2	FGP-1824F8	.65	.7
FGP-1836F	18 X 36	18 X 40	8.9	2.3	1.6	FGP-1836F8	1.3	.9
FGP-2024F	19 X 22	20 X 24	5.9	1.2	1.0	FGP-2024F8	.7	.55
FGP-21F	22 X 22	22 X 24	6.1	2.2	1.5	FGP-21F8	1.25	.85
FGP-24F	24 X 24	24 X 27	6.1	2.2	1.5	FGP-24F8	1.25	.85
FGP-2430F	24 X 30	26 X 30	7.0	2.8	1.8	FGP-2430F8	1.6	1.05
FGP-2436F	24 X 36	24 X 40	8.0	3.4	2.0	FGP-2436F8	1.95	1.15
FGP-2448F	24 X 48	26 X 48	9.3	4.4	2.4	FGP-2448F8	2.5	1.35
FGP-28F	28 X 28	32 X 32	8.3	2.2	1.5	FGP-28F8	1.25	.85
FGP-30F	30 X 30	30 X 34	8.1	3.6	2.0	FGP-30F8	2.05	1.15
FGP-36F	36 X 36	36 X 40	9.1	4.6	2.4	FGP-36F8	2.65	1.35
FGP-3648F	36 X 48	40 X 48	11.5	6.8	3.2	FGP-3648F8	3.9	1.85
FGP-48F	48 X 48	48 X 54	13.2	9.5	3.9	FGP-48F8	5.45	2.25
FGP-5024F	24 X 24	28 X 28	6.1	2.2	1.5	FGP-5024F8	1.25	.85

FOR REFERENCE ONLY
FLOGARD CATCH BASIN INSERT FILTER
NTS

DMA DATA TABLE		
DMA TITLE	TRIBUTARY SIZE (AC)	DRAINS TO
1A	2.00	EXISTING POINT OF DISCHARGE (NO IMPROVEMENTS PROPOSED)
1B	0.61	BF–1B
1C	0.17	BF–1C
1D	0.38	BF–1D
1E	0.46	BF–1E
1F	0.16	BF–1F
2A	0.40	BF–2A
2B	0.28	BF–2B
2C	0.71	BF–2C

NORTH 1" = 20'

20' 0' 20' 40' 60'

GRAPHIC SCALE
1 INCH = 20 FEET

SANTEE COMMUNITY CENTER

POST-DEVELOPMENT DRAINAGE CONDITION

FIGURE A2

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NOTES TO USERS

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. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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 National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the USDA National Agriculture Imagery Program (NAIP). this information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated 2009.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

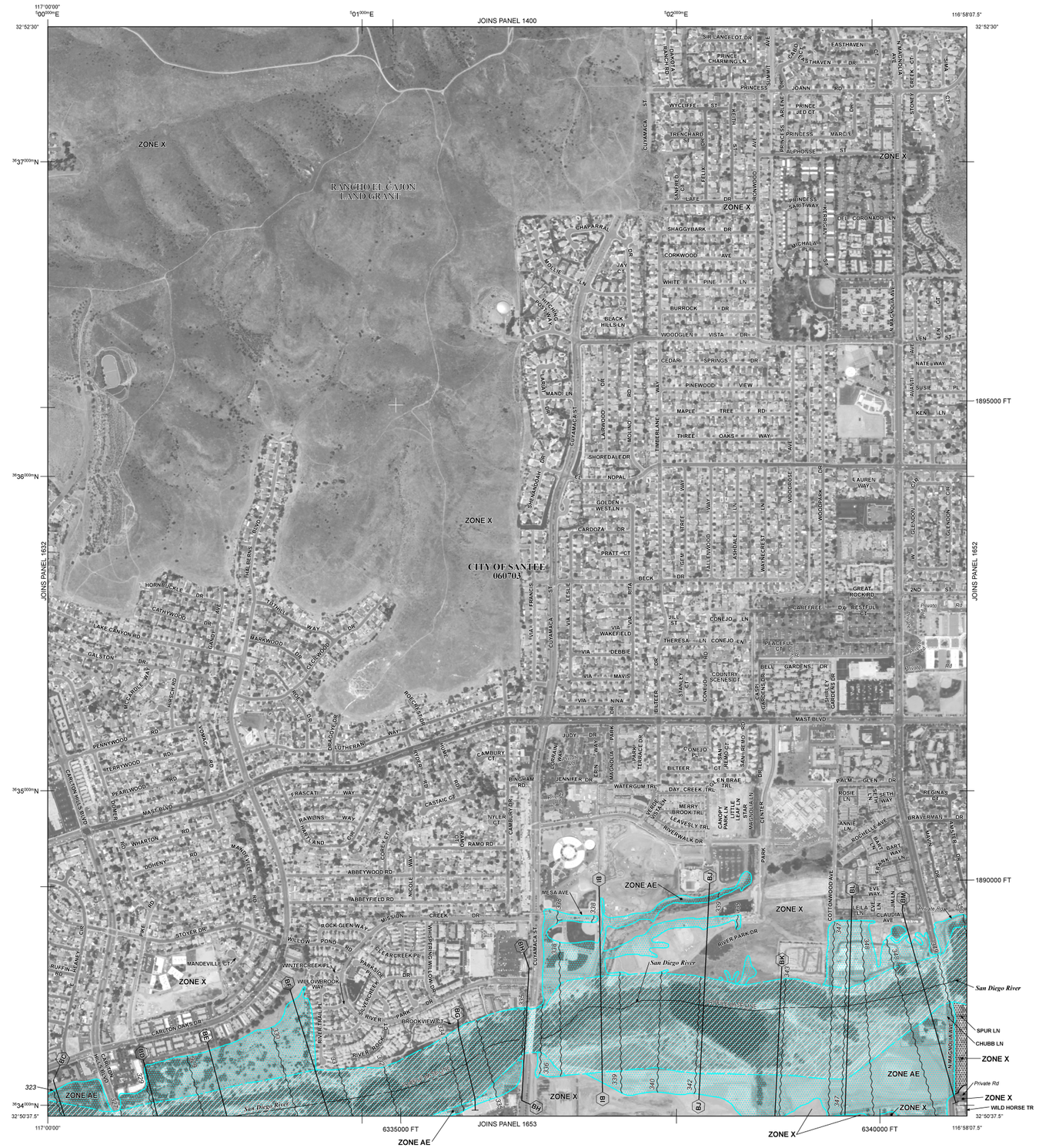
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-877-FEMA MAP (1-877-336-2627) for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The **"profile base lines"** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance 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 AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
513 (EL 987) Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A) (A) Cross section line
(23) (23) Transect line
97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4075000mE 1000-meter Universal Transverse Mercator grid ticks, zone 11
6000000 FT 5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 19, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
May 16, 2012 – to update corporate limits, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to update map elevations to North American Vertical Datum of 1988.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1651G

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1651 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SANTEE, CITY OF	060703	1651	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 06073C1651G

MAP REVISED MAY 16, 2012

Federal Emergency Management Agency

APPENDIX A

PSOMAS
401 B STREET, SUITE 1600
SAN DIEGO, CA 92101

SANTEE CC
PSOMAS#: 5HMC010100
CALCULATED BY: JM

Preciptation (in.)

	100-year Storm
6hr P	2.5
24hr P	5
Adjusted 6hr P	N/A
Between 45% to 65%?	50.00%

100 YEAR - EXISTING CONDITION

DRAINAGE AREA	DEVELOPMENT	A (ACRES)	% OF TOTAL ACREAGE	C	Tc***	*I50 (IN/HR)	Q** (CFS)	REMARKS
THE FOLLOWING HYDROLOGIC CALCULATIONS DONE PER METHODS DESCRIBED IN THE CITY OF SAN DIEGO DRAINAGE DESIGN MANUAL								
Watershed 1								
1	71% IMPERVIOUS	3.78	73.11%	0.74	5.0	6.6	18.4	
Watershed 2								
2	16% IMPERVIOUS	1.39	26.89%	0.44	5.0	6.6	4.0	
	TOTAL	5.17					**22.5**	

* Intensities are based on the equation from the San Diego County - Hydrology Manual (2004) , Figure 3-1 where:

I(t) = 7.44 * P6 * D^-0.645

**Q based on the rational method equation from the San Diego County - Hydrology Manual (2004) and expressed as:

Q = C * I *A

**Time of Concentration (Tc) is based on the nomograph on San Diego County - Hydrology Manual (2004), Figure 3-4 .

APPENDIX B

PSOMAS
401 B STREET, SUITE 1600
SAN DIEGO, CA 92101

SANTEE CC
PSOMAS#: 5HMC010100
CALCULATED BY: JM

Preciptation (in.)

	100-year Storm
6hr P	2.5
24hr P	5
Adjusted 6hr P	N/A
Between 45% to 65%?	50.00%

100 YEAR - PROPOSED CONDITION

DRAINAGE AREA	DEVELOPMENT	A (ACRES)	% OF TOTAL ACREAGE	C	Tc***	*I50 (IN/HR)	Q** (CFS)	REMARKS
THE FOLLOWING HYDROLOGIC CALCULATIONS DONE PER METHODS DESCRIBED IN THE CITY OF SAN DIEGO DRAINAGE DESIGN MANUAL								
Watershed 1								
1A	79% IMPERVIOUS	2.00	38.68%	0.77	5.0	6.6	10.1	
1B	83% IMPERVIOUS	0.61	11.80%	0.80	5.0	6.6	3.2	
1C	70% IMPERVIOUS	0.17	3.29%	0.72	5.0	6.6	0.8	
1D	79% IMPERVIOUS	0.38	135.71%	0.77	5.0	6.6	1.9	
1E	90% IMPERVIOUS	0.46	64.79%	0.84	5.0	6.6	2.5	
1F	71% IMPERVIOUS	0.16	3.09%	0.73	5.0	6.6	0.8	
Watershed 2								
2A	72% IMPERVIOUS	0.40	7.74%	0.73	5.0	6.6	1.9	
2B	94% IMPERVIOUS	0.28	5.42%	0.86	5.0	6.6	1.6	
2C	71% IMPERVIOUS	0.71	13.73%	0.73	5.0	6.6	3.4	
	TOTAL	5.17					**26.3**	

* Intensities are based on the equation from the San Diego County - Hydrology Manual (2004) , Figure 3-1 where:

$$I(t) = 7.44 * P6 * D^{-0.645}$$

**Q based on the rational method equation from the San Diego County - Hydrology Manual (2004) and expressed as:

$$Q = C * I * A$$

***Time of Concentration (Tc) is based on the nomograph on San Diego County - Hydrology Manual (2004), Figure 3-4 .

APPENDIX C

LATERAL STATION	***SD LINE "A"***
FLOW REGIME	FULL
DESIGN FLOW "Q100" (cfs)	9.80 cfs
PIPE DIAMETER "d" (inches)	18"
PIPE MATERIAL	HDPE
MANNINGS "n" VALUE	0.012
PIPE SLOPE "S" (feet/feet)	0.0100
FRICTION SLOPE "S_f" (feet/feet)	0.0100
DEPTH OF FLOW "D" (feet)	1.50'
FLOW AREA "A" (square feet)	1.77 sf
WETTED PERIMETER "P"	4.71'
HYDRAULIC RADIUS "R" (A/P)	0.38'
FLOW TOP WIDTH, T (feet)	0.00'
FLOW VELOCITY "V" (feet/second)	6.44 fps
VELOCITY HEAD (V^2/2G) (feet)	0.64'
SPECIFIC ENERGY (D+ V^2/2G) (lb-ft/lb)	2.14'
FLOW CAPACITY DEPTH RATIO "D/d"	1.00
PIPE FLOW CAPACITY (cfs)	11.38 cfs

LATERAL STATION	***SD LATERAL "B-1"***	***SD LATERAL "B-2"***	***SD LATERAL "B-3"***
FLOW REGIME	NORMAL	NORMAL	NORMAL
DESIGN FLOW "Q100" (cfs)	2.00 cfs	3.40 cfs	3.70 cfs
PIPE DIAMETER "d" (inches)	10"	12"	12"
PIPE MATERIAL	PVC	PVC	PVC
MANNINGS "n" VALUE	0.009	0.009	0.009
PIPE SLOPE "S" (feet/feet)	0.0100	0.0100	0.0100
FRICTION SLOPE "S_f" (feet/feet)	0.0100	0.0100	0.0100
DEPTH OF FLOW "D" (feet)	0.83'	1.00'	1.00'
FLOW AREA "A" (square feet)	0.55 sf	0.79 sf	0.79 sf
WETTED PERIMETER "P"	2.58'	3.14'	3.14'
HYDRAULIC RADIUS "R" (A/P)	0.21'	0.25'	0.25'
FLOW TOP WIDTH, T (feet)	0.03'	0.00'	0.00'
FLOW VELOCITY "V" (feet/second)	5.85 fps	6.55 fps	6.55 fps
VELOCITY HEAD ($V^2/2G$) (feet)	0.53'	0.67'	0.67'
SPECIFIC ENERGY ($D+ V^2/2G$) (lb-ft/lb)	1.37'	1.67'	1.67'
FLOW CAPACITY DEPTH RATIO "D/d"	1.00	1.00	1.00
PIPE FLOW CAPACITY (cfs)	3.16 cfs	5.15 cfs	5.15 cfs