

Appendix F

Existing Conditions Assessment for Water, Sewer, and Storm Drain



Morena Boulevard Station Area Specific Plan Existing Conditions Assessment for Water, Sewer and Storm Drain

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In order to support the development of the Morena Boulevard Station Area Specific Plan, the existing water, sewer and storm drain infrastructure has been assessed to determine the potential impacts of the Specific Plan on this infrastructure. This assessment is based on information provided by the City of San Diego, as well as approximate, planning level calculations where needed.

Water

The existing water system in the Morena Boulevard Station Area is displayed on the exhibits in Attachment 1. The water system is administered by the City of San Diego Public Utilities Department. Waterlines in the area are generally located in the public streets, and range in size from 5" to 16". The area is primarily served by a 16" main running the length of Morena Boulevard through the project area, which connects to a 16" main in Friars Road. Other large waterlines in the area include 12" lines in Cushman Avenue, Knoxville Street, Littlefield Street, Milton Street, Jellett Street, and Gesner Street. The water line material is primarily cast iron (CI), asbestos cement (AC), and poly-vinyl chloride (PVC).

The City of San Diego Public Utilities Department has planned maintenance that will upgrade/replace some of the older and undersized waterlines within the Morena Boulevard Station Area. This work is scheduled to be completed from 2018 to 2023, and is shown on the Planned Water System Upgrades exhibit in Attachment 1. This work includes replacing the 16" CI line in Morena Boulevard with a 16" PVC line, and replacing numerous AC lines with PVC. Where the existing AC lines are undersized, the new PVC lines will be upsized to meet current standards. The City of San Diego currently requires an 8" minimum diameter for public water mains, with a 12" minimum in commercial zones to meet fire flow requirements.

Implementation of the Morena Boulevard Station Area Specific Plan could have potential impacts on the existing water system, in both the timing and extent of water infrastructure upgrades. If projects under the Specific Plan are implemented prior to the planned upgrades of the water system, the projects may need to construct the water system upgrades ahead of their planned schedule. Additionally, commercial uses in the Specific Plan may need to upsize additional water

mains to 12" if they are outside of areas that are served by 12" mains. Individual projects within the Specific Plan may be required to perform a water study to ensure sufficient water pressure and fire flow, and to identify any water infrastructure upgrades which may be needed for that individual project.

Sewer

The existing sewer system in the Morena Boulevard Study area is also administered by the City of San Diego Public Utilities Department. See the exhibits in Attachment 2 for the existing sewer system. The sewer lines in the project area can be divided into two classifications- small mains and trunk sewers. The small mains form the collection system within the area, and convey sewer flows from individual properties to the trunk sewers. The trunk sewers are larger diameter sewer lines that convey flows from multiple small mains, as well as from adjacent neighborhoods. The major trunk sewers include lines in Morena Boulevard, Anna Avenue, Tecolote Road, Lehigh Street, Frankfort Street, and Ingulf Street.

The small mains are 8"-15" in diameter, and consist of vitrified clay (VC) and PVC pipes. Generally, the small mains are considered to be operating within their capacity, with no known capacity related issues in the project area. Similar to the water system, the City of San Diego has identified required maintenance and upgrades for the sewer system. Sewer lines which have been inspected have been identified as either requiring routine maintenance only, point repair, rehabilitation, or replacement. These determinations can be found in the Planned Sewer System Upgrades exhibit in Attachment 2.

The City of San Diego Sewer Modeling Section conducts flow analyses on the City's trunk sewer lines for both current conditions and for projected growth. The most recently available data examined measured flows in 2012 and projected flows in 2025 for both dry weather (DWF) and wet weather (WWF) conditions. The 2025 projections, however, do not include the implementation of the Morena Boulevard Station Area Specific Plan. To assess the capacity of the trunk sewers to accept a potential increase in flows from the project area, the 2012 and 2025 flow data was examined. The table below identifies which trunk sewers are at or near capacity during wet and dry weather conditions in 2012 and 2025.

Trunk Sewer Line	% Capacity - 2012 Flow Data		% Capacity - 2025 Flow Projections	
	DWF	WWF	DWF	WWF
TS 004 – East Mission Bay	50-75%	>100%	75-100%	>100%
TS 008 – Tecolote Canyon	<50%	>100%	<50%	>100%
TS 009 – West Linda Vista	<50%	>100%	<50%	>100%
TS 011 – Morena Boulevard	<50%	75-100%	<50%	>100%
TS 045 – North Clairemont	75-100%	>100%	75-100%	75-100%
TS 114 – Morena Boulevard Intersecptor	50-75%	>100%	75-100%	>100%

As shown in the table above, several of the trunk sewer lines in the Morena Boulevard Station Area are at or near capacity. This does not mean that the trunk sewers are failing, since the rated capacity is based on gravity flow only, and the pipes can convey larger flows without failing when subjected to head pressure. It does mean however, that if significant flows are added to these trunk sewers, upsizing or other infrastructure improvements may be needed.

Individual projects within the Specific Plan may be required to perform a sewer study to ensure sufficient sewer capacity if available, and to identify any sewer infrastructure upgrades which may be needed for that individual project.

As part of future infrastructure associated with the Pure Water program, the City of San Diego is in preliminary planning stages for a new sewer pump station in the project area. The pump will be located in the area bounded by Friars Road, Morena Boulevard, and Interstate 5, in the southwestern corner of the project area. No timeline is yet available for the construction of this pump station and a specific location has not been selected.

Storm Drain

Two major water courses are present within or adjacent to the project area- the San Diego River just to the south of the project area, and Tecolote Creek which cuts through the project area. An examination of FEMA Flood Insurance Rate Maps reveals that portions of the project area are within a 100-year flood plain. Please refer to the FEMA Flood Map exhibit in Attachment 3. Along the San Diego River, the floodplain and floodway is primarily confined to south of Morgan Street along the very edge of the project area, though some Shaded Zone X (flooding depth of less than 1') is present to the southeast of Gaines Street. A larger floodplain is present north of Tecolote Creek, with Zone AO present for a considerable area, with 100-year flooding depths of 1-3' anticipated.

The public storm drain system in the Morena Boulevard Station Area has also been studied to assess the potential of impacts from the implementation of the Specific Plan. The topography of the project area generally falls from the east to the west, and thus this is the direction of storm drain flow. For this analysis, the project area has been divided into six drainage basins, Basins A through F, based on the discharge points. Please refer to the Existing Drainage Basins exhibit in Attachment 3 for a graphical depiction of these basins.

Basin A consists of the southeastern portion of the project area that drains to the San Diego River. Runoff in this area is collected by storm drain systems that convey flows southwesterly to the River. Basin B is located in the southwesterly portion of the project, and drains to a 60" diameter storm drain that discharges to an open channel along Interstate 5. Basin C drains to Tecolote Creek via multiple underground storm drain systems, and includes the south-central portion of the project area both north and south of Tecolote Creek. Basin D is located in the north-central portion of the project, and ultimately discharges to Mission Bay via multiple underground storm drain systems. Basins E and F are in the northerly portion of the project area, and drain to large diameter storm drains that also collect runoff from the offsite areas to the east. The storm drains in Basin E and F both discharge to Mission Bay.

Information on the existing flow, capacity, and condition of the public storm drain system is not available from the City of San Diego. To be able to determine if the proposed specific plan will increase discharge to the public storm drain system, approximate existing condition peak flow

rates have been calculated. These calculations have been performed in accordance with the San Diego County Hydrology Manual using the Rational Method. Existing condition runoff calculations were determined based on the existing zoning in the project area. Peak discharges were calculated for the 2-year, 10-year, and 100-year storms. Runoff calculations can be found in Attachment 4, and are summarized in the table below.

Basin	Area	Runoff Coefficient, C	Q(2)	Q(10)	Q(100)
	(ac)		cfs	cfs	cfs
A	75.52	0.82	88	129	177
B	76.64	0.85	93	135	186
C	73.97	0.80	84	123	169
D	37.47	0.77	54	78	107
E	14.50	0.76	20	30	41
F	26.55	0.81	40	58	80

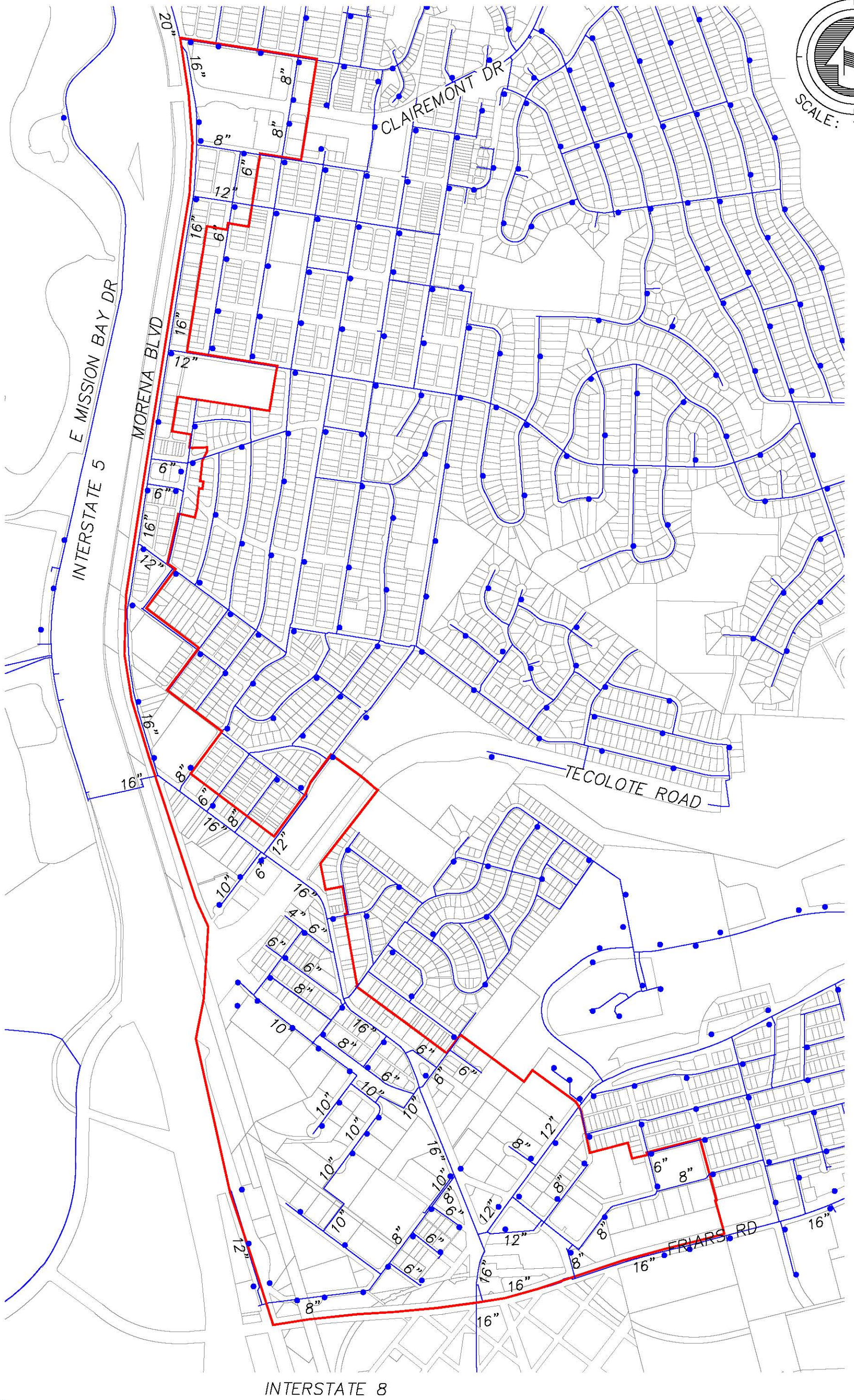
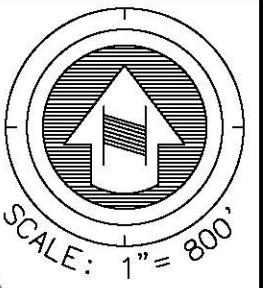
It should be noted that these calculations are for the area within the Morena Boulevard Station Area boundary only, and do not reflect offsite watersheds which drain through the project area. These flowrates are meant only to determine if the change in land use associated with the Specific Plan will generally increase or reduce discharge to the public storm drain system.

ATTACHMENTS




Attachment 1	Water System Exhibits
Attachment 2	Sewer System Exhibits
Attachment 3	Storm Drain System Exhibits
Attachment 4	Hydrology Calculations

ATTACHMENT 1

Water System Exhibits



LEGEND

- PROJECT BOUNDARY 
- EXISTING WATER MAIN 
- EXISTING FIRE HYDRANT 

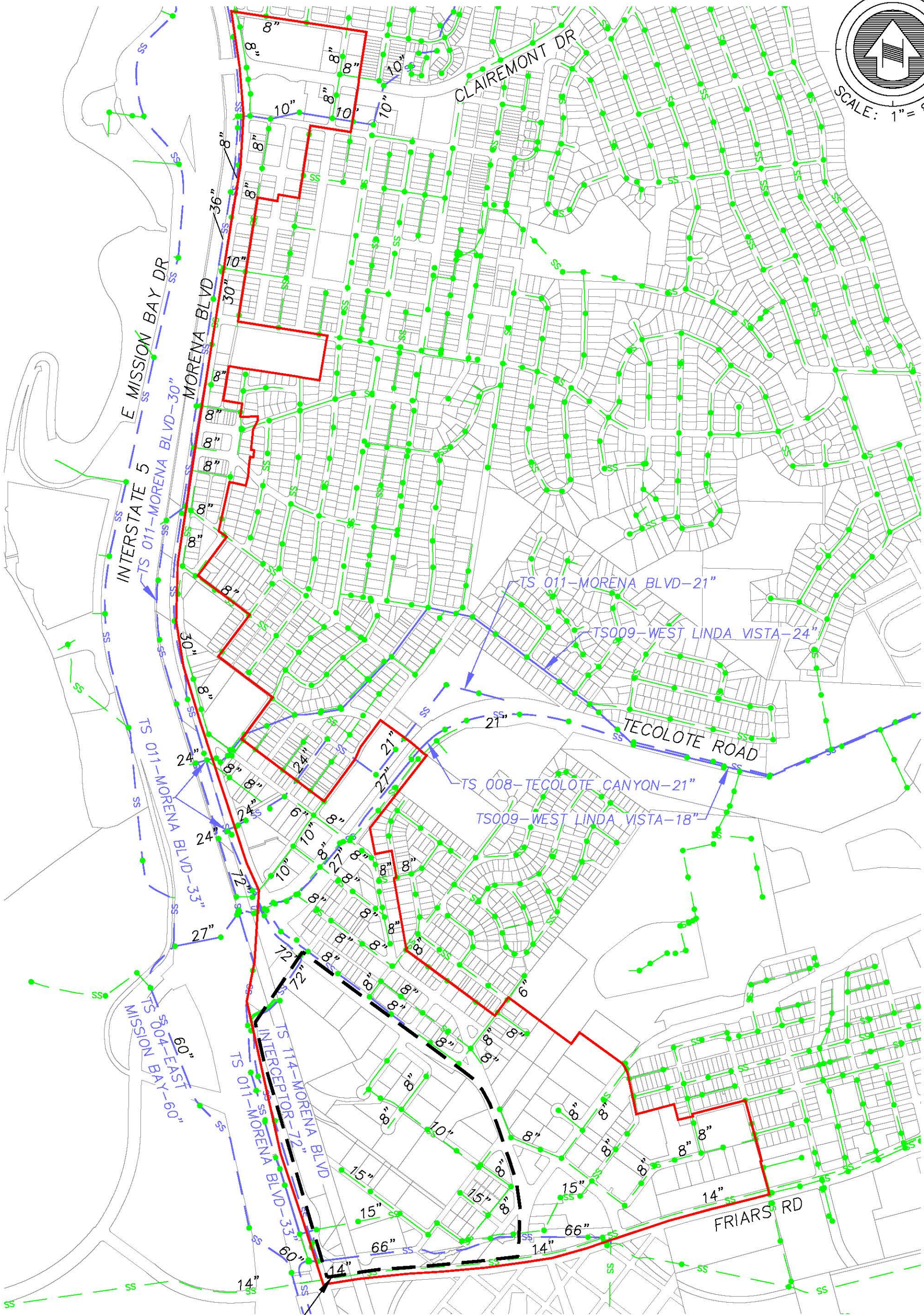


LEGEND

- PROJECT BOUNDARY ———
- EXISTING WATER MAIN ———
- FUTURE WATER MAIN (PVC) ———
- EXISTING FIRE HYDRANT •

ATTACHMENT 2

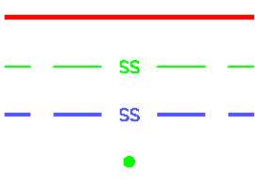
Sewer System Exhibits



APPROXIMATE LOCATION
OF PROPOSED SEWER
PUMP STATION

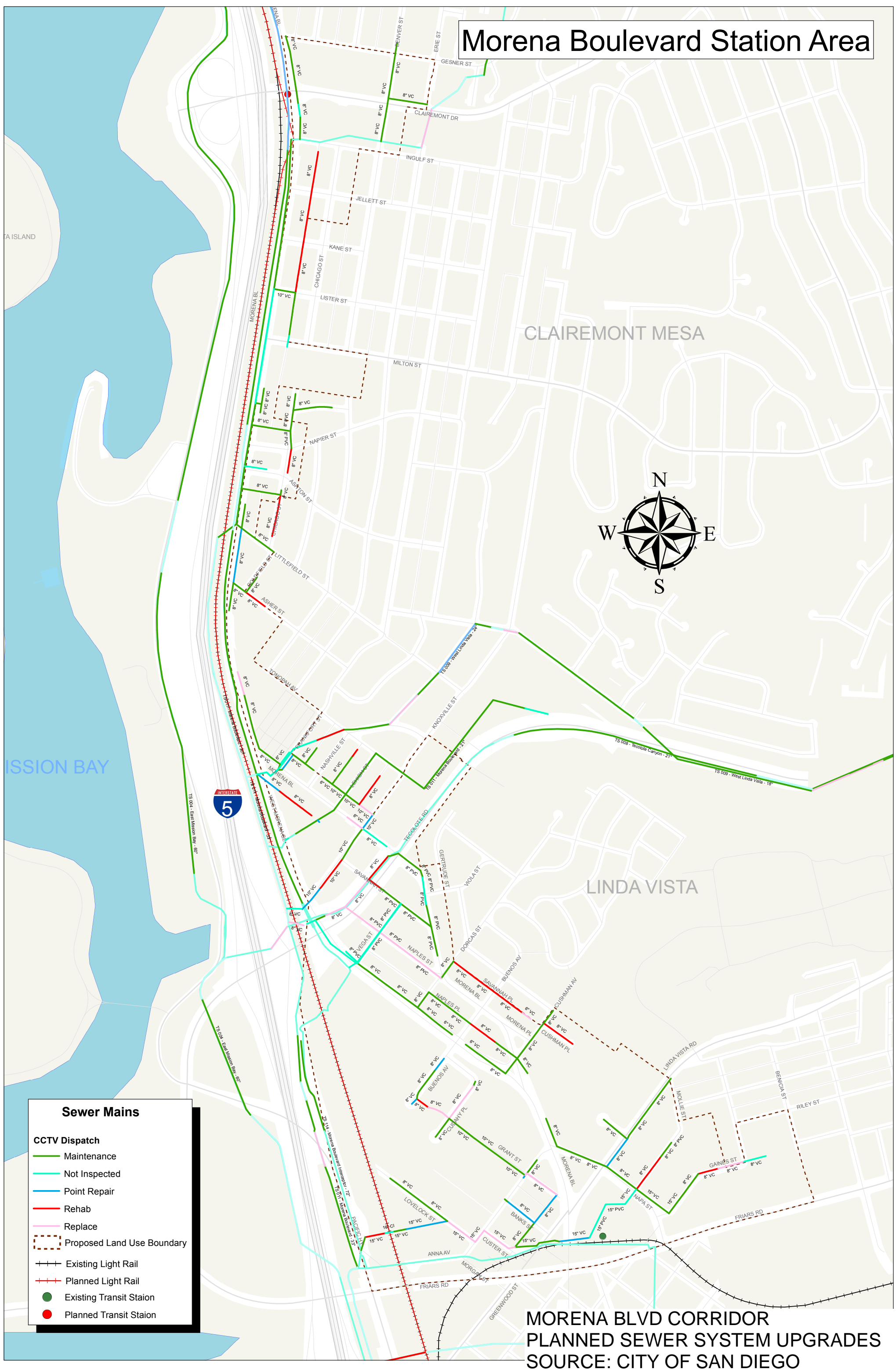
LEGEND

- PROJECT BOUNDARY
- EXISTING SMALL SEWER MAIN
- EXISTING TRUNK SEWER
- EXISTING SEWER MANHOLE



**MORENA BLVD CORRIDOR
EXISTING SEWER EXHIBIT
CITY OF SAN DIEGO
JULY 10, 2015**

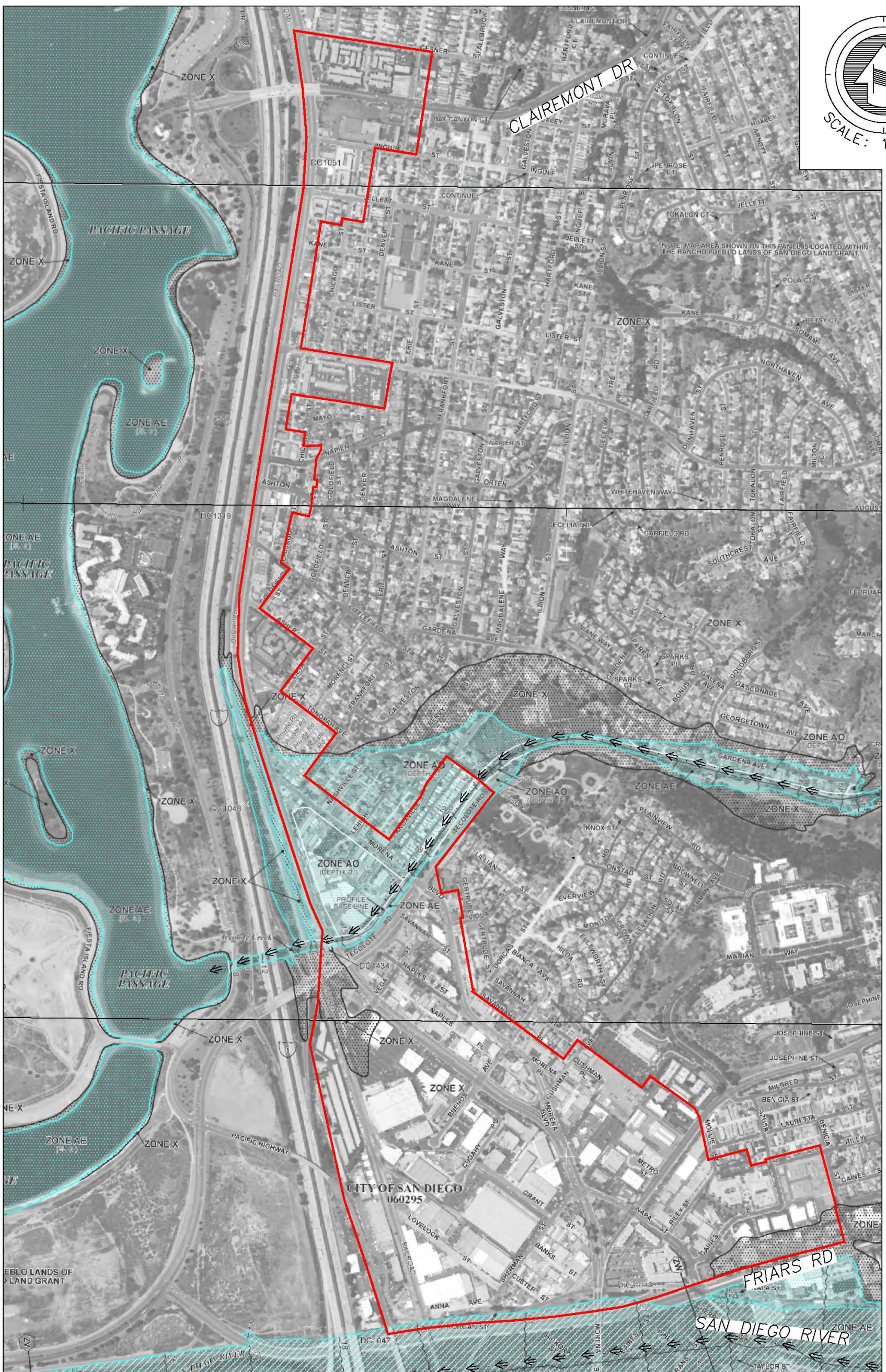
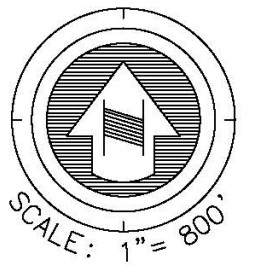
Morena Boulevard Station Area



MORENA BLVD CORRIDOR
PLANNED SEWER SYSTEM UPGRADES
SOURCE: CITY OF SAN DIEGO

ATTACHMENT 3

Storm Drain System Exhibits



LEGEND

PROJECT BOUNDARY

CREEK & RIVER

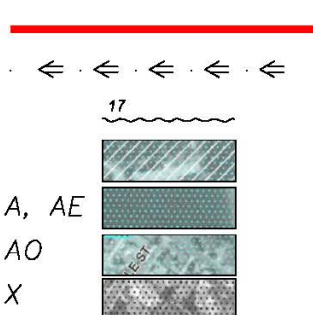
BASE FLOOD ELEVATION

100-YR FLOODWAY

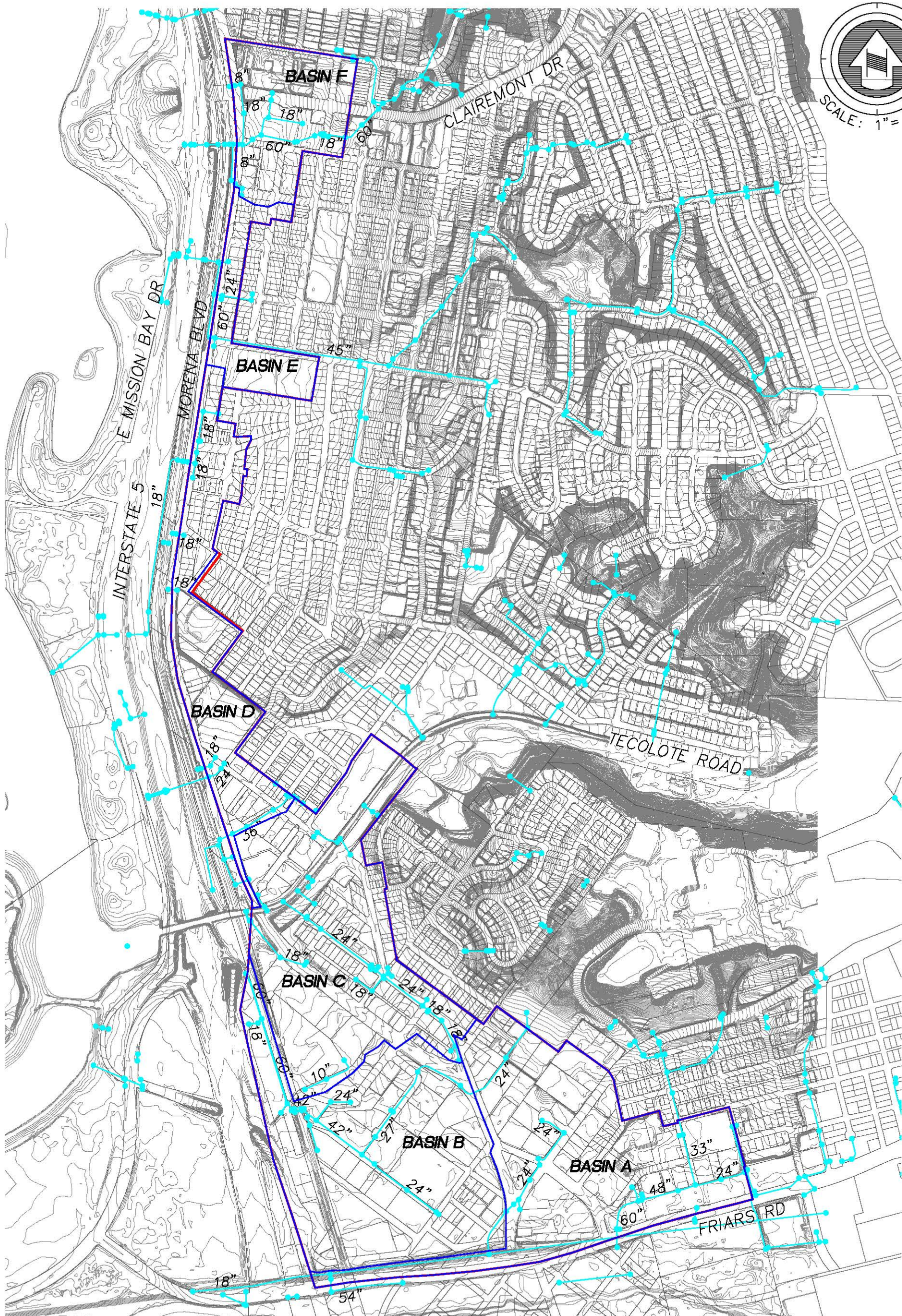
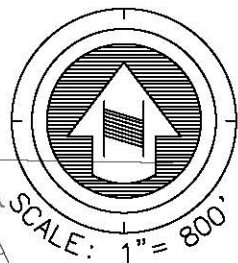
100YR FLOODPLAIN, ZONE A, AE

100YR FLOODPLAIN, ZONE AO

100YR FLOODPLAIN, ZONE X



**MORENA BLVD CORRIDOR
FEMA FLOODPLAIN MAP
CITY OF SAN DIEGO
JULY 10, 2015**



LEGEND

- PROJECT BOUNDARY ———
- CREEK & RIVER < < < < <
- EXISTING STORM DRAIN ———
- STORM DRAIN STRUCTURES ●
- DRAINAGE BASIN BOUNDARY ———

**MORENA BLVD CORRIDOR
EXISTING DRAINAGE BASINS
CITY OF SAN DIEGO
JULY 10, 2015**

ATTACHMENT 4

Hydrology Calculations

Morena Boulevard Station Area Hydrology Study

Runoff Coefficient Calculations

Soil Type: D

Based on Table 3-1 of the Hydrology Manual

Land Use	% Imp	Runoff Coefficient	Total Area (ac)
		Soil Type D	Ex. Conditions
Single Family Residential, 8.7 DU/AC	45	0.60	20
Multifamily Residential, 25-43 DU/AC	80	0.79	19
Neighborhood Commercial	80	0.79	5
Community Commercial	85	0.82	166
Limited Industrial	90	0.85	95

Existing Conditions

Overall Weighted Runoff Coefficient: 0.81

Overall Percent Impervious: 83.5

Basin A

Total Area 75.52 Ac

Land Use	Area (Ac)
	Soil Type D
Single Family Residential	
Multifamily Residential	
Neighborhood Commercial	
Community Commercial	65.99
Limited Industrial	9.53
Total Area (Ac)	75.52
Weighted Runoff Coefficient	0.82

Basin B

Total Area 76.64 Ac

Land Use	Area (Ac)
	Soil Type D
Single Family Residential	
Multifamily Residential	
Neighborhood Commercial	
Community Commercial	9.65
Limited Industrial	66.99
Total Area (Ac)	76.64
Weighted Runoff Coefficient	0.85

Basin C

Total Area 73.97 Ac

Land Use	Area (Ac)
	Soil Type D
Single Family Residential	8.94
Multifamily Residential	
Neighborhood Commercial	
Community Commercial	47.97
Limited Industrial	17.06
Total Area (Ac)	73.97
Weighted Runoff Coefficient	0.80

Basin D

Total Area 37.47 Ac

Land Use	Area (Ac)
	Soil Type D
Single Family Residential	7.65
Multifamily Residential	7.98
Neighborhood Commerical	4.18
Community Commercial	16.48
Limited Industrial	1.18
Total Area (Ac)	37.47
Weighted Runoff Coefficient	0.77

Basin E

Total Area 14.50 Ac

Land Use	Area (Ac)
	Soil Type D
Single Family Residential	3.74
Multifamily Residential	0.59
Neighborhood Commerical	
Community Commercial	10.17
Limited Industrial	
Total Area (Ac)	14.50
Weighted Runoff Coefficient	0.76

Basin F

Total Area 26.55 Ac

Land Use	Area (Ac)
	Soil Type D
Single Family Residential	
Multifamily Residential	10.12
Neighborhood Commerical	0.44
Community Commercial	15.99
Limited Industrial	
Total Area (Ac)	26.55
Weighted Runoff Coefficient	0.81

Morena Boulevard Station Area Specific Plan Existing Conditions Hydrology Calculations

$Q = CIA$

Intensity = $7.44 * P_6 * (T_c)^{-0.645}$

100-year P_6 : 2.2 in.

10-year P_6 : 1.6 in.

2-year P_6 : 1.1 in.

Basin A

$C = 0.82$

$A = 75.52 \text{ Ac}$

$T_c = 15.00 \text{ min.}$

Design Storm	I (in/hr)	Q (cfs)
100-year	2.85	176.7
10-year	2.08	128.5
2-year	1.43	88.4

Basin B

$C = 0.85$

$A = 76.64 \text{ Ac}$

$T_c = 15.00 \text{ min.}$

Design Storm	I (in/hr)	Q (cfs)
100-year	2.85	185.9
10-year	2.08	135.2
2-year	1.43	93.0

Basin C

$C = 0.80$

$A = 73.97 \text{ Ac}$

$T_c = 15.00 \text{ min.}$

Design Storm	I (in/hr)	Q (cfs)
100-year	2.85	168.9
10-year	2.08	122.8
2-year	1.43	84.4

Basin D

$C = 0.77$

$A = 37.47 \text{ Ac}$

$T_c = 10.00 \text{ min.}$

Design Storm	I (in/hr)	Q (cfs)
100-year	3.71	106.9
10-year	2.70	77.8
2-year	1.85	53.5

Basin E

$C = 0.76$

$A = 14.50 \text{ Ac}$

$T_c = 10.00 \text{ min.}$

Design Storm	I (in/hr)	Q (cfs)
100-year	3.71	40.8
10-year	2.70	29.7
2-year	1.85	20.4

Basin F

$C = 0.81$

$A = 26.55 \text{ Ac}$

$T_c = 10.00 \text{ min.}$

Design Storm	I (in/hr)	Q (cfs)
100-year	3.71	79.7
10-year	2.70	58.0
2-year	1.85	39.9