NORTH CITY PRESBYTERIAN CHURCH
ARCHAEOLOGICAL SURVEY
PROJECT NO. 150585

Submitted to:

City of San Diego
Development Services Department
1222 First Avenue
San Diego, California 92101

Prepared for:

North City Presbyterian Church
11747 Poway Road
Poway, California 92064

Prepared by:

Affinis
Shadow Valley Center
847 Jamacha Road
El Cajon, California 92019

John A. Meriwether
Archaeologist
&
Mary Robbins-Wade, M.A. (RPA)
Director of Cultural Resources

June 2010

Affinis Job No. 2390

USGS quadrangle:	Poway (7.5' series)
Acreage:	7.39 acres
Keywords:	Negative survey; City of San Diego, San Diego County, Sabre Springs area, Los Peñasquitos Canyon, Peñasquitos Creek; Township 14 South, Range 2 West, Section 22

R3/C7

This report form shall be used when a site-specific survey for historical resources was completed and no archaeological resources were identified within the project area (APE). This form may be used, rather than completion of an Archaeological Resource Management Report, when archaeological resources were identified and, based on an evaluation, were determined to be non-significant or are potentially significant but will not be directly impacted by the proposed development project. Completion of the required site-specific survey and this report form must conform to the Historical Resources Guidelines of the Land Development Manual.

I. PROJECT DESCRIPTION AND LOCATION (Include the geographic limits of the study area and a description of the proposed development project).

The current project is the construction of two new Sanctuary buildings on the campus of North City Presbyterian Church separated into two phases of work.

The project area is in the Sabre Springs neighborhood of the City of San Diego, in central San Diego County (Figure 1). The property is east of Interstate 15, west of Pomerado Road, and immediately south of Poway Road (Figures 2 and 3). The North City Presbyterian Church is located at 11717 Poway Road. The project area is adjacent to Los Peñasquitos Canyon; Peñasquitos Creek bisects the church property, which is at the base of Van Dam Peak (Figures 2 and 3). The project area is within Section 22 of Township 14 South, Range 2 West, on the USGS 7.5' Poway quadrangle (Figure 2).

The current project is construction of two new worship buildings between existing buildings on the church property, as shown in Figure 4.

II. SETTING

Natural Environment (Past and Present)

The project area is at the juncture of the coastal plains and foothills of San Diego County. The project lies along Los Peñasquitos Creek, which flows through Los Peñasquitos Canyon into Peñasquitos Lagoon approximately 10 miles west of the project area. Average January minimum daily temperatures in the project area are 40° to 44° F, while average July maximum daily temperatures are between 80° and 85° F (Griner and Pryde 1976). Geologically, the majority of the project area is underlain by Cretaceous granitic rock (Kennedy and Peterson 1975); the area along Peñasquitos Creek is Quaternary alluvium and slopewash (Kennedy and Peterson 1975). Soils mapped on the property are Ramona sandy loam, 5 to 9 percent slopes, on the north side of the creek; Riverwash along the creek; and Diablo-Olivenhain complex, 9 to 30 percent slopes, on the south side of the creek (Bowman 1973). Vegetation in the vicinity includes grasses, chamise, oaks, and riparian vegetation along Peñasquitos Creek.

Ethnography/History

Several summaries discuss the prehistory of San Diego County and provide a background for understanding the archaeology of the general area surrounding the project. Moratto's (1984) review of the archaeology of California contains important discussions of Southern California, including the San Diego area, as does a new book by Neusius and Gross (2007). Bull (1983, 1987), Carrico (1987), Gallegos (1987), and Warren (1985, 1987) provide summaries of relatively recent work and interpretations, and a recent paper (Arnold et al. 2004) discusses advances since 1984. A culture history of the region is included as Attachment D.

The project area is within lands that have traditionally been inhabited by the Kumeyaay Indians, also known as Diegueño or Ipai/Tipai (Luomala 1978).

The Sabre Springs site (SDI-6669, SDM-W-230) is a multi-component site located about 1 mile to the northwest of the project area, along Chicarita Creek. The earliest occupation of the site occurred around 1000 B.C. and the latest was during the Late Prehistoric period, sometime between A.D. 1120 and A.D.1750. Robbins-Wade argued that Sabre Springs was the focus of a major Late Prehistoric habitation area, based on the volume of material recovered and the number of burials present. She points out that the volume of material sets Sabre Springs apart from other sites in the area that may have been resource processing/procurement camps for the larger village (Gross and Robbins-Wade 1992).

A number of archaeological sites are located along Los Peñasquitos Creek, and the prehistoric and ethnohistoric village of Paguai is located approximately 3 miles northeast of the project area.

III. AREA OF POTENTIAL EFFECT (APE) (Describe the nature and extent of anticipated direct, indirect and cumulative impacts).

The Area of Potential Effect (APE) is shown in Figure 4. The APE consists of the new construction area, which is between existing buildings.

IV. STUDY METHODS (Include a description of the specific methods used in the identification and evaluation of archaeological resources for this study).

Affinis obtained a records search from the South Coastal Information Center at San Diego State University for the church property and a 1-mile radius around it. The project Principal Investigator, Mary Robbins-Wade, contacted the Native American Heritage Commission for a search of their Sacred Lands Files. Letters were sent to all Tribes and individuals identified by the Native American Heritage Commission.

John Meriwether of Affinis and Clint Linton of Red Tail Monitoring and Research conducted a pedestrian survey of the entire 7.39-acre church property on May 26, 2010. To the extent feasible, the area was covered using parallel transects spaced approximately 10 m apart. This level of coverage was not possible in the floodway area, due to thick vegetation, but no development is proposed in that area.

Historic maps and aerial photographs were reviewed to assess the potential for historic archaeological material.

V. RESULTS OF STUDY

Background Research

A records search was obtained from the South Coastal Information Center (SCIC) at San Diego State University in May 2010. This records search indicated many archaeological sites recorded within 1 mile of the project area. CA-SDI-9291 was recorded by Hector in 1982, who said on the site record, "This site is the village locus around which [SDI-12] is built." The site consists of Tizon Brown Ware sherds, manos, metates, lithic and bone tools, and a number of hearth features. CA-SDI-12 is recorded as a collection of 16 loci surrounding CA-SDI-9291 that consist of numerous bedrock milling features, lithic and ceramic scatters, and other habitation debris. These two sites are very near the current APE, and there is a high likelihood that associated subsurface archaeological resources exist.

CA-SDI-592 is recorded as a campsite with light habitation debris, although the site record itself has degraded and the information is not comprehendible. CA-SDI-4515, CA-SDI-4633, CA-SDI-6666, and CA-SDI-6665 comprise a cluster of campsites to the northeast of the APE that includes ground stone artifacts, bedrock milling stations, lithic production stations, and hearth features. CA-SDI-5179, CA-SDI-5515, and CA-SDI-5517 are all lithic scatter sites to the west and northwest of the APE. CA-SDI-5179 also has two areas of bedrock milling features. CA-SDI-11,256 is an historic wooden floor platform with associated trash pits and cobblestone arrangements. CA-SDI-15,547 is a large site consisting of dense habitation debris, bedrock milling features, lithic and ceramic scatters,

and previously disturbed human cremation. The site has been heavily disturbed due to historic and modern development.

The Native American Heritage Commission indicated that there is no record of significant Native American cultural resources within 1/2 mile of the project area. No responses have been received from Tribes and individuals contacted regarding the project.

Historic maps and aerial photographs were reviewed. Although Poway Road is visible on the 1928 San Diego County Tax Factor aerial photographs and the historic topographic maps (1930 USGS 15' La Jolla quadrangle, 1952 USGS 7.5' Poway Valley quadrangle), no buildings appear in the vicinity of the project area on these maps and photographs.

Field Reconnaissance

John Meriwether of Affinis and Clint Linton of Red Tail Monitoring and Research conducted a pedestrian survey of the entire 7.39-acre church property on May 26, 2010. No archaeological resources were discovered. Two areas of possible bedrock milling were noted, but they could not be positively identified due to extensive weathering and exfoliation of the rock surface. In portions of the property ground visibility was quite good. In the area of the proposed Building A (see Figure 4), landscaping severely limited ground visibility.

Evaluation

No archaeological sites have been identified within or adjacent to the current project area. The Native American Heritage Commission has no record of significant Native American cultural resources in the vicinity. Based on this, no impacts to cultural resources are anticipated. However, ground visibility was quite limited in the area of the proposed Building A, so there is a potential for archaeological resources that could not be seen. In addition, a number of archaeological sites have been recorded in the vicinity, and there is a potential for subsurface cultural resources, particularly along the creek.

VI. RECOMMENDATIONS (Include recommendations for mitigation of significant indirect and cumulative impacts and monitoring, as appropriate).

No cultural resources have been identified within the church property, including the current project area. Therefore, the project is expected to have no impact to cultural resources. However, ground visibility was limited in the area of the proposed Building A, so there is a potential for archaeological resources that could not be seen during the survey. Based on this, and the general sensitivity of the area, it is recommended that an archaeologist and a Native American monitor be present to observe initial grading, trenching, and other ground

disturbing activities for the project. No grading is proposed in the alluvial soils along the creek, so monitoring should not be necessary below a depth of approximately 2 ft.

VII. SOURCES CONSULTED	DATE	
■National Register of Historic Places	Month and Year:	May 2010
■California Register of Historical Resources	Month and Year:	May 2010
■City of San Diego Historical Resources Register	Month and Year:	May 2010
Archaeological/Historical Site Records:		
■South Coastal Information Center	Month and Year:	May 2010
■San Diego Museum of Man	Month and Year:	May 2010
Other Sources Consulted:		
Native American Heritage Commission	Month and Year:	May 2010

VIII. CERTIFICATION

Preparer: John Meriwether Title: Archaeologist

Signature: Date: June 3, 2010

Preparer: Mary Robbins-Wade Title: Director of Cultural Resources

Signature: Mary Robbins-Wade Date: June 3, 2010

IX. ATTACHMENTS

A National Archaeological Data Base Information
B Bibliography
C Maps
D Culture History

ATTACHMENT A

NATIONAL ARCHAEOLOGICAL DATA BASE INFORMATION

NATIONAL ARCHAEOLOGICAL DATA BASE INFORMATION

Authors:	John Meriwether and Mary Robbins-Wade
Consulting Firm:	Affinis, 847 Jamacha Road, El Cajon, California 92019
Report Date:	June 2010
Report Title:	North City Presbyterian Church. Project No. 150585
Submitted to:	City of San Diego, City of San Diego Development Services Department, 1222 First Avenue, San Diego, California 92101
Prepared for:	North City Presbyterian Church, 11747 Poway Road, Poway, California 92064
Contract number:	Affinis Job No. 2390
USGS quadrangles:	Poway (7.5' series)
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ATTACHMENT B

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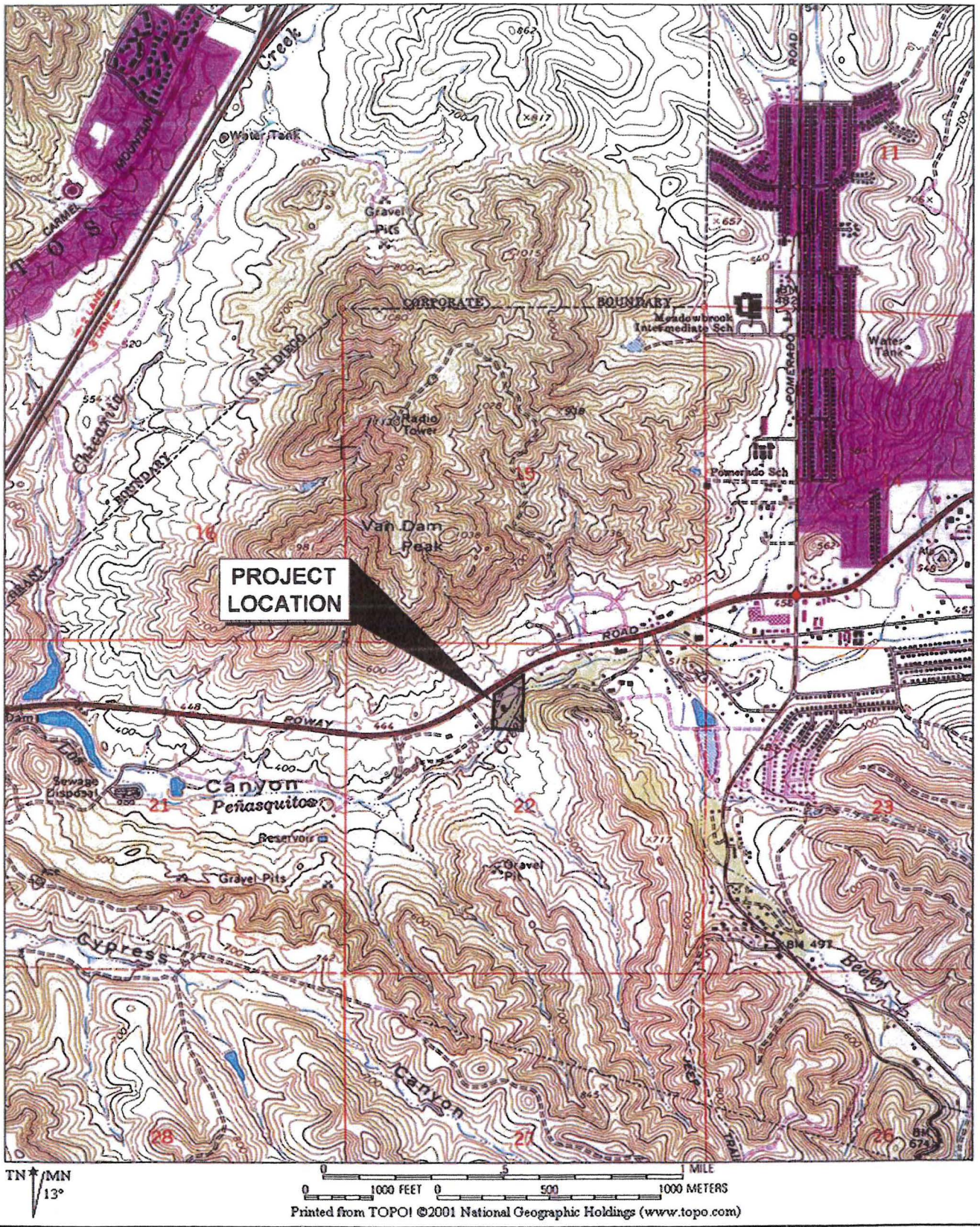
ATTACHMENT C

MAPS

Affinis
Shadow Valley Center
847 Jamacha Road
El Cajon, CA 92019

Regional location in San Diego County

Figure 1



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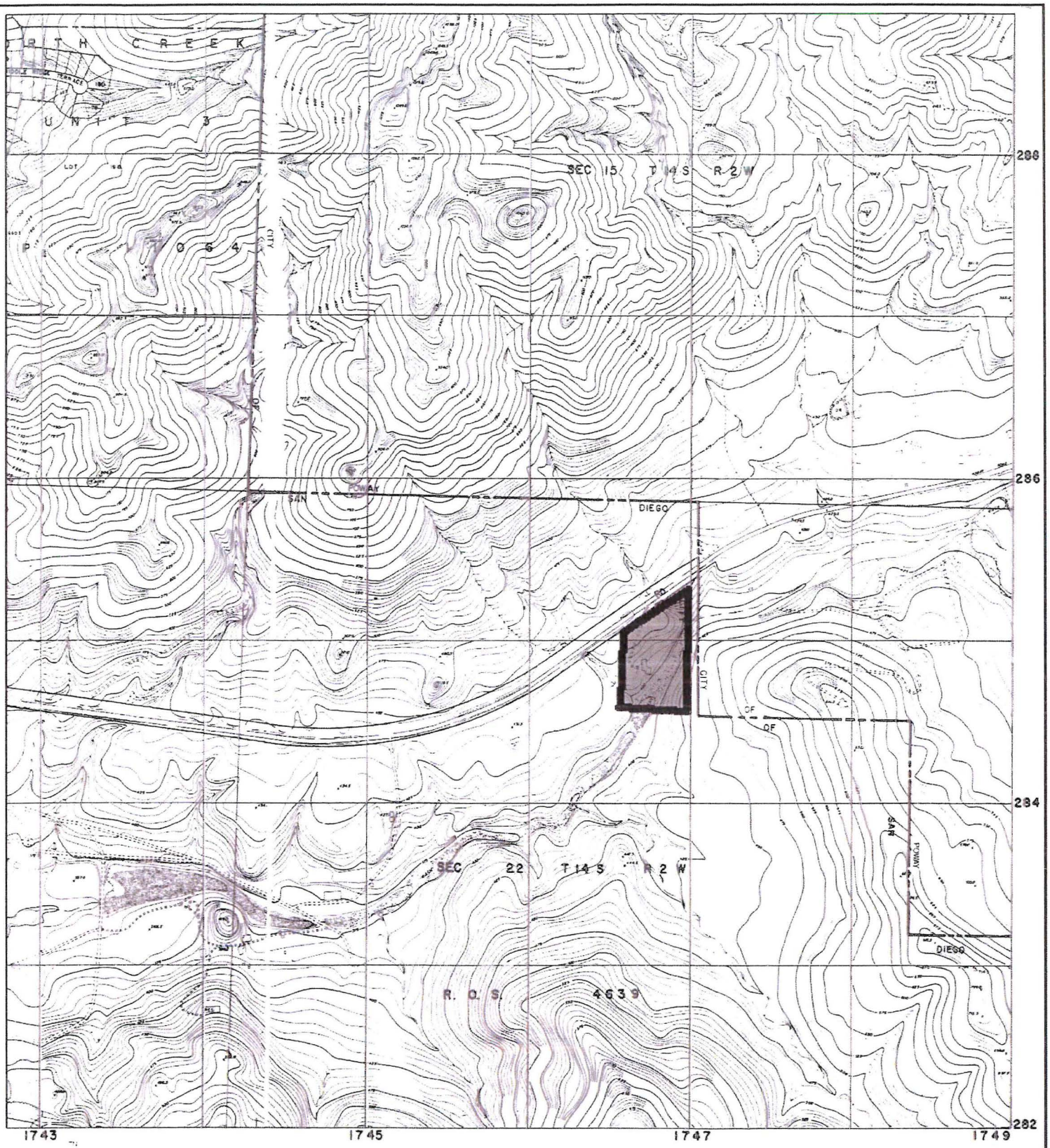
El Cajon, CA 92019

Project location on USGS 7.5'
Poway quadrangle

Figure 2



0 800
Feet

CITY OF SAN DIEGO, CALIFORNIA
SCALE 1 INCH = 800 FEET
DATUM IS MEAN SEA LEVEL

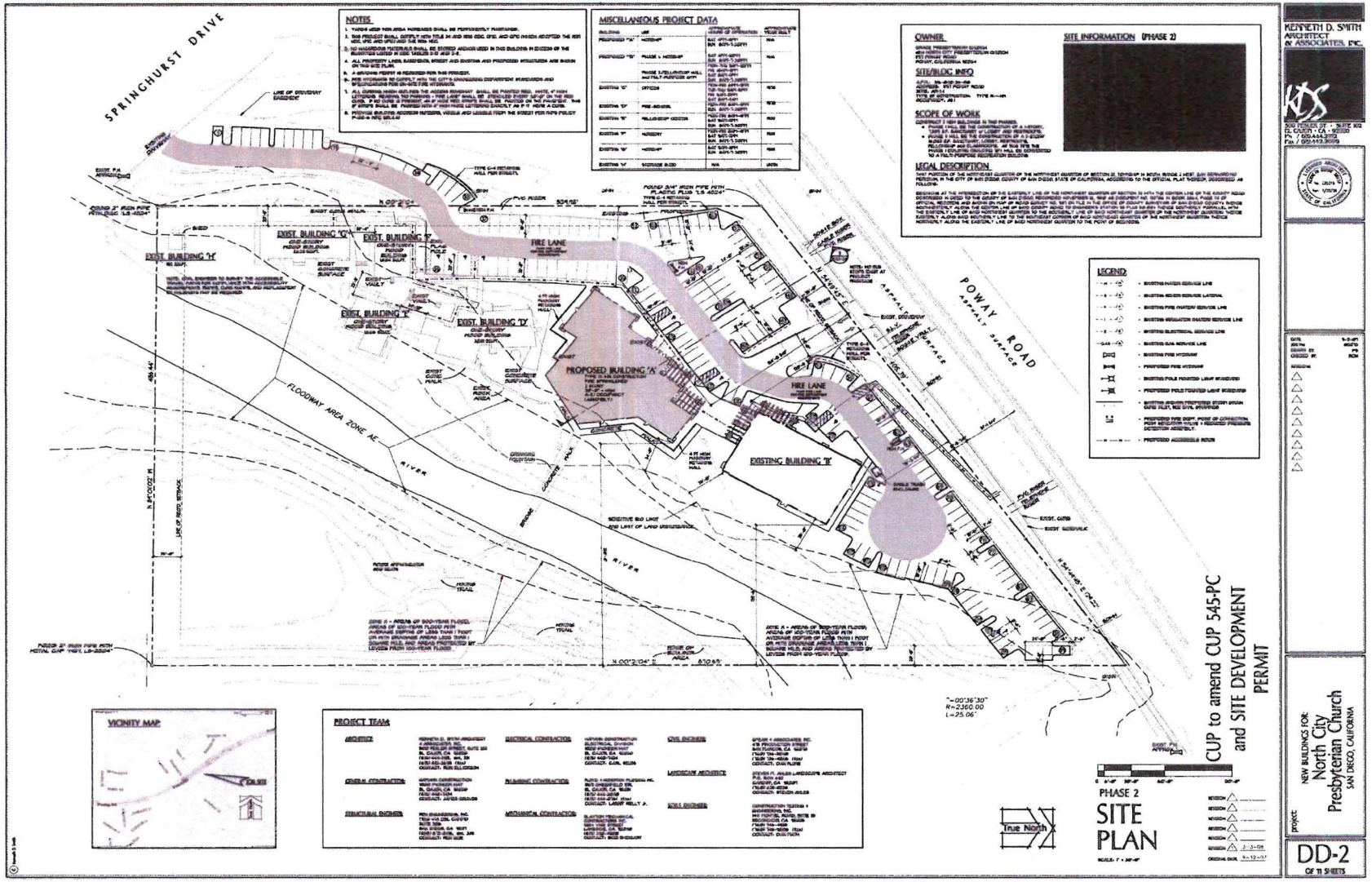
	290-1737	
282-1725		282-1749
	274-1737	

282-1737

Affinis
Shadow Valley Center
847 Jamacha Road
El Cajon, CA 92019

Project location on
city Engineering map

Figure 3



Affinis
Shadow Valley Center
847 Jamacha Road
El Cajon, CA 92019

Project Plans

Figure 4

ATTACHMENT D

CULTURE HISTORY

GENERAL CULTURE HISTORY

Several summaries discuss the prehistory of San Diego County and provide a background for understanding the archaeology of the general area surrounding the project. Moratto's (1984) review of the archaeology of California contains important discussions of Southern California, including the San Diego area, as does a new book by Neusius and Gross (2007). Bull (1983, 1987), Carrico (1987), Gallegos (1987), and Warren (1985, 1987) provide summaries of relatively recent work and interpretations, and a recent paper (Arnold et al. 2004) discusses advances since 1984. The following is a brief discussion of the culture history of the San Diego region.

Carter (1957, 1978, 1980), Minshall (1976) and others (e.g., Childers 1974; Davis 1968, 1973) long have argued for the presence of Pleistocene humans in California, including the San Diego area. The sites identified as "early man" are all controversial. Carter and Minshall are best known for their discoveries at Texas Street and Buchanan Canyon. The material from these sites is generally considered nonartifactual, and the investigative methodology is often questioned (Moratto 1984).

The earliest accepted archaeological manifestation of Native Americans in the San Diego area is the San Dieguito complex, dating to approximately 10,000 years ago (Warren 1967). The San Dieguito complex was originally defined by Rogers (1939), and Warren published a clear synthesis of the complex in 1967. The material culture of the San Dieguito complex consists primarily of scrapers, scraper planes, choppers, large blades, and large projectile points. Rogers considered crescentic stones to be characteristic of the San Dieguito complex as well. Tools and debitage made of fine-grained green metavolcanic material, locally known as felsite, were found at many sites that Rogers identified as San Dieguito. Often these artifacts were heavily patinated. Felsite tools, especially patinated felsite, came to be seen as an indicator of the San Dieguito complex. Until relatively recently, many archaeologists felt that the San Dieguito culture lacked milling technology and saw this as an important difference between the San Dieguito and La Jolla complexes. Sleeping circles, trail shrines, and rock alignments have also been associated with early San Dieguito sites. The San Dieguito complex is chronologically equivalent to other Paleoindian complexes across North America, and sites are sometimes called "Paleoindian" rather than "San Dieguito." San Dieguito material underlies La Jolla complex strata at the C. W. Harris site in San Dieguito Valley (Warren, ed. 1966).

The traditional view of San Diego prehistory has the San Dieguito complex followed by the La Jolla complex at least 7000 years ago, possibly as long as 9000 years ago (Rogers 1966). The La Jolla complex is part of the Encinitas tradition and equates with Wallace's (1955) Millingstone Horizon, also known as Early Archaic or Milling Archaic. The Encinitas tradition is generally "recognized by millingstone assemblages in shell middens, often near sloughs and lagoons" (Moratto 1984:147). "Crude" cobble tools, especially choppers and scrapers, characterize the La Jolla complex (Moriarty 1966). Basin metates, manos, discoidals, a small number of Pinto series and Elko series points, and flexed burials are also characteristic.

Warren et al. (1961) proposed that the La Jolla complex developed with the arrival of a desert people on the coast who quickly adapted to their new environment. Moriarty (1966) and Kaldenberg (1976) have suggested an in situ development of the La Jolla people from the San Dieguito. Moriarty has since proposed a Pleistocene migration of an ancestral stage of the La Jolla people to the San Diego coast. He suggested this Pre-La Jolla complex is represented at Texas Street, Buchanan Canyon, and the Brown site (Moriarty 1987).

In recent years, archaeologists in the region have begun to question the traditional definition of San Dieguito people as makers of finely crafted felsite projectile points, domed scrapers, and discoidal cores, who lacked milling technology. The traditional defining criteria for La Jolla sites (manos, metates, "crude" cobble tools, and reliance on lagoonal resources) have also been questioned (Bull 1987; Cárdenas and Robbins-Wade 1985; Robbins-Wade 1986). There is speculation that differences between artifact assemblages of "San Dieguito" and "La Jolla" sites reflect functional differences rather than temporal or cultural variability (Bull 1987; Gallegos 1987). Gallegos (1987) has proposed that the San Dieguito, La Jolla, and Pauma complexes are manifestations of the same culture, with differing site types "explained by site location, resources exploited, influence, innovation and adaptation to a rich coastal region over a long period of time" (Gallegos 1987:30). The classic "La Jolla" assemblage is one adapted to life on the coast and appears to continue through time (Robbins-Wade 1986; Winterrowd and Cárdenas 1987). Inland sites adapted to hunting contain a different tool kit, regardless of temporal period (Cárdenas and Van Wormer 1984).

Several archaeologists in San Diego, however, do not subscribe to the Early Prehistoric/ Late Prehistoric chronology (see Cook 1985; Gross and Hildebrand 1998; Gross and Robbins-Wade 1989; Shackley 1988; Warren 1998). They feel that an apparent overlap among assemblages identified as "La Jolla," "Pauma," or "San Dieguito" does not preclude the existence of an Early Milling period culture in the San Diego region, whatever name is used to identify it, separate from an earlier culture. One problem these archaeologists perceive is that many site reports in the San Diego region present conclusions based on interpretations of stratigraphic profiles from sites at which stratigraphy cannot validly be used to address chronology or changes through time. Archaeology emphasizes stratigraphy as a tool, but many of the sites known in the San Diego region are not in depositional situations. In contexts where natural sources of sediment or anthropogenic sources of debris to bury archaeological materials are lacking, other factors must be responsible for the subsurface occurrence of cultural materials. The subsurface deposits at numerous sites are the result of such agencies as rodent burrowing and insect activity. A number of studies have emphasized the importance of bioturbative factors in producing the stratigraphic profiles observed at archaeological sites (see Gross 1992). Different classes of artifacts move through the soil in different ways (Bocek 1986; Erlandson 1984; Johnson 1989), creating vertical patterning (Johnson 1989) that is not culturally relevant. Many sites that have been used to help define the culture sequence of the San Diego region are the result of just such nondepositional stratigraphy.

The Late Prehistoric period is represented by the Cuyamaca complex in the southern portion of San Diego County and the San Luis Rey complex in the northern portion of the county. The Cuyamaca complex is the archaeological manifestation of the Yuman forebears of the Kumeyaay people. The San Luis Rey complex represents the Shoshonean predecessors of the ethnohistoric Luiseño. The name Luiseño derives from Mission San Luis Rey de Francia and has been used to refer to the Indians associated with that mission, while the Kumeyaay people are also known as Ipai, Tipai, or Diegueño (named for Mission San Diego de Alcala). Agua Hedionda Creek is often described as the division between the territories of the Luiseño and the Kumeyaay people (Bean and Shipek 1978; Luomala 1978; White 1963). The property is within the ethnographic territory of the Kumeyaay.

Elements of the Cuyamaca and San Luis Rey complexes include small, pressure-flaked projectile points (e.g., Cottonwood and Desert Side-notched series); milling implements, including mortars and pestles; *Olivella* shell beads; ceramic vessels; and pictographs (True 1970; True et al. 1974). Of these elements, mortars and pestles, ceramics, and pictographs are not associated with earlier sites. True noted a greater number of quartz projectile points at San Luis Rey sites than at Cuyamaca complex sites, which he interpreted as a cultural preference for quartz (True 1966). He considered ceramics to be a late development among the Luiseño, probably learned from the Diegueño. The general mortuary pattern at San Luis Rey sites is ungathered cremations.

The Cuyamaca complex also differs from the San Luis Rey complex in the following points:

1. Defined cemeteries away from living areas;
2. Use of grave markers;
3. Cremations placed in urns;
4. Use of specially made mortuary offerings;
5. Cultural preference for side-notched points;
6. Substantial numbers of scrapers, scraper planes, etc., in contrast to small numbers of these implements in San Luis Rey sites;
7. Emphasis placed on use of ceramics; wide range of forms and several specialized items;
8. Steatite industry;
9. Substantially higher frequency of milling stone elements compared with San Luis Rey;
10. Clay-lined hearths (True 1970:53-54).

Both the San Luis Rey and Cuyamaca complexes were defined on the basis of village sites in the foothills and mountains. Coastal manifestations of both Luiseño and Kumeyaay differ from their inland counterparts. Fewer projectile points are found on the coast, and there tends to be a greater number of scrapers and scraper planes at coastal sites (Robbins-Wade 1986, 1988). Cobble-based tools, originally defined as "La Jolla," are characteristic of coastal sites of the Late Prehistoric period, as well (Cárdenas and Robbins-Wade 1985; Winterrowd and Cárdenas 1987).

Both the San Luis Rey and Cuyamaca complexes were defined on the basis of village sites in the foothills and mountains. Coastal manifestations of both Luiseño and Kumeyaay differ from their inland counterparts. Fewer projectile points are found on the coast, and there tends to be a greater number of scrapers and scraper planes at coastal sites (Robbins-Wade 1986, 1988). Cobble-based tools, originally defined as "La Jolla", are characteristic of coastal sites of the Late Prehistoric period, as well (Cárdenas and Robbins-Wade 1985:117; Winterrowd and Cárdenas 1987:56).

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HELIX
Environmental Planning

North City Presbyterian Church
Project No. 150585

Biological Resources Technical Report

July 20, 2016

Prepared for:
North City Presbyterian Church
11717 Poway Road
Poway, CA 92064

Prepared by:
HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942

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NORTH CITY PRESBYTERIAN CHURCH
BIOLOGICAL RESOURCES TECHNICAL REPORT

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1.0 EXECUTIVE SUMMARY

Foothill Associates' biologists conducted a general biological resources assessment for the North City Presbyterian Church Project in the City of San Diego, California. HELIX Environmental Planning, Inc. (HELIX) has utilized these surveys as the basis for the biological assessment. The approximately 7.65-acre project site is located near the intersection of Poway Road and Springhurst Street in San Diego, California.

The purpose of this document is to summarize the general biological resources on the site, to assess the suitability of the site to support special-status species and sensitive habitat types, to conduct an analysis of potential project impacts, and to propose measures to avoid, minimize, and compensate for project impacts.

The project site and surrounding area of the proposed project is a mixture of native vegetation communities, non-native vegetation, and developed areas. The vegetation communities on the project site include: coastal sage scrub (0.29 acre), disturbed coastal sage scrub (0.13 acre), eucalyptus woodland (0.39 acre), southern willow riparian forest (1.56 acres), ornamental plantings (0.16 acre), coast live oak woodland (0.28 acre), disturbed/ruderal habitat (1.61 acres), and developed/landscaped areas (3.23 acres). Numerous listed and special-status plant and animal species have the potential to occur in vicinity of the project area. Wetlands or other waters subject to the jurisdiction of federal, State, and/or local agencies include 0.27 acre of perennial drainage, 0.49 acre of riparian wetland, 1.29 acres of southern willow riparian forest, and 0.27 acre of streambed. Some of these communities overlap with one another. The riparian woodland, coast live oak woodland, and coastal sage scrub habitats are within the Multi-Habitat Planning Area (MHPA) for the City of San Diego. Given the extent of developed vegetation the riparian woodland may be considered a wildlife movement corridor.

The proposed project would result in direct impacts to eucalyptus woodland, disturbed/ruderal, and previously developed or ornamental landscape areas; no impacts to coastal sage scrub, disturbed coastal sage scrub, or coast live oak woodland would occur. Indirect impacts to southern willow riparian forest may occur and are discussed in later sections. Impacts to disturbed/ruderal areas, ornamental plantings, eucalyptus woodland, and previously developed areas would not require mitigation. Mitigation measures have been proposed to minimize construction impacts and to offset direct and indirect effects to adjacent sensitive vegetation communities and special-status species that may occur on the site.

This report summarizes the findings of a biological resources assessment completed for the proposed project. This document addresses the onsite physical features, the vegetation communities present, and the plant and wildlife species occurring or potentially occurring on the site. Furthermore, the suitability of habitats to support special-status species and sensitive habitats is analyzed. Based on the proposed project plans, a biological resources impact assessment has been conducted. Finally, proposed mitigation measures for avoiding, minimizing, and compensating for these impacts are provided.

2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION

The existing 7.65-acre North City Presbyterian Church project site is located at 11717 Poway Road in the City of San Diego (City), California. Specifically, the project is located at the southeast corner of Poway Road and Springhurst Drive within the Sabre Springs neighborhood of the City in central San Diego County (Figures 1 and 2). The proposed project area is within Section 22 of Township 14 South, Range 2 West, on the USGS 7.5' Poway quadrangle (Figure 3).

The North City Presbyterian Church consists of 7.39 acres, which includes a current ingress and egress right-turn in and out driveway along Poway Road east of Springhurst, as well as an additional 0.26-acre outbound only, one-way church driveway at the intersection of Springhurst and Sabre Springs Parkway, for a total project study area of 7.65 acres.

In March 1997, the Multiple Species Conservation Program (MSCP) Subarea Plan for the City of San Diego was adopted. The MSCP identifies lands proposed for open space and habitat preservation and designates the areas as an MHPA. The MHPA identifies areas of the subarea within which conservation or habitat areas and linkages will occur in addition to limited development. The proposed project site contains 3.58 acres within the City of San Diego's MHPA.

2.2 SURROUNDING LAND USES AND SETTING

The project site contains some previously developed areas with church and school buildings, outdoor playground and landscaping, and areas of natural vegetation. The surrounding land uses include undeveloped open space, institutional utilities development, and residential development.

Elevations of the project site range from approximately 400 to 440 feet above mean sea level (AMSL). The project area is at the juncture of the coastal plains and foothills of San Diego County. Topography and drainage on the site are dominated by Los Peñasquitos Canyon Creek, which bisects the project site flowing from northeast to southwest. No other drainage courses occur on the proposed project site. Geologically, the majority of the project area is underlain by Cretaceous granitic rock; the area along Peñasquitos Creek is Quaternary alluvium and slopewash. Soils mapped on the property include Ramona sandy loam, 5 to 9 percent slopes, on the north side of the creek; Riverwash, Cieneba rocky course sandy loam, 9 to 30 percent slopes; and Diablo-Olivenhain complex, 9 to 30 percent slopes, on the south side of the creek. Vegetation in and around the project area includes: Diegan Coastal Sage Scrub, Southern Willow Riparian Forest, Coast Live Oak Woodland, and Eucalyptus Woodland, as well as Disturbed/Ruderal and Ornamental Vegetation.

2.3 BACKGROUND

A Conditional Use Permit (CUP) was approved in 1997 (CUP No. 545PC). Allowed uses included construction of a sanctuary, multi-purpose building, administration building,

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Regional Location Map

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

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Figure 1

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Existing Site Development

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

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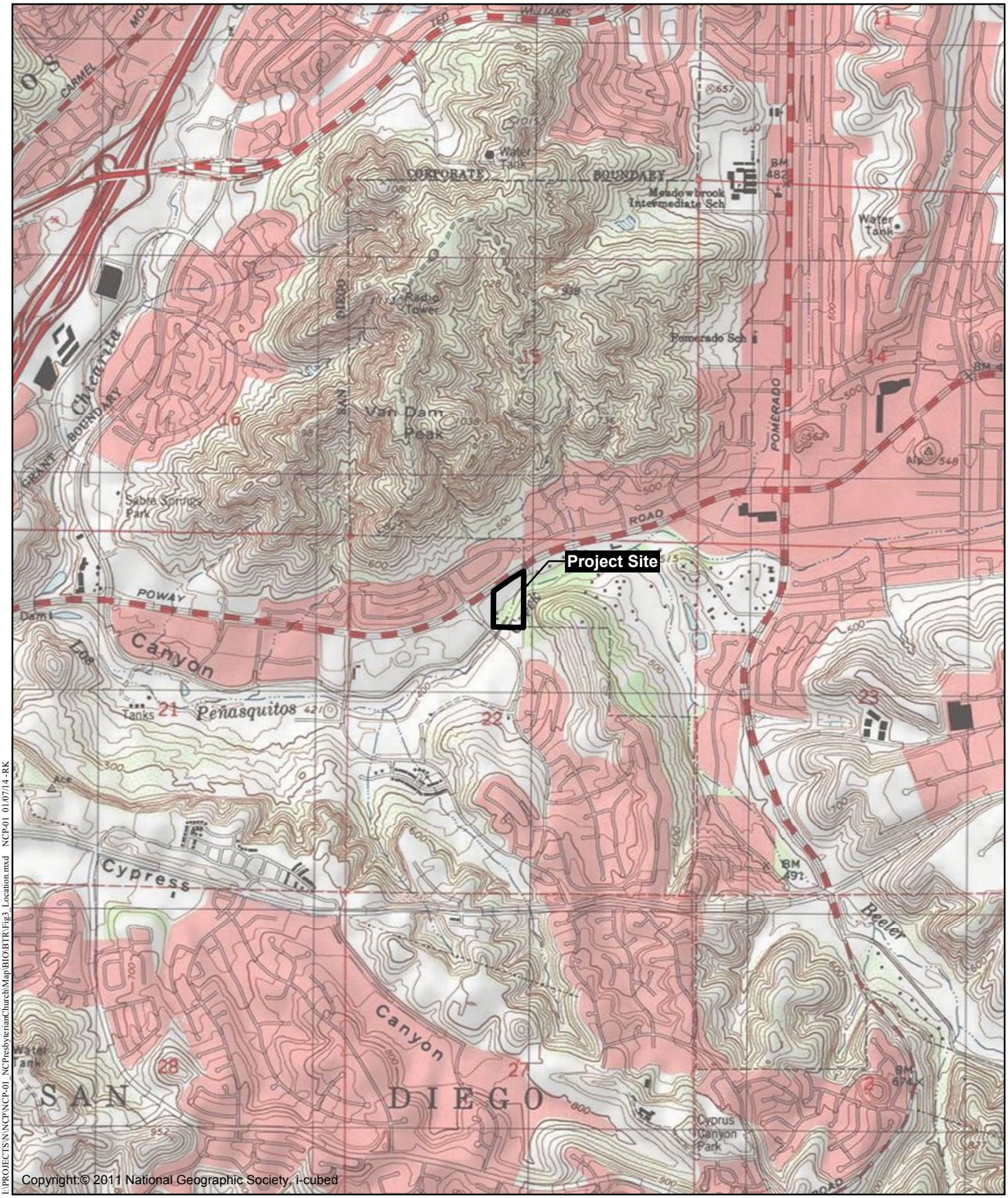
Figure 2



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Project Vicinity Map

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

0 2,000 Feet

Figure 3

classrooms, parking, and amphitheater (Figure 4). Uses were located on both sides of the creek and were to be built out over 5 phases. Additionally, landscaping for the facilities was also allowed under the CUP. The MHPA boundary line was placed on the property after approval of the CUP over these approved uses. The project site has been developed as a church campus consistent with the CUP between 1978 and 1982 and included the following:

- 2,059-square foot office building (also known as Building C) built in 1978;
- 3,581-square foot pre-school building (also known as Building D) built in 1978;
- 1,666-square foot fellowship building (also known as Building E) built in 1982;
- 1,604-square foot nursery building (also known as Building F) built in 1982;
- 2,639-square foot worship hall (also known as Building G) built in 1982; and
- 199-square foot storage building (also known as Building H)[1] (Figure 4).

Additional existing facilities onsite include a 62-space paved parking lot, a wooden deck, a pedestrian bridge over Los Peñasquitos Canyon creek, walking trails on the east side of the creek, and associated sidewalks and turf/play areas between the buildings and the eucalyptus habitat on the north edge of the riparian zone.

The North City Presbyterian Church has been serving the community since 1985 and specifically from the existing site since 1990.

2.4 PROJECT PURPOSE

The North City Presbyterian Church has outgrown their existing Worship Center and proposes the construction of a new sanctuary in order to better serve the community. The proposed development would occur in two phases as described below.

2.5 PROJECT COMPONENTS

2.5.1 Phase One

Phase One includes the construction of a 7,039-square foot, one-story, 414-seat sanctuary (proposed Building B), which can be compared to the existing worship hall (Building G) containing only 200 seats (Figure 5).

As part of the proposed project, an MHPA Boundary Line Correction (BLC) is proposed that would remove 0.48 acre, add 0.28 acre to the MHPA, while conserving the remaining portions of the MHPA to provide for consistency with the MSCP subarea plan's preservation goals. Additionally, potential development previously allowed under the CUP east of the creek is also being eliminated from future consideration.

[1] The date of construction for the storage buildings is unknown. However, it existed on-site prior to the purchase of the property in 1990.

2.5.2 Phase Two

Phase Two would consist of the construction of a 16,083-square foot, two-story, 516-seat sanctuary (proposed Building A). When construction of the proposed Building A is complete, the proposed Building B (Phase One sanctuary) would be used as a Fellowship Hall and multi-purpose gymnasium. In order to construct proposed Building A, the existing 2,059 square-foot office building (Building C) would be demolished and the existing fellowship building (Building E) would be remodeled by reducing the existing square footage from 1,666 to 779 square feet (Figure 5). In order to accommodate the construction of proposed Building A, the existing Building C would need to be demolished prior to construction. Therefore, the offices located in existing Building C that would be removed to accommodate the construction of proposed Building A would be temporarily relocated to existing Building G and/or E while proposed Building A is being constructed. Once construction is complete, the offices will be housed on the second floor of the new Building A sanctuary. Over the long-term, it is expected that existing Building G and remodeled Building E will be used for Christian Education on Sundays.

2.5.3 Parking Access and Tabulation

As part of the proposed project, the existing church driveway to and from Poway Road would be removed due to safety concerns of allowing the existing driveway to remain within the Poway Road transition lane. Therefore, the Poway Road driveway is proposed to be relocated easterly to its far eastern location further from Springhurst Drive, and thus allowing Poway Road to be restriped as part of the proposed project improvements. By moving the driveway, the Poway Road eastbound lanes between Springhurst Drive and the new driveway can be restriped to make this section of road safer where the existing three eastbound lanes merge down to two lanes.

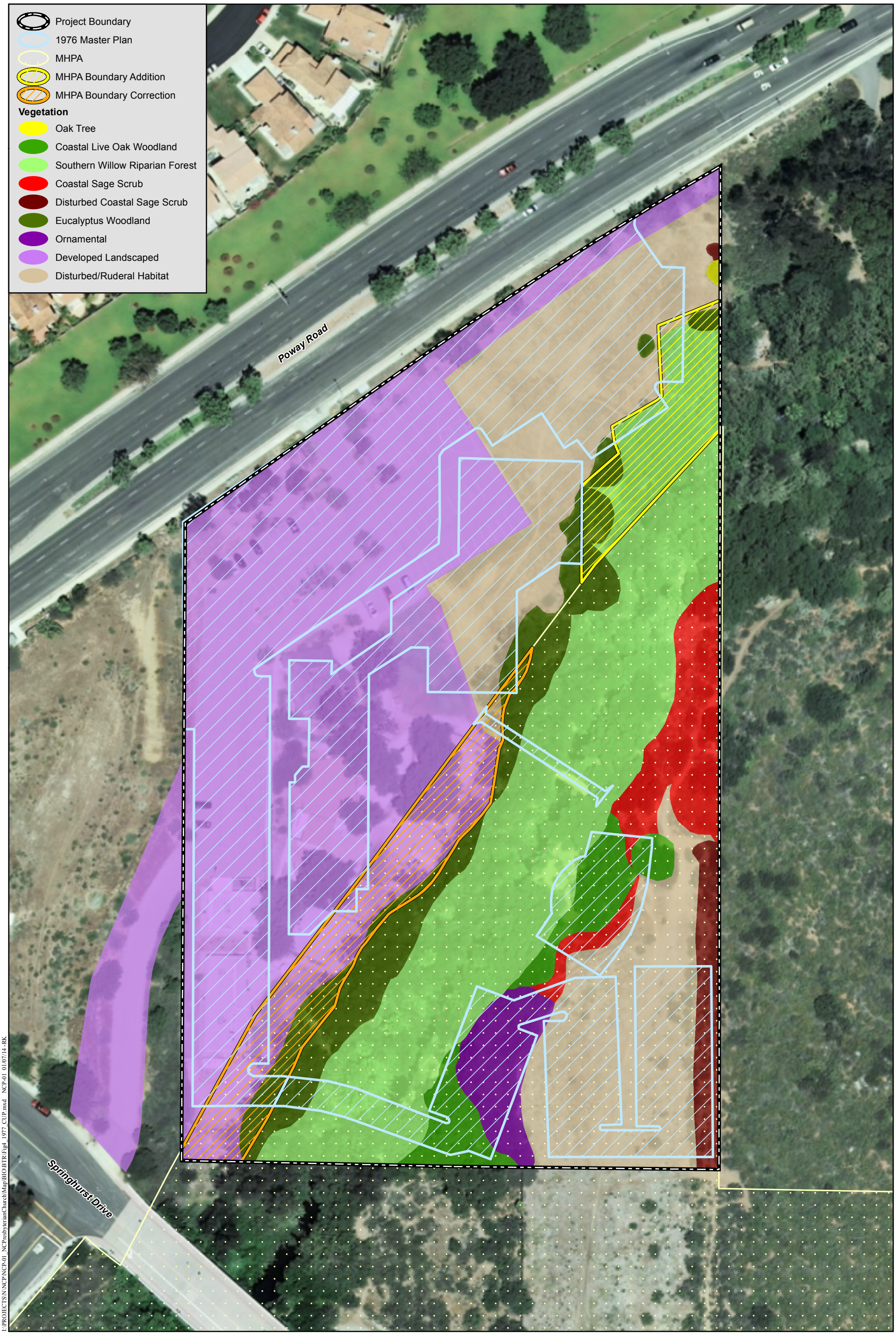
In addition, the driveway to Springhurst Drive would be made for two-way traffic. The two-way driveway to Springhurst/Sabre Springs intersection will ultimately accommodate a flare for a 60-foot right turn lane (in the future) in addition to the combined through and left turn as it approaches Springhurst Drive.

The Phase One 414-seat sanctuary includes 146 parking spaces while the Phase Two 516-seat sanctuary includes 172 parking spaces (as shown in Figure 5). A portion of the existing northerly parking lot will be removed and replaced while the westerly parking lot will remain and be resurfaced.

2.6 PROJECT CONSTRUCTION

2.6.1 Phase One – Construction Process

Phase One construction would commence with the site preparation and construction of the proposed Building B, a 7,039-square foot, one-story, 414-seat sanctuary. The location of the proposed new building is currently vacant and gently slopes to the southeast. The elevation difference across the area varies by approximately 10 feet. The western portion of the project site is vegetated with low growing grass while the eastern portion is barren with scattered boulders



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1977 CUP/Vegetation

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

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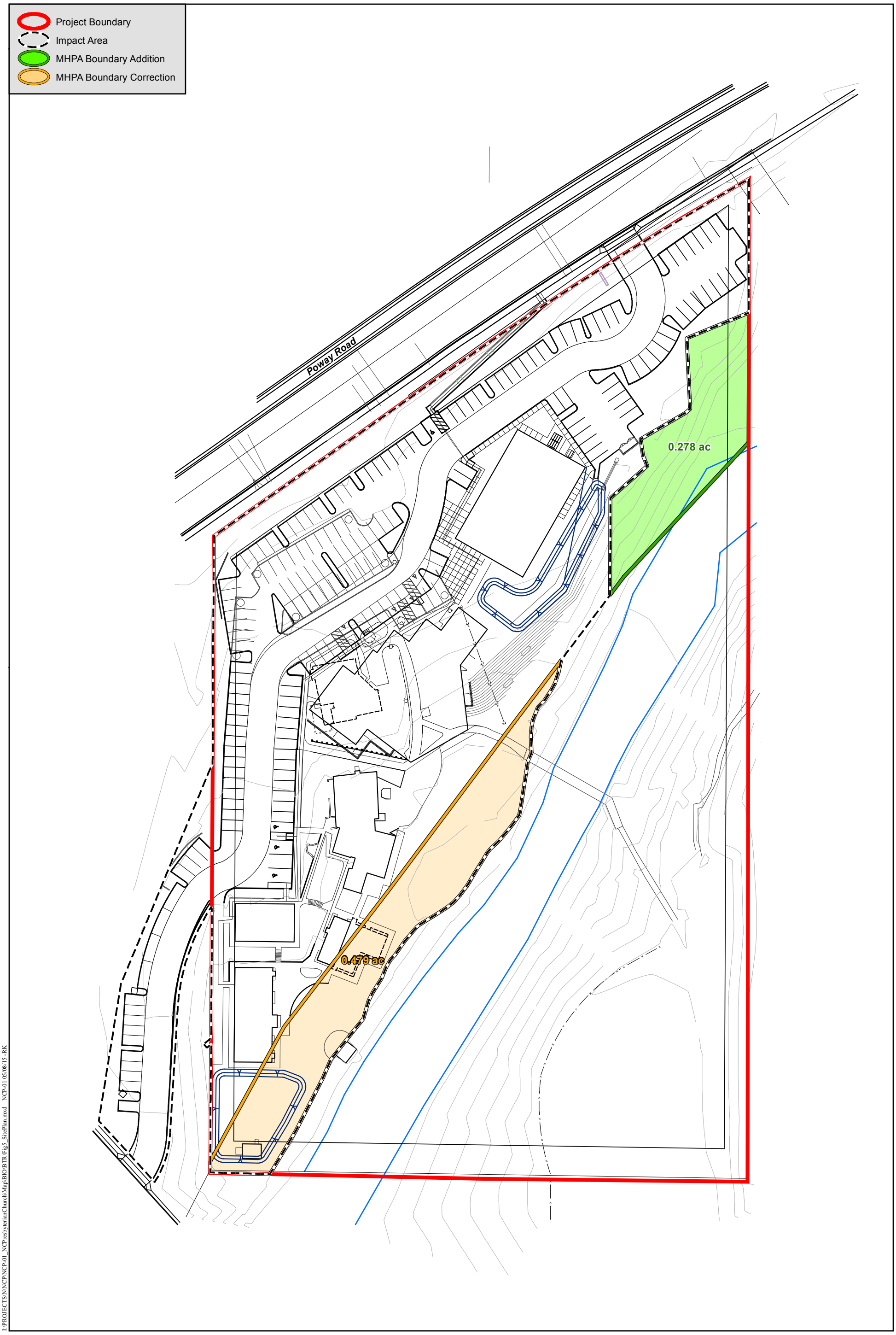
Figure 4



Site Map/MHPA

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

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Figure 5

exposed at ground surface. Approximately 1.4 acres of soil disturbance would occur for implementation of the proposed Building B. After site earthwork and grading, the new sanctuary building would be constructed, along with parking and landscaping. Although construction would not involve the removal of any existing pavement, it would include an additional 0.27 acre of pavement for construction of the parking area along the northern portion of the site.

Earthwork

Due to the topography of the site, 3,800 cubic yards of earth would be cut with 2,450 cubic yards of fill relocated onsite so that building access will be near street level. All remaining would be exported offsite.

All areas to be graded or to receive fill and/or structures would be cleared of vegetation. Vegetation and debris from clearing operations would be properly disposed of off-site. The area would be thoroughly inspected for any possible buried objects, which would be re-routed or removed prior to the inception of, or during grading. All holes, trenches, or pockets left by the removal of these objects would be properly backfilled with compacted fill materials. Clearing operations would extend a minimum of 10 feet beyond the proposed building limits. All additional measures included in the geotechnical investigation for the proposed project would be implemented.

Construction Equipment

Specific construction equipment is not yet identified but would be expected to consist of standard demolition, grading, building, and paving equipment. The need for blasting is not anticipated in Phase One.

Construction Timeframe

It is expected that the Phase One construction would begin in the fall of 2014 and would take approximately 18 months.

Construction Access and Staging Areas

All access, construction staging and construction parking for Phase One would be located within all areas designated as disturbed/ruderal areas at least 50 feet from the wetland buffer areas.

Construction Best Management Practices

Site surface drainage currently drains into the perennial drainage (Los Peñasquitos Canyon Creek) on the southern portion of the site. Industry standard Best Management Practices (BMPs) shall be used to avoid construction phase erosion on the project site and adjacent areas. Practices that would be employed during construction, as described in the Stormwater Management Plan include: gravel bag berms, sandbag barriers, entrance entrance/exits wash, stockpile management, concrete waste management, erosion control mats, scheduling, solid waste storage areas, spill prevention control, and hazardous waste management.

Industry standard BMPs shall be employed to prevent, capture, and/or treat stormwater and nuisance runoff generated from the site, as specified in the Stormwater Management Plan. Design measures included to accomplish this include: maximizing pervious surfaces, conservation of natural areas onsite, minimizing connected impervious areas, maximizing water conservation, and vegetation of slopes with native and drought tolerant plant species. Source control measures to be included in the project include: reduction of pesticide use, distribution of Integrate Pest Management educational materials, efficient landscape and irrigation design, and storm water conveyance system signage/stenciling. Treatment control measures to be employed by the project include: grass swales and hydro cartridge drainage inserts.

2.6.2 Phase Two – Construction Process

Phase Two construction would commence with the demolition of the existing 2,059 square-foot Office Building C and the remodel to reduce the existing fellowship Building E from 1,666 to 779 square feet and would include removal of all existing pavement. Approximately 1.1 acres of soil disturbance would occur for implementation of the proposed Building A. After site earthwork and grading, the new 16,083-square foot sanctuary Building A would be constructed, along with an additional 0.40 acre of paved parking and landscaping.

Earthwork

The location of the proposed Building A is currently occupied with existing development. Therefore, there would not be a need to cut additional cubic yards.

Construction Equipment

Specific construction equipment is not yet identified but would be expected to consist of standard demolition, grading, building, and paving equipment. The need for blasting is not anticipated for the demolition of the existing buildings.

Construction Timeframe

It is anticipated that the Phase Two construction would begin many years in the future. However, for purposes of this analysis, the full build-out year is expected to be 2030. Therefore, construction would potentially begin as late as 2027 and would take approximately 24 months to complete.

Construction Access and Staging Areas

All access, construction staging and construction parking for Phase Two would be located within all areas designated as disturbed/ruderal areas at least 50 feet from the wetland buffer areas.

Construction Best Management Practices

Site surface drainage currently drains into the perennial drainage (Los Peñasquitos Canyon Creek) on the southern portion of the site. Industry standard BMPs shall be used to avoid

construction phase erosion on the project site and adjacent areas. Practices that would be employed during construction, as described in the Stormwater Management Plan include: gravel bag berms, sandbag barriers, entrance entrance/exits wash, stockpile management, concrete waste management, erosion control mats, scheduling, solid waste storage areas, spill prevention control, and hazardous waste management.

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3.0 REGULATORY FRAMEWORK

The following describes federal, State, and local environmental laws and policies that are relevant to the California Environmental Quality Act (CEQA) review process. The CEQA significance criteria are also included in this section.

3.1 ENDANGERED SPECIES ACT

The United States Congress passed the federal Endangered Species Act (ESA) in 1973 to protect those species that are endangered or threatened with extinction. ESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend.

ESA prohibits the “take” of endangered or threatened wildlife species. “Take” is defined to include: harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species or any attempt to engage in such conduct (ESA Section 3 [(3)(19)]). Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns (50 Code of Federal Regulations [CFR] Section 17.3). “Harass” is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns (50 CFR Section 17.3). Actions that result in take can result in civil or criminal penalties. See Section 3.8 for a discussion of the habitat conservation plan that addresses endangered and threatened species in the City of San Diego. Projects that are implemented consistent with City of San Diego guidelines would be allowed to “take” endangered species with the City’s authorization and approval.

3.2 MIGRATORY BIRD TREATY ACT AND CALIFORNIA FISH AND GAME CODE

The federal Migratory Bird Treaty Act (MBTA), first enacted in 1916, prohibits any person unless permitted by regulations, to:

> "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 USC 703).

The list of migratory birds includes nearly all bird species native to the United States. The Migratory Bird Treaty Reform Act (MBTRA) of 2004, further defined species protected under the act and excluded all non-native species. The statute was extended in 1974 to include parts of birds, as well as eggs and nests. Thus, it is illegal under MBTA to directly kill, or destroy a nest of, nearly any bird species, not just endangered species. Activities that result in removal or destruction of an active nest (a nest with eggs or young being attended by one or more adults) would violate the MBTA. Removal of unoccupied nests, or bird mortality resulting indirectly from a project, is not considered a violation of the MBTA. California Fish and Game Code Sections 3503, 3503.5, and 3512 also prohibit take of birds and active nests. Any activity, such as grading or grubbing for construction of the project site, that results in destruction of one or more active nests of native birds would entail a violation of the MBTA. Construction activities that result in abandonment of an active bird nest in areas adjacent to the disturbance may also violate sections of the Fish and Game Code.

3.3 CALIFORNIA ENDANGERED SPECIES ACT

The State of California enacted the California Endangered Species Act (CESA) in 1984. CESA is similar to ESA but pertains to state-listed endangered and threatened species. CESA requires state agencies to consult with the California Department of Fish and Wildlife (CDFW), formerly California Department of Fish and Game, when preparing CEQA documents. The purpose is to ensure that the state lead agency actions do not jeopardize the continued existence of a listed species or result in the destruction, or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available (Fish and Game Code Section 2080). CESA directs agencies to consult with CDFW on projects or actions that could affect listed species, directs CDFW to determine whether jeopardy would occur, and allows CDFW to identify "reasonable and prudent alternatives" to the project consistent with conserving the species. CESA allows CDFW to authorize exceptions to the state's prohibition against take of a listed species if the "take" of a listed species is incidental to carrying out an otherwise lawful project that has been approved under CEQA (Fish and Game Code Section 2081). See Section 3.8 for a discussion of the habitat conservation plan that addresses endangered and threatened species in the City of San Diego. Projects that are implemented

consistent with City of San Diego guidelines would be allowed to "take" endangered species with the City's authorization and approval.

3.4 CDFW SPECIES OF CONCERN

In addition to formal listing under ESA and CESA, species receive additional consideration by CDFW and local lead agencies during the CEQA process. Species that may be considered for review are included on a list of "Species of Special Concern," developed by CDFW. It tracks species in California whose numbers, reproductive success, or habitat may be threatened. See Section 3.8 for a discussion of the habitat conservation plan that addresses other sensitive species in City of San Diego.

3.5 CALIFORNIA NATIVE PLANT SOCIETY

The California Native Plant Society (CNPS) maintains a list of plant species native to California that has low population numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. Potential impacts to populations of CNPS-listed plants receive consideration under CEQA review. The following identifies the definitions of the CNPS listings:

- List 1A: Plants presumed Extinct in California
- List 1B: Plants Rare, Threatened, or Endangered in California and elsewhere
- List 2: Plants Rare, Threatened, or Endangered in California, but more numerous elsewhere
- List 3: Plants about which we need more information - A Review List
- List 4: Plants of limited distribution - A Watch List

3.6 JURISDICTIONAL WATERS OF THE UNITED STATES

3.6.1 Federal Jurisdiction

The U.S. Army Corps of Engineers (USACE) regulates discharge of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act (CWA). "Discharges of fill material" are defined as the addition of fill material into waters of the U.S., including, but not limited to the following: placement of fill that is necessary for the construction of any structure, or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; fill for intake and outfall pipes and subaqueous utility lines (33 CFR Section 328.2(f)). In addition, Section 401 of the CWA (33 USC 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification that the discharge will comply with the applicable effluent limitations and water quality standards, as administered by the Regional Water Quality Control Board (RWQCB).

Waters of the U.S. include a range of wet environments such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, and wet meadows. Boundaries between jurisdictional waters and uplands are determined in a variety of ways depending on which types of waters are present. Methods for delineating wetlands and non-tidal waters are described below.

- Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" [33 CFR Section 328.3(b)]. Presently, to be a wetland, a site must exhibit three wetland criteria: hydrophytic vegetation, hydric soils, and wetland hydrology existing under the "normal circumstances" for the site.

- The lateral extent of non-tidal waters is determined by delineating the ordinary high water mark (OHWM) [33 CFR Section 328.4(c)(1)]. The OHWM is defined by the USACE as "that line on shore established by the fluctuations of water and indicated by physical character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" [33 CFR Section 328.3(e)].

3.6.2 State Jurisdiction

The CDFW is a trustee agency that has jurisdiction under Section 1600 et seq. of the California Fish and Game Code. Under this code, a project proponent must notify the CDFW if a proposed project will "substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds." If an existing fish or wildlife resource may be substantially adversely affected by the activity, the CDFW may propose reasonable measures that will allow protection of those resources. If these measures are agreeable to the project proponent, they may enter into an agreement with the CDFW identifying the approved activities and associated mitigation measures.

Under the California Water Code Porter-Cologne Water Quality Act, "waters of the State" are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCB has jurisdiction over waters of the State under the California Porter-Cologne Act and regulates discharges into these waters. The RWQCB regulates waste dischargers primarily through the National Pollutant Discharge Elimination System (NPDES) permitting system so that water quality objectives are met within the applicable Basin Plan.

3.6.3 City of San Diego Jurisdiction

The City of San Diego regulates wetlands under the Environmentally Sensitive Lands (ESL) Municipal Code. The ESL Code defines wetlands as areas that meet one of the following criteria:

1) An area persistently or periodically containing naturally occurring wetland vegetation communities characteristically dominated by hydrophytic vegetation, including but not

limited to salt marsh, brackish marsh, freshwater marsh, riparian forest, oak riparian forest, riparian woodlands, riparian scrub, and vernal pools;

2) An area that has hydric soils or wetland hydrology and lacks naturally occurring wetland vegetation communities because human activities have removed the historic wetland vegetation or catastrophic or recurring natural events or processes have acted to preclude the establishment of wetland vegetation as in the case of salt panes and mudflats;

3) An area lacking wetland vegetation communities, hydric soils and wetland hydrology due to non-permitted filling of previously existing wetlands; and

4) An area mapped as wetland on Map No. C-713 as shown in Chapter 13, Article 2, Division 6 (Sensitive Coastal Overlay Zone) of the Municipal Code.

With the exception of wetlands created for the purpose of providing wetland habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating wetland characteristics and are also artificially created are not considered wetlands.

3.7 CEQA SIGNIFICANCE CRITERIA

Section 15064.7 of the CEQA Guidelines encourages local agencies to develop and publish the thresholds that the agency uses in determining the significance of environmental effects caused by projects under its review. However, agencies may also rely upon the guidance provided by the expanded Initial Study checklist contained in Appendix G of the CEQA Guidelines.

Appendix G provides examples of impacts that would normally be considered significant. Based on these guidelines, impacts to biological resources would normally be considered significant if the project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS;

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS;

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means;

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional or state habitat conservation plan.

An evaluation of whether or not an impact on biological resources would be substantial must consider both the resource itself and how that resource fits into a regional or local context. Substantial impacts would be those that would diminish, or result in the loss of, an important biological resource, or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations. The evaluation of impacts considers direct impacts, indirect impacts, and cumulative impacts and whether the impact is permanent or temporary.

3.8 LOCAL PROGRAMS

In addition to federal and State regulations, the City of San Diego has developed the MSCP, which is a regional, multi-jurisdictional plan that provides a coordinated program issuing "take" authorization for covered species for projects that comply with the plan. The ultimate goal of the MSCP is to create a regional habitat preserve system, within the MHPA, while allowing development projects to occur. The MSCP provides for a streamlined development review system that avoids the traditional project-by-project review by regulatory agencies.

As an implementing mechanism for the MSCP, the City of San Diego has established the ESL regulations. ESLs include lands within the MHPA, wetlands, sensitive vegetation communities, habitats for listed species, lands supporting narrow endemics, steep slopes, sensitive coastal bluffs, coastal beaches, and Special Flood Hazard Areas. The regulations encourage avoidance and minimization of impacts to ESLs. Biology Guidelines have been established that define the survey and impact assessment methodologies and mitigation requirements for unavoidable impacts.

4.0 METHODS

Available information pertaining to the natural resources of the region was reviewed. This report is based on field-collected data from surveys conducted by Foothill Associates although final contents of this report are the responsibility of HELIX. All references reviewed for this assessment are listed in the References section of this document. In addition to studies of the site conducted by Foothill Associates, information was reviewed including the following sources:

- California Department of Fish and Game (CDFG). 2012. California Natural Diversity Data Base (CNDDB). Sacramento, California;

- Gaetke/Partners, Architects. 1986. Original Blueprints for Calvary Covenant Church.

- Kenneth D. Smith Architects and Associates. 2014. Phase 1 and Phase 2 Site Plan: CUP to amend CUP 545-PC and Site Development Permit; and

- U.S. Geological Survey (USGS) Seamless Data Distribution System. 2008. Aerial photography of the site;

- U.S. Department of Agriculture (USDA). 1973. Soil Survey of San Diego County, San Diego Area, California. Soil Conservation Service;

Foothill Associates' biologists Mike Howard and Tom Ryan conducted field surveys of the project site. Preparer qualifications are provided in Appendix A. A general biological survey, habitat assessment, and wetland delineation were conducted on July 24, 2006, July 30, 2006, August 16, 2006, and August 31, 2006. Spring plant surveys were conducted on March 28, 2007 and May 7, 2007. The project site was systematically surveyed on foot with special attention given to identifying those portions of the site with the potential for supporting special-status species and sensitive habitats. During the field surveys, the biologists recorded plant and animal species observed and mapped biological communities. Vegetation classification was based on the Holland scheme (Holland 1986). Vegetation was mapped in the field over ortho-rectified aerial photographs and digitized into a geographic information system (GIS). All mapping and impact analysis was conducted using the GIS database. The biological surveys, impact analysis, and report have been prepared consistent with the City's Guidelines for Conducting Biological Surveys.

Mike Howard and Tom Ryan left the employment of Foothill Associates in 2007. Subsequent biological analysis and revisions to this report have been completed by David Bise, Dick Rol, Kevin Derby, Jessica Koteen, and Brian Mayerle. Foothill Associates' biologist, Sara Nedrich, subsequently performed a general biological survey on January 29, 2013 to confirm conditions have not changed from previous surveys. Verification of mapped vegetative communities, wetland habitats, and a general survey for special-status species were conducted.

Finally, HELIX biologist Barry Jones conducted a site assessment and updated the vegetation mapping in August 2013, and reconfirmed this mapping on July 19, 2016.

5.0 RESULTS

5.1 PROJECT SITE LOCATION AND DESCRIPTION

The existing 7.65-acre North City Presbyterian Church parcel and church driveway at the intersection of Springhurst and Sabre Springs Parkway is located at 11717 Poway Road in the City of San Diego, California. Specifically, the project is located at the southeast corner of Poway Road and Springhurst Drive within the Sabre Springs neighborhood of the City of San Diego, in central San Diego County (Figure 2). The proposed project area is within Section 22 of Township 14 South, Range 2 West, on the USGS 7.5' Poway quadrangle (Figure 3).

The project site contains some previously developed areas with church and school buildings, outdoor playground and landscaping, and areas of natural vegetation. The surrounding land uses include undeveloped open space, institutional utilities development, and residential development (Figure 2).

5.2 PHYSICAL CHARACTERISTICS

5.2.1 Topography and Drainage

Elevations in the project site range from approximately 400 to 440 feet AMSL. Topography and drainage on the site are dominated by Los Peñasquitos Canyon Creek, which bisects the project site flowing from northeast to southwest. No other drainage courses occur on the site.

5.2.2 Soils

The U.S. Department of Agriculture (USDA) has mapped four soil types in the project area including: Ramona sandy loam, 5 to 9 percent slopes, Riverwash, Cieneba rocky coarse sandy loam, 9 to 30 percent slopes, and Diablo-Olivenhain complex, 9 to 30 percent slopes (Figure 6). Typical characteristics of these soils types are discussed below:

- Ramona sandy loam, 5 to 9 percent slopes: Ramona soils are composed of well- drained, very deep sandy loams derived from granitic alluvium. Elevations range from

- 200 to 1,800 feet AMSL. This Ramona soil type is found on terraces and alluvial fans. Runoff is slow to medium and the erosion hazard is slight to moderate.

- Riverwash: Riverwash occurs in intermittent stream channels: Material is typically sandy or cobbly. It is excessively drained and rapidly permeable. Western sycamores and coast live oaks may exist along banks.

- Cieneba rocky coarse sandy loam, 9 to 30 percent slopes: Cieneba soils are composed of excessively drained, very shallow to shallow coarse sandy loams. These soils formed from material weathered from granitic rock. Elevations range from 500 to 3,000 feet AMSL. Natural vegetation typically consists of annual grasses, herbaceous species, and sage scrub vegetation.

- Diablo-Olivenhain complex, 9 to 30 percent slopes: This soil complex is composed of 50 percent Diablo clay and 45 percent Olivenhain cobbly loam. Diablo clay is derived from sandstone and shale. Olivenhain cobbly loams are derived from old gravelly and cobbly alluvium. It occurs at elevations of 100 to 600 feet AMSL. Both soils are well-drained, have medium to rapid runoff, and a moderate to high erosion hazard.

5.3 BIOLOGICAL RESOURCES

The project area for the North City Presbyterian Church Project is characterized by a mixture of developed and disturbed/ruderal areas on the northern half of the site, and coastal sage scrub, coast live oak woodland, and southern willow riparian forest on the southern half of the site (Figure 7). Each of the vegetation communities, including associated common plant and wildlife species observed or expected to occur within these communities, are described below. A complete list of the flora and fauna recorded during surveys of the site is provided in Appendix B.

USDA, NRCS, digital data derived from SSURGO data, San Diego County 2010.
USGS, NAIP 1m Orthoimagery; San Diego County 2005.

Source: Foothill Associates 2013

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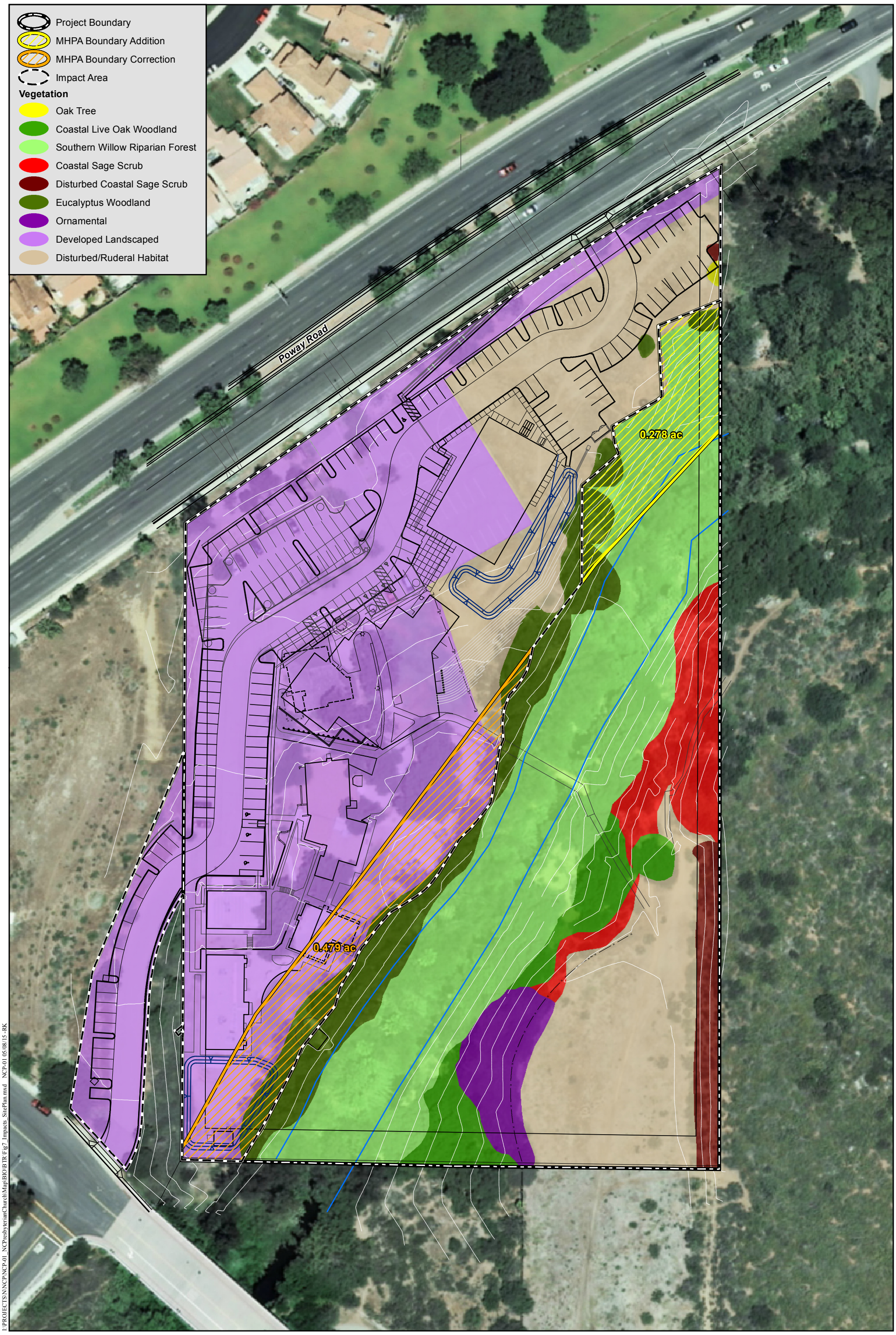
Soils Map

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

Figure 6



Phase I and II Impacts/Site Map

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

N 0 75 Feet

Figure 7

5.3.1 Vegetation Communities

Coast Live Oak Woodland - Tier I

Coast live oak woodland is dominated by coast live oak (*Quercus agrifolia*). There is usually little to no shrub layer in this community. The understory of this community is dominated by non-native annual grasses such as bromes (*Bromus* sp.). Approximately 0.28 acre of coast live oak woodland was mapped in the project area.

Developed/Landscaped

Areas that have been previously developed as buildings, parking lot, and landscape areas are mapped as Developed. The developed areas total approximately 3.23 acres.

Diegan Coastal Sage Scrub - Tier II

Diegan coastal sage scrub is comprised of low, soft-woody subshrubs from ground level to about three feet high, many of which are facultatively drought-deciduous. Dominant shrub species include: California sagebrush (*Artemisia californica*), deerweed (*Lotus scoparius*), flat-top buckwheat (*Eriogonum fasciculatum* ssp. *fasciculatum*), black sage (*Salvia mellifera*), and white sage (*Salvia apiana*). The shrub layer in this community ranges from a continuous canopy and little understory to a more open canopy with widely spaced shrubs and a well-developed understory. Approximately 0.29 acre of coastal sage scrub and approximately 0.13 acre of disturbed coastal sage scrub were mapped in the project area.

Disturbed/Ruderal - Tier IV

Disturbed or ruderal habitats are those areas that have received intense disturbance in the past, such as grading or agricultural use. They are distinguished from non-native grasslands or highly disturbed forms of native habitats by the presence of past physical disturbance and by their species composition, which includes barren areas as well as broad-leaved non-native herbaceous species as opposed to the non-native grasses found in non-native grasslands. Species typical of disturbed/ruderal areas include: horseweed (*Conzya* spp.), garland chrysanthemum (*Chrysanthemum coronarium*), pineapple-weed (*Chamomilla suaveolens*), sow-thistle (*Sonchus* spp.), Russian thistle (*Salsola tragus*), mustards (*Brassica* spp.), knotweed (*Polygonum* spp.), burclover (*Medicago polymorpha*), fennel (*Foeniculum vulgare*), and minor amounts of non-native grasses. Areas mapped as disturbed on the site appear to have undergone past grading and are composed of greater than 50 percent of the types of species noted above. Disturbed/ ruderal habitats on site total 1.61 acres.

Eucalyptus Woodland - Tier IV

Eucalyptus woodland is dominated by an overstory of eucalyptus trees (*Eucalyptus* sp). The shrub layer in this community is typically poorly developed. The understory typically contains ruderal or other weedy, non-native species such as introduced annual grasses. Approximately 0.39 acre of eucalyptus woodland was mapped in the project area.

Ornamental Plantings - Tier IV

Areas mapped as Ornamental plantings on site are areas composed of horticultural or ornamental landscape species and are disconnected spatially from developed and landscaped portions of the site. On this project site, the area mapped as ornamental is dominated by a low growing variety of Acacia that totals approximately 0.16 acre.

Southern Willow Riparian Forest - Wetlands (ESL)

Southern willow riparian forest is dominated by mixed species of willows (*Salix* sp.). The willows can be in the form of trees with shrub understory or composed primarily of shrub habitats. This habitat occurs on terraces of rivers and streams. Characteristic species in this association include: mugwort (*Artemisia douglasiana*), mule fat (Baccharis salicifolia), black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), and sandbar willow (*Salix exigua*). Approximately 1.56 acres of southern willow riparian forest were mapped on the project site.

5.3.2 Wildlife Resources

The primary wildlife habitats on the property include: the shrublands (coastal sage scrub), coast live oak woodland, and willow riparian habitat. Although residential and commercial development does occur on surrounding parcels, the undeveloped portion of the site and surrounding open space areas provide high-quality habitat for wildlife.

Common reptiles species observed during the multiple surveys of the property include western fence lizard (*Sceloporus occidentalis*). Common bird species observed during the multiple surveys of the property include: red-tailed hawk (*Buteo jamaicensis*), western scrub jay (*Aphelocoma coerulescens*), California towhee (*Pipilo crisalis*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaidura macroura*), Anna's hummingbird (*Calypte anna*), bushtit (*Psaltriparus minimus*), house finch (*Carpodacus mexicanus*), and black phoebe (*Sayornis nigricans*). Common mammal species observed during the multiple surveys of the property include desert cottontail (*Sylvilagus audubonii*), and coyote (*Canis latrans*). A complete list of wildlife species observed on the site is provided in Appendix B.

5.4 RARE, THREATENED, ENDANGERED, ENDEMIC, SENSITIVE, AND MSCP-COVERED SPECIES

Special-status species are plant and animal species that have been afforded special recognition by federal, State, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and may require specialized habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

- Listed or proposed for listing under the state or federal Endangered Species Acts;
- Protected under other regulations (e.g., Migratory Bird Treaty Act);
- CDFW Species of Special Concern;

- Listed as species of concern by CNPS or USFWS; or
- Receive consideration during environmental review under CEQA.

Special-status species considered for this analysis were based on queries of the California Natural Diversity Database (CNDDB) for the areas within a five-mile radius of the site, CNPS literature, and field survey results. Figure 8 depicts the locations of special-status species recorded in the CNDDB within 5 miles of the site.

Table 1 includes the common name and scientific name for each species, regulatory status (federal, state, local, CNPS), habitat descriptions, and potential for occurrence on the site. The following set of criteria has been used to determine each species' potential for occurrence on the site:

- Present: Species is known to occur, based on CNDDB records, and/or was observed onsite during the field survey(s).

- May Occur: Species is known to occur on or near the site (based on CNDDB or other records within 5 miles, and/or based on professional expertise specific to the site or species), and there is suitable habitat onsite.

- Not Likely to Occur: Species is known to occur in the vicinity of the site; however, there is poor quality or marginal habitat in the site. Alternatively, there is suitable habitat on the site, however, there are no records within a 5-mile radius and the species was not observed during surveys.

- Absent: Species is not known to occur on or in the vicinity of the site and there is no suitable habitat for the species in the site. -OR- Species was surveyed for during the appropriate season with negative results for species occurrence.

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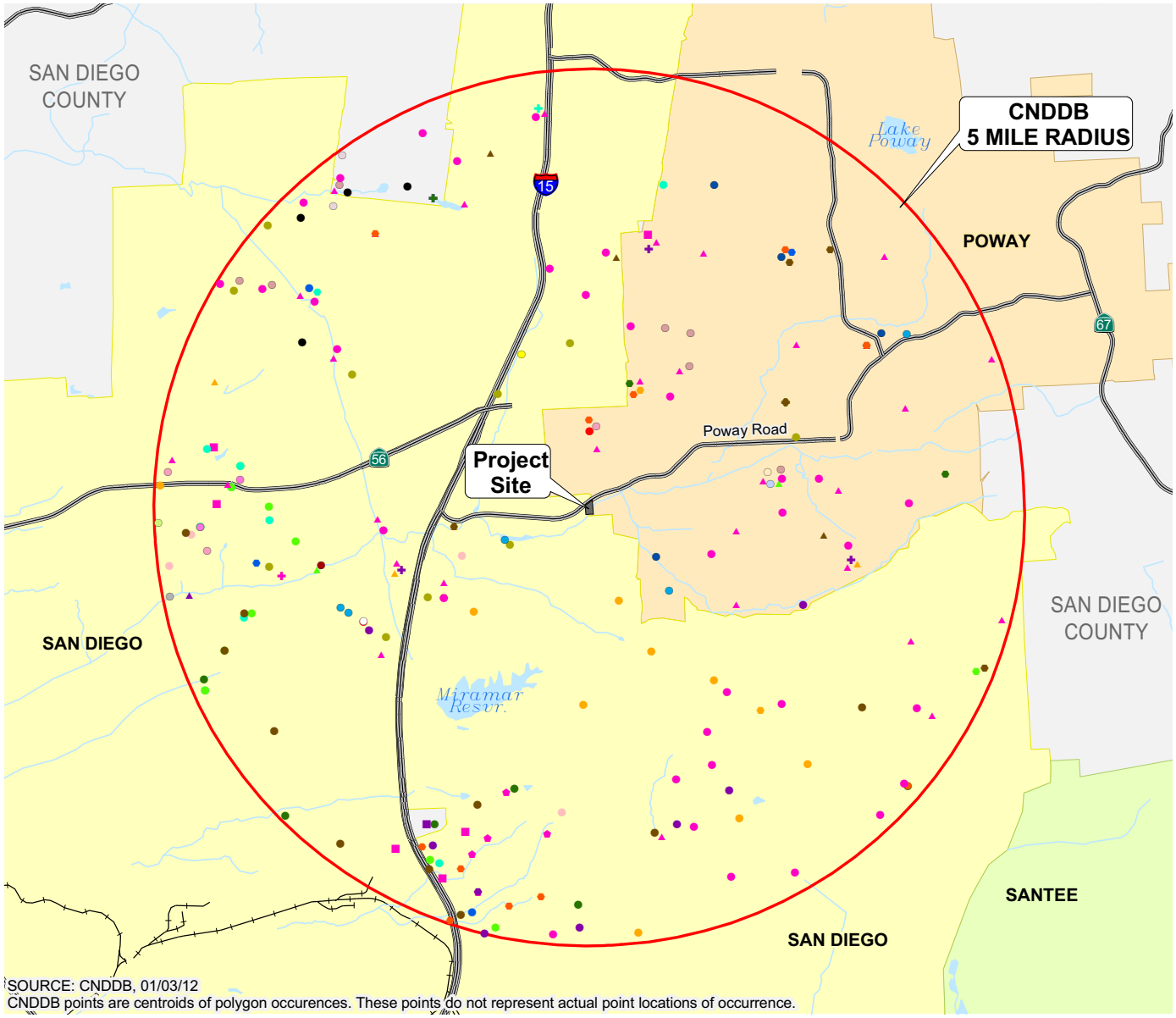

- California Adolphia
- Campbell's Liverwort
- Coulter's Saltbush
- Decumbent Goldenbush
- Del Mar Manzanita
- Del Mar Mesa Sand Aster
- Encinitas Baccharis
- Little Mousetail
- Long-Spined Spineflower
- Nuttall's Scrub Oak
- Orcutt's Brodiaea
- Robinson's Pepper-Grass
- San Diego Ambrosia
- San Diego Barrel Cactus
- San Diego Button-Celery
- San Diego Goldenstar
- San Diego Marsh-Elder
- San Diego Mesa Mint
- San Diego Sagewort
- San Diego Thorn-Mint
- Spreading Navarretia
- Summer Holly
- Thread-Leaved Brodiaea
- Variegated Dudleya
- Willowy Monardella
- Riverside Fairy Shrimp
- San Diego Fairy Shrimp
- Western Spadefoot Toad
- Coast Horned Lizard
- Coastal Whiptail
- Coronado Island Skink
- Orangethroat Whiptail
- Red-Diamond Rattlesnake
- Rosy Boa
- San Diego Ringneck Snake
- Two-Striped Garter Snake
- Coastal Cactus Wren
- Coastal California Gnatcatcher
- Least Bell's Vireo
- Southern California Rufous-Crowned Sparrow
- White-Tailed Kite
- Big Free-Tailed Bat
- Mexican Long-Tongued Bat
- Pocketed Free-Tailed Bat
- San Diego Black-Tailed Jackrabbit
- San Diego Desert Woodrat
- Western Mastiff Bat
- Western Yellow Bat
- Yuma Myotis

Source: Foothill Associates 2013

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CNDDB Map

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

Figure 8

Table 1 SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA OR IN THE VICINITY							
Scientific Name	**Common Name**	**Federal Status**	**State Status**	**CNPS Status**	**MSCP**	**General Habitat**	**Potential for Occurrence**
Amphibians							
Spea (Scaphiopus) hammondi	Western spadefoot toad	Former FSC	CSC			Sandy or gravelly soil in grasslands, open chaparral and pine-oak woodlands, coastal sage scrub; vernal pools or freshwater marshes are essential for breeding.	May Occur
Birds							
Aimophila ruficeps canescens	Southern California rufous-crowned sparrow	None	CSC		X	Coastal sage scrub and sparse mixed chaparral, often in steep or rocky terrain.	May Occur
Campylorhynchus brunneicapillus sandiegoense	Coastal (San Diego) cactus wren	None	CSC		X	Coastal sage scrub usually with abundant cactus patches.	Not Likely to Occur; Coastal sage scrub habitat onsite does not contain suitable cactus patches for this species.
Elanus leucurus	White-tailed kite	None	CSC			Large riparian or upland trees for nesting.	May Occur
Polioptila californica californica	Coastal California gnatcatcher	FT	CSC		X	Coastal sage scrub below 2,500 feet in elevation. Low, coastal sage scrub, in arid washes, on mesas and slopes.	May Occur
Vireo bellii pusillus	Least bell's vireo	FE	CE		X	Willow and mule fat dominated riparian forests and woodlands.	Not likely to occur
Invertebrates							
Branchinecta sandiegonensis	San Diego fairy shrimp	FE	None		X	Vernal pools and seasonal depressions, restricted to mesas and other areas with suitable soils.	Absent; No habitat on the site for this species.
Streptocephalus woottoni	Riverside fairy shrimp	FE	None		X	Vernal pools and seasonal depressions, restricted to mesas and other areas with suitable soils.	Absent; No habitat on the site for this species.

Table 1 (cont.) **SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA OR IN THE VICINITY**							
Scientific Name	**Common Name**	**Federal Status**	**State Status**	**CNPS Status**	**MSCP**	**General Habitat**	**Potential for Occurrence**
Mammals							
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None	CSC			Grasslands, open scrub habitats, disturbed areas, and agricultural fields.	May Occur
Neotoma lepida intermedia	San Diego desert woodrat	None	CSC			Sagebrush scrub, annual grassland, chaparral, and desert scrubs, often with cactus patches, rock outcrops, or rock piles.	May Occur
Various	Pocketed and big free-tailed bat, mexican long-tongued, western mastiff, and Yuma myotis	Former FSC	CSC		X	Found in a variety of habitats in the western U.S. Typically roosts in rock crevices of cliff formations and abandoned buildings.	May Occur; Site does not contain suitable roosting habitat. However, species may forage on site.
Plants							
Acanthomintha ilicifolia	San Diego thorn-mint	FT	CE	1B	X	Openings in chaparral and sage scrub with clay soils.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Adolphia californica	California adolphia	None	None	2		Coastal slopes with sage scrub and/or chaparral below 300 meters.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Ambrosia pumila	San Diego ambrosia	FE	None	1B	X	Floodplains and terraces with open scrub or grassland, including disturbed sites.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Arctostaphylos glandulosa ssp. Crassifolia	Del mar manzanita	FE	None	1B	X	Coastal slopes below 150 meters that support southern maritime chaparral.	Absent; Site does not contain suitable habitat for this species.

Table 1 (cont.) **SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA OR IN THE VICINITY**							
Scientific Name	**Common Name**	**Federal Status**	**State Status**	**CNPS Status**	**MSCP**	**General Habitat**	**Potential for Occurrence**
Plants (cont.)							
Artemisia palmeri	San Diego sagewort	None	None	1B		Riparian	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Atriplex coulteri	Coulter's saltbush	None	None	1B		Dunes in coastal scrub	Absent; Site does not contain suitable habitat
Baccharis vanessae	Encinitas baccharis	FT	CE	1B	X	Low-growing chaparral typically with chamise.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Brodiaea filifolia	Thread-leaved brodiaea	FT	CE	1B	X	Moist grasslands along vernal swales and periphery of vernal pools.	Absent; Site does not contain suitable habitat for this species.
Brodiaea orcuttii	Orcutt's brodiaea	None	None	1B	X	Moist grasslands along vernal swales and periphery of vernal pools.	Absent; Site does not contain suitable habitat for this species.
Chorizanthe polygonoides longispina	Long-spined spineflower	None	None	1B		Sparsely populated clay substrate areas, periphery of vernal pools and vernal seeps.	Absent; Site does not contain suitable habitat for this species.
Comarostaphylis diversifolia ssp. Diversifolia	Summer holly	Former FSC	None	1B		Cismontane foothills below 700 meters in mixed chaparral.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Corethrogyne filaginifolia var. linifolia	Del mar mesa sand aster	None	None	1B	X	Coastal scrub, grasslands, and woodlands.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.

Table 1 (cont.) **SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA OR IN THE VICINITY**							
Scientific Name	**Common Name**	**Federal Status**	**State Status**	**CNPS Status**	**MSCP**	**General Habitat**	**Potential for Occurrence**
Plants (cont.)							
Dudleya variegata	Variegated dudleya	None	None	1B	X	Grasslands with clay soils	Absent; Site does not contain suitable habitat or soils for this species.
Eryngium aristulatum parishii	San Diego button-celery	FE	CE	1B	X	Vernally moist swales and vernal pools.	Absent; Site does not contain suitable habitat for this species.
Ferocactus viridescens	San Diego barrel cactus	Former FSC	None	1B	X	Chaparral, coastal scrub, and grassland with exposed soils, usually south-facing slopes.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Geothallus tuberosus	Campbell's liverwort	None	None	1B		Description of habitat requirements generally lacking; however, species has a patchy distribution throughout Southern California.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Isocoma menziesii var. decumbens	Decumbent goldenbrush	None	None	1B		Sparse chaparral and coastal sage scrub habitats.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results. Common variety found on site.
Iva hayesiana	San Diego marsh-elder	N	None	2		Riparian habitat with sandy or cobbly substrate.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Lepidium virginisum robinsonii	Robinson's pepper-grass	N	None	1B		Inland chaparral and coastal sage scrub on dry soils. 1-945m.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.

Table 1 (cont.) **SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA OR IN THE VICINITY**							
Scientific Name	**Common Name**	**Federal Status**	**State Status**	**CNPS Status**	**MSCP**	**General Habitat**	**Potential for Occurrence**
Plants (cont.)							
Monardella linoides ssp. Viminea	Willowy monardella	FE	CE	1B	X	Riparian scrub, sandy or cobbly floodplains.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Muilla clevelandii	San Diego goldenstar	None	None	1B	X	Vernally moist grasslands, mima mound topography; clay soils.	Absent; Site does not contain suitable habitat for this species.
Myosurus minimus	Little mousetail	Former FSC	None	2	X	Vernal pools	Absent; Site does not contain suitable habitat for this species.
Navarretia fossalis	Spreading navarretia	FT	None	1B	X	Vernal pools and swales	Absent; Site does not contain suitable habitat for this species.
Pogogyne abramsii	San Diego mesa mint	FE	CE	1B	x	Vernal pools and swales	Absent; Site does not contain suitable habitat for this species.
Quercus dumosa	Nuttall's scrub oak	Former FSC	None	1B		Chaparral, coastal scrub with sandy, clay, or loam soils.	Not Likely to Occur; Site was surveyed in 2007 and re-confirmed in 2010 for species with negative results.
Reptiles							
Aspidoscelis hyperythra	Orange-throated whiptail	None	CSC		x	Found in sage scrub and open woodland habitats in southern California.	May Occur
Aspidoscelis tigris stejnegeri	Coastal western whiptail	None	None			Found in sage scrub and open woodland habitats in southern California.	May Occur

Table 1 (cont.) **SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA OR IN THE VICINITY**							
Scientific Name	**Common Name**	**Federal Status**	**State Status**	**CNPS Status**	**MSCP**	**General Habitat**	**Potential for Occurrence**
Reptiles (cont.)							
Crotalus ruber ruber	Red-diamond rattlesnake	None	CSC			Coastal sage scrub and grasslands. Occurs in rocky areas and dense vegetation with rodent burrows, cracks in rocks, or surface cover objects.	Not Likely TO Occur; No suitable burrows or other surface cover for this species and not observed onsite during multiple site visits.
Eumeces skiltonianus interparietalis	Coronado skink	None	CSC			Scrub habitats with leaf litter and sandy substrates.	May Occur
Lichanura (Charina) trivirgata	Rosy boa	None	None			Found in woodland and forests of southern California.	Not Likely to Occur; Habitat on the site is not suitable for this species based on lack of rock outcrops.
Lichanura(Charina) trivirgata roseofusca	Coastal rosy boa	None	None			Scrub habitats with rock outcrops. Once common on the coast, now typically found in inland locations.	Not Likely to Occur; Habitat on the site is not suitable for this species based on lack of rock outcrops.
Phrynosoma coronatum blainvillei	Coast (San Diego) horned lizard	None	CSC			Coastal sage scrub and chaparral.	May Occur
Thamnophis hammondii	Two-striped garter snake	None	CSC			Cismontane habitats. Often seen near water although not necessarily a strictly aquatic species.	May Occur

5.4.1 Special-status Plants

Based on field observations and literature review specific to the special-status plants listed in Table 1, the potential for occurrence has been determined for each species. Several special-status plant species are known to occur in the general vicinity of the site (Figure 8). However, a focused plant survey was conducted on the site in 2007 and 2010 by Foothill Associates. No special-status plant species were found on the site. Therefore, special-status plant species are unlikely to occur on the site.

5.4.2 Special-status Animals

Based on field observations and literature review specific to the special-status animals listed in Table 1, the potential for occurrence has been determined for each species. Several special-status animal species are known to occur in the general vicinity of the site (Figure 8). The following special-status animal species were determined to be "absent" or "not likely to occur" on the project site due to the lack of suitable habitat for these species on the site and are therefore are not given further consideration. These species include: San Diego fairy shrimp (*Branchinecta sandiegonensis*), Riverside fairy shrimp (*Streptocephalus woottoni*), rosy boa (Lichanura (Charina) trivirgata), red diamond rattlesnake (*Crotalus ruber ruber*), coastal rosy boa (*Lichanura* (Charina) *trivirgata roseofusca*), least Bell's vireo (*Vireo bellii pusillus*), and coastal cactus wren (*Campylorhynchus brunneicapillus sandiegoense*).

5.4.3 Species That are Present or May Occur

No special-status wildlife species were found to be present on the site during multiple surveys of the site in 2007 and 2010. However, special-status species that may occur on the site include: western spadefoot toad (*Spea hammondii*), coast (San Diego) horned lizard (*Phrynosoma coronatum blainvillei*), coastal California gnatcatcher (*Polioptila californica californica*), coastal western whiptail (*Aspidoscelis tigris stejnegeri*), Coronado skink (*Eumeces skiltonianus interparietalis*), orange-throated whiptail (*Aspidoscelis hyperythra*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), San Diego woodrat (*Neotoma lepida intermedia*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), two-striped garter snake (*Thamnophis hammondii*), white-tailed kite (*Elanus leucurus*), and various bat species including Mexican long-tongued bat, big and pocketed free- tailed bat, western mastiff, and Yuma myotis.

Coast (San Diego) Horned Lizard

Coast horned lizard is a small lizard species found throughout California. This subspecies is found in arid regions with sparse vegetation on sandy soils. The distribution of this species is likely associated with the presence of the harvester ants, its primary prey item. There are seven records in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). This species was not detected during multiple surveys, but may occur on the project area.

Coastal California Gnatcatcher

Coastal California gnatcatcher is a small songbird that occurs in coastal sage scrub habitat in southern California and Baja California. The species has been eliminated from a majority of its historic range due to loss of habitat. There are several records in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). This species was not detected during multiple surveys, but may occur on the project area.

Coastal Western Whiptail

Coastal western whiptail is a relatively large lizard species associated with coastal sage scrub, chaparral, woodland, and desert habitats. This species is found throughout southern California and northern Baja, California. There is one record in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). The species was not detected during multiple surveys, but may occur on the project area.

Coronado Skink

Coronado skink is a subspecies of the western skink known from San Diego County and Baja, California. It is most commonly found in open areas, sparse brush, and in oak woodlands, usually under rocks, leaf litter, logs, debris or in the shallow burrows it digs. It is most active during the cooler parts of the day during the warm seasons, and inactive in the winter. There are two records in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). This species was not detected during multiple surveys, but may occur on the project area.

Orange-Throated Whiptail

Orange-throated whiptail is a small lizard species strongly associated with coastal sage scrub habitat. This species is found throughout southern California and northern Baja California. There are four records in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). The species was not detected during multiple surveys, but may occur on the project area.

Two-Striped Garter Snake

Two-striped garter snake is known to occur on the southern coast of California and in the Peninsular and Transverse Ranges. It is highly aquatic and rarely found a significant distance from water sources. There is one record in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDD 2012). The species was not detected during multiple surveys, but may occur on the project area.

San Diego Black-Tailed Jackrabbit

San Diego black-tailed jackrabbit is found in cismontane areas of Southern California. It is found in open grasslands, and open shrubland areas. It feeds on annual grasses and other herbaceous plant species. There are three records in the CNDDB for this species within 5 miles of the site

(Figure 8) (CNDDB 2012). The species was not detected during multiple surveys, but may occur on the project area.

San Diego Woodrat

San Diego woodrat is found in a variety of grasslands and shrublands throughout southern California. This species is generally nocturnal and eats a variety of herbs, grasses, and other vegetation. There is one record in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). The species was not detected during multiple surveys, but may occur on the project area.

Southern California Rufous-Crowned Sparrow

Southern California rufous-crowned sparrow is found throughout southern California and Baja California. The species is found in grassland, scrub, and sparse chaparral, typically with steep or rocky terrain. There are two records in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). This species was not detected during multiple surveys, but may occur on the project area.

Special-status Bat Species

Special-status bat species have a potential to occur on the site. Bat species throughout the western U.S. have been in decline due to habitat loss. There are several records in the CNDDB for special-status bat species within 5 miles of the site (Figure 8) (CNDDB 2012). These species were not detected during multiple surveys, but may occur on the project area. Bat species would not be expected to roost on the project site due to lack of suitable roosting habitat.

Western Spadefoot Toad

Western spadefoot toad is found in a variety of habitats throughout California. Upland communities include annual grassland, open woodlands, and shrublands. Seasonal wetlands such as vernal pools or wetland swales are also required for breeding. There are four records in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). The species was not detected during multiple surveys, but may occur on the project area.

White-Tailed Kite

White-ailed kite is widespread over the coastal slope of San Diego County, preferring riparian woodland, oak groves, or sycamore groves adjacent to grassland. There is one record in the CNDDB for this species within 5 miles of the site (Figure 8) (CNDDB 2012). This species was not detected during multiple surveys, but may occur on the project area.

5.5 OTHER SENSITIVE RESOURCES

Other sensitive resources include habitats that are of special concern to resource agencies or those that are protected under CEQA, Section 1600 of the California Fish and Game Code,

and/or Sections 401 and 404 of the Clean Water Act. Other sensitive resources also include wildlife migration corridors that provide for movement for species.

5.5.1 Jurisdictional Resources

A wetland delineation was performed on the site in August 2006 (see Appendix C, which includes a map of delineated features). The delineation found approximately 0.27 acre of perennial drainage and 0.49 acre of riparian wetland that are associated with Los Peñasquitos

Canyon Creek and presumably subject to jurisdiction of the USACE. The wetland delineation for the site has not been verified by the USACE as of the date of preparation of this document.

The site also contains 1.29 acres of southern willow riparian forest, and 0.27 acre of streambed that are subject to the jurisdiction of the CDFW under Section 1600 of the California Fish and Game Code.

Onsite wetlands regulated under the ESL Code cover the same area as those listed above for CDFW (1.29 acres of southern willow riparian forest, and 0.27 acre of streambed); however, because the southern willow riparian forest canopy completely overlaps the streambed, City of San Diego jurisdiction is represented effectively by the extent of the southern willow riparian forest on site. The biology guidelines also require the inclusion of wetland buffers, though no specific distance is required outside of the Coastal Zone. Buffers are intended to provide for the protection of the functions and values of the wetland (Section 6.2 discusses impacts relevant to buffers).

No impacts to features subject to the jurisdiction of the USACE, the CDFW (streambed and southern willow riparian forest), or the City of San Diego (southern willow riparian forest) are expected. Foothill Associates' biologists attempted contact with State and federal agency staff to discuss wetland issues on the site, but no responses have been received to date. No responses were expected given that the project successfully avoids any direct impacts to wetlands and would not require permits from these agencies. No further coordination attempts with the agencies should be needed.

5.5.2 Wildlife Migration Corridors

Wildlife movement zones are important for the movement of migratory wildlife populations. Corridors provide foraging opportunities and shelter during migration. Generally, wildlife movement zones are established to provide migration routes for many species of wildlife. Movement corridors often occur in open areas or riverine habitats that provide a clear route for migration in addition to supporting ample food and water sources during movement.

The riparian corridor on the southern portion of the site is designated as MHPA and could potentially provide a suitable movement corridor for local wildlife species. It connects to a long, continuous MHPA corridor along Los Peñasquitos Creek and to adjacent upland habitats along the corridor. The corridor is closely bordered by residential and commercial development similar to the subject project site along most of its length. Springhurst Street generally marks a change in

width of the riparian corridor, with the corridor upstream of Springhurst Street being narrower than the corridor below it. Though the riparian corridor continues upstream, the project site sits at the boundary between the City of San Diego and the City of Poway. The City of San Diego's MHPA terminates at the northern tip of the property, but continues generally to the east/southeast through upland habitats.

6.0 IMPACTS AND MITIGATION MEASURES

Three types of impacts to biological resources are considered: direct impacts, indirect impacts, and cumulative impacts. Direct impacts are those that directly remove resources in the proposed project area. Indirect impacts result from the effects of the construction or operation of the proposed project on the surrounding resources. Both direct and indirect impacts can be either temporary or permanent. All the projects and activities in a region contribute to the cumulative impact on biological resources for the region.

6.1 DIRECT IMPACTS

The proposed development is planned to occur in two phases. Any areas impacted by Phase Two are also impacted by Phase One are reported as Phase Two impacts only. All such overlaps in impacts occur within existing developed or landscape areas that are being redeveloped by the proposed project.

Permanent direct impacts will result from the development of church buildings, associated parking lots, landscaping, and brush management on the proposed project site. All impacts, including Brush Management Zone 1, are located in disturbed/ruderal and eucalyptus woodland habitats or in developed areas (see Table 2). The site currently contains 3.58 acres within the City's MHPA, where 0.48 acre is being proposed to be removed and 0.28 acre is being added as part of the proposed project's MHPA BLC, with remaining portions being preserved (Figure 7) to provide for consistency with the MSCP subarea plan's preservation goals. Additionally, 0.90 acre of facility area previously approved through the CUP is being removed from consideration for future development east of the creek (Figure 9). The site design, building design, and brush management plan has been designed to avoid all impacts within areas to remain in the MHPA (post-project). The following are design and plan features incorporated into the proposed project to address ESLs and avoid impacts within the remaining portions of the MHPA (post-project).

The development area of the proposed project is designed to encompass the flat portions in the northern half of the site that have been previously disturbed or developed during construction of existing church facilities and has avoided the wetland communities and all native habitats on the site.

Numerous water quality measures have been incorporated into the project to avoid potential indirect impacts to adjacent resources (see Section 6.2 for further discussion).

Section 6.4 provides mitigation measures to be followed during project implementation. Table 2 provides a summary of the impact analysis for the proposed project. The proposed site design and impact analysis for the project is provided in Figure 7.

Table 2
VEGETATION COMMUNITIES IMPACT ANALYSIS FOR THE PROJECT AREA

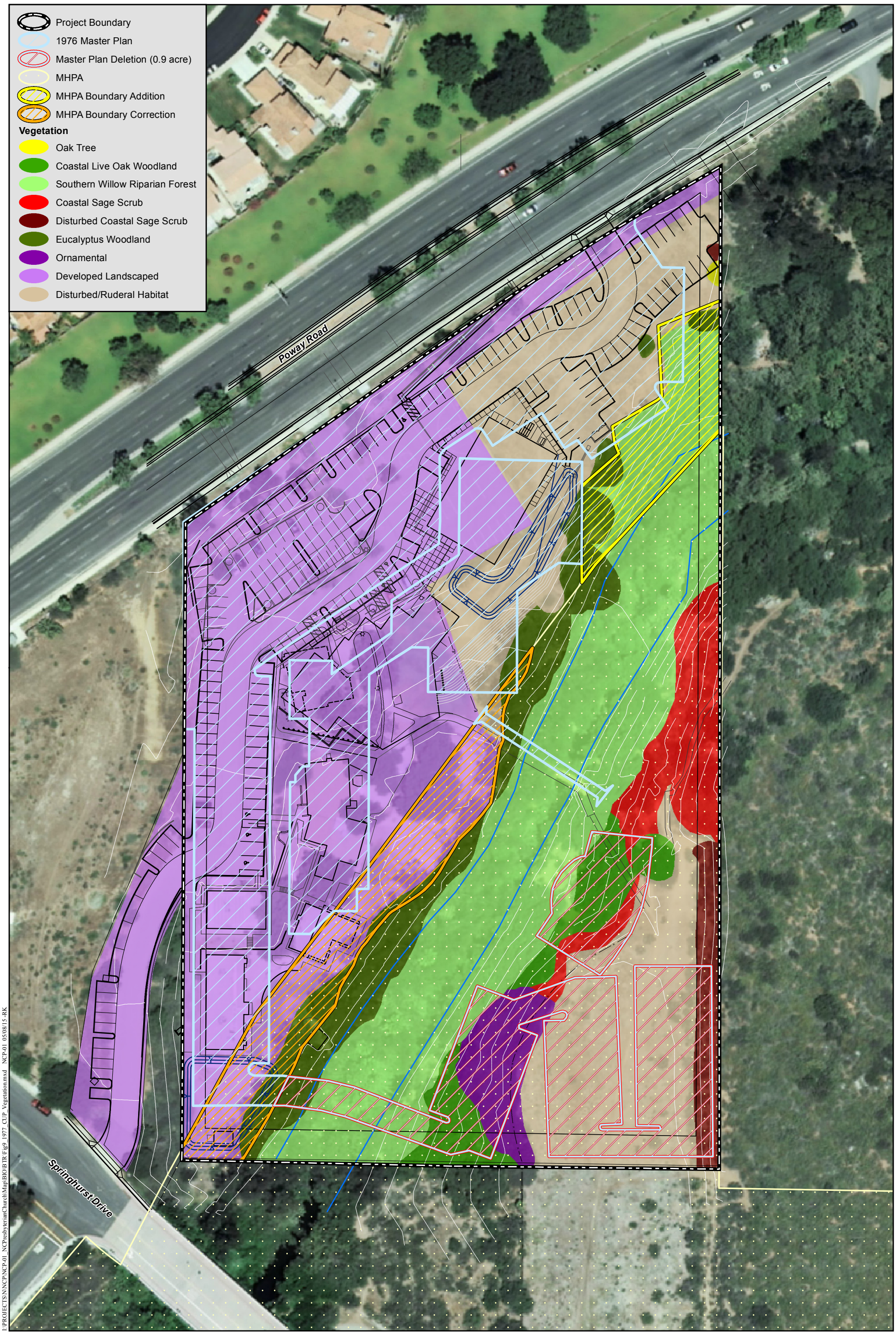
Vegetation Community	Existing Acreage[1]	Habitat Tier	Mitigation Ratio	Phase One Impact Acreage	Phase Two Impact Acreage	BMZ1 Impact Acreage	Total Impact Acreage	Onsite Preservation	Offsite Mitigation
Coastal Sage Scrub	0.29	II	1:1	0.00	0.00	0.00	0.00	0.29	None
Disturbed Coastal Sage Scrub	0.13	II	1:1	0.00	0.00	0.00	0.00	0.13	None
Eucalyptus Woodland	0.39	IV	0:1	0.00	0.00	0.14	0.14	0.39	None
Southern Willow Riparian Forest	1.56		1:1	0.00	0.00	0.0	0.00	1.56	None
Ornamental Plantings	0.16	IV	0:1	0.00	0.00	0.00	0.00	0.16	None
Coast Live Oak Woodland	0.28	I	1:1	0.00	0.00	0.00	0.00	0.28	None
Disturbed/ Ruderal	1.61	IV	0:1	0.49	0.00	0.34	0.83	1.12	None
Developed/ Landscaped	3.23	IV	0:1	1.26	0.80	0.48	2.54	1.17	None
Total	**7.65**			**1.75**	**0.80**	**0.96**	**3.51**	**5.10**	

[1] The total acreage calculation includes the 7.39 acres for the church parcel along with the 0.26-acre driveway at the intersection of Springhurst Street and Sabre Springs Parkway leading into the church.

6.1.1 Vegetation Communities and Other Land Cover

Permanent direct impacts to vegetation communities from both phases of the proposed project total 3.51 acres, which includes 0.83 acre of impacts to disturbed/ ruderal vegetation. The remainder of the impacts (2.68 acres) is to existing developed/landscaped areas and eucalyptus woodland. See Table 2 for the breakdown of impacts.

All of the vegetation communities on the site that would be impacted by either project phase are considered Tier IV communities. Any impacts to these communities would not be considered significant and would not require mitigation.



1977 CUP/Proposed Project/Vegetation

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

N 0 75 Feet

Figure 9

6.1.2 Listed and Special-status Species

No special-status plant species were recorded on the project site during multiple site visits and focused surveys for special-status plants in 2007 and subsequent 2013 follow up biological survey. Impacts to sensitive vegetation communities are avoided by both project phases. Therefore, impacts to special-status plant species are not expected.

The coastal California gnatcatcher has the potential to occur in habitats on the site that will not be directly impacted by the proposed project. Coastal California gnatcatcher is a federally threatened species and is a MSCP covered species (this species is not an MSCP narrow endemic). Impacts to habitats for this species would be limited to indirect impacts and could be potentially significant, but would be mitigated below a level of significance through the implementation of the habitat-based mitigation measures described in Section 6.4, which are consistent with the City of San Diego's Biology Guidelines for mitigation.

Spadefoot toad, orange-throated whiptail, coastal western whiptail, two-striped garter snake, Coronado skink, coast horned lizard, coast patch-nosed snake, Southern California rufous-crowned sparrow, San Diego black-tailed jackrabbit, and San Diego desert woodrat were all special-status animal species with the potential to occur on the property, but were not detected during multiple surveys of the site. Impacts to potential habitat for these species would be considered less than significant and no specific mitigation measures would be required. All other special-status animal species were considered absent or not likely to occur, and no impacts to these species would be anticipated.

The project site provides foraging and nesting habitat for raptors. However, suitable nesting and foraging habitat is not expected to be impacted by the proposed project. A total of 17 trees are proposed to be removed as part of the project that is located within the Developed/Landscaped areas. These trees include the following:

- Three Eucalyptus trees with approximate height of 20 feet for development of the new parking lot entrance;
- Five Eucalyptus trees with approximate height of 30 feet for development of the new Phase Two Worship Building (to be removed after Phase One development and prior to development of the proposed Phase Two Worship Building;
- One Eucalyptus tree with approximate height of 20 feet for development of the new parking lot;
- Two Eucalyptus trees with approximate height of 20 feet for development of the new parking lot;
- Two Olive trees (*Pyrus Kawakamii*) with approximate height of 15 feet for development of the new parking lot;
- Two Eucalyptus trees with approximate height of 20 feet for development of the new parking lot; and

- Two Olive trees with approximate height of 15 feet for development of the new parking lot.

In addition, there are also measures in place to protect existing trees on site during construction that are included in Section 6.4.

There would be a potential for there to be significant indirect noise impact from construction on potential nesting raptors. In order to ensure the avoidance of significant indirect noise impacts to potential nesting raptors in surrounding coast live oaks and eucalyptus trees, mitigation measures would be required as described in Section 6.4.

6.1.3 Other Sensitive Resources

A total of 2.32 acres of potentially jurisdictional wetland features are present on the site (see Wetland Delineation data sheets and map included in Appendix C for more detail). This acreage includes 0.27 acre of perennial drainage, 0.49 acre of riparian wetland, 1.29 acres of southern willow riparian forest, and 0.27 acre of streambed. These features are subject to the jurisdiction of the USACE and/or CDFW and the City of San Diego. While neither phase of the proposed project would have direct impacts on the adjacent wetlands, potential indirect impacts to wetland function should be avoided. Because no direct impacts are proposed to onsite wetlands, no CDFW or USACE requirements exist for the proposed development on site. Abatement of indirect impacts to wetlands is discussed in Section 6.2.8, Wetland Buffers.

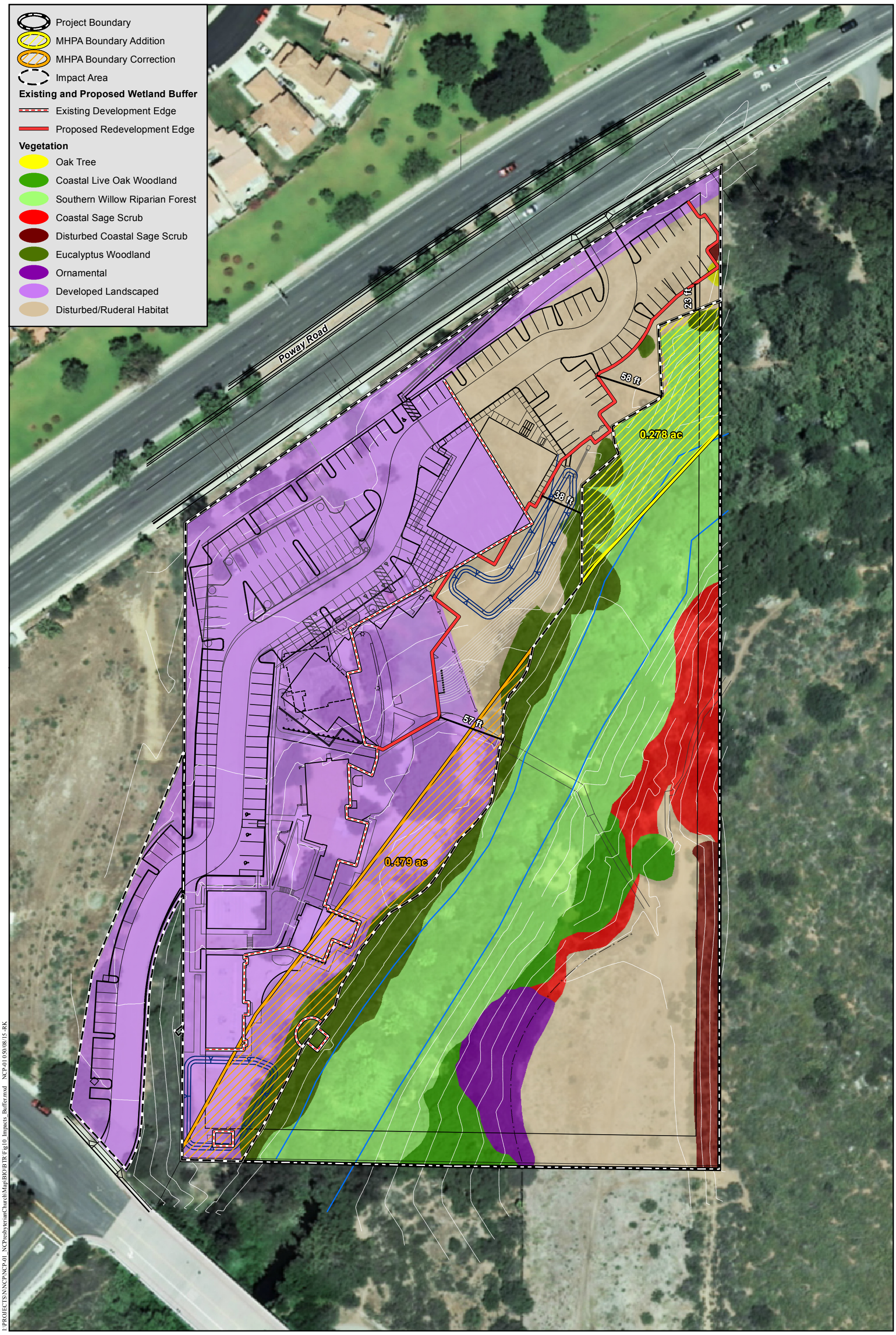
City of San Diego Biology Guidelines do not specify a minimum wetland buffer width for sites outside of the Coastal Overlay Zone, but the intent is to prevent loss of wetland function and value by including buffer zones between wetlands and development. Buffer zones have been shown to protect wetland water quality, aid in stream bank stabilization, provide wildlife habitat, increase food chain productivity, recharge groundwater, and preserve hydrological function.

6.1.3.1 *Existing Buffer*

Existing developed and landscaped areas on the site are buffered from the wetlands by a band of eucalyptus woodland that ranges from 10 to 50 feet wide, with an average width of 38 feet (Figure 10). The existing wetland buffer between paved areas on the northeastern portion of site is composed of a disturbed/ruderal area that is approximately 50-60 feet wide. The extreme northern portion of the property is an undeveloped area composed of disturbed/ruderal vegetation. It provides a buffer between the wetlands and Poway Road of approximately 125 to 150 feet although this area does also get used periodically for overflow parking.

Proposed Buffer

The riparian woodland could potentially be used as a wildlife movement corridor. The proposed project includes a buffer that varies between 5 to 80 feet in width. The proposed Phase One building slightly reduces the width of the existing buffer between Poway Road and the wetlands; however, it leaves a buffer of 45 to 65 feet and it substantially improves the quality of the buffer through planting the area with a drought-tolerant plant palette composed partially of native



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Phase I and II Impacts and Buffer Map

NORTH CITY PRESBYTERIAN CHURCH

HELIX Environmental Planning

N 0 75 Feet

Figure 10

species. The proposed Phase One parking lot on the northeastern portion of the property reduces the existing buffer between Poway Road and the wetlands to a highly variable width ranging from as little as 5 feet to as much as 80 feet. This buffer was approved by the USFWS and CDFW during the MHPA BLC process on August 20, 2013 (Figure 10). While direct impacts to this community are not expected, indirect impacts such as lighting impacts, and temporary noise impacts from construction may result from project implementation during both phases. In order to avoid significant indirect impacts to the wildlife movement corridor, mitigation measures would be required as described in Section 6.4.

6.1.4 Consistency with the MSCP

The southern half of the site contains MHPA; the proposed project includes an MHPA BLC. Based on the analyses provided in these sections, the proposed project is considered to be consistent with the MSCP; however, portions of the existing development on the site are located within the MHPA. Such development includes portions of two of the five existing occupied structures, a small storage shed, a wooden deck, a pedestrian bridge over the creek, and associated sidewalks and turf/play areas between the buildings and the eucalyptus woodland habitat on the north edge of the riparian zone.

The subject site was originally approved for church and school uses in 1977 under CUP 545PC. This included the construction of a sanctuary, multi-purpose building, administration building, classrooms, parking, and amphitheater. Uses were located on both sides of the creek and were to be built out over five phases. Additionally, landscaping for the facilities was also allowed under the CUP. The MHPA boundary line was placed on the property after approval of the CUP over these approved uses. Additionally, a kitchen addition was permitted to an existing facility in 1986, with the MHPA being placed over this existing structure when the MSCP was subsequently approved.

Church and school-related uses continued until North City Presbyterian Church purchased the property from Pacific Southwest Conference of Evangelical Covenant Church (formerly Calvary Covenant Church on the original CUP) in 1998.

The day care facility is a permitted existing use under the CUP that is currently permitted to provide care for up to 77 children. State law mandates that there must be at least 75 square feet of outside play area for each child, which would mean that there would need to be a minimum of 5,775 square feet of outside play space. This is also part of the legally permitted uses on the property and occurs largely within the BLC.

As noted above, existing church and preschool related uses occur within the current limits of the MHPA including an existing kitchen facility, shed, pre-school playground, and grass and landscaped areas. All of these uses were allowed under the original CUP. A BLC to the MHPA is proposed that would eliminate those portions of the site that support existing church and preschool related uses, while insuring that the biological value of the MHPA is not compromised by the BLC. It appears that the BLC is simply correcting a registration error where the southern portion of the MHPA should have been shifted slightly to the east while the northern portion of the MHPA should have been shifted slightly west as is being proposed by the BLC. As mapped

on Figure 10, the BLC would result in a decrease in MHPA acreage on the site of 0.48 acre, all of which was developed or landscaped area at the time of the original MHPA adoption and would add 0.28 acre of riparian vegetation to the MHPA.

In order for a BLC to be made as part of the proposed project, per the MSCP, a comparison of biological value will be based on the following factors:

- Effects on significantly and sufficiently conserved habitats (i.e., the exchange maintains or improves the conservation, configuration, or status of significantly or sufficiently conserved habitats as defined in Section 4.2.4 of the MSCP);
- Effects to covered species (i.e., the exchange maintains or increased the conservation of covered species);
- Effects of habitat linkages and function of preserve areas (i.e., the exchange maintains or improves a habitat linkage or wildlife corridor);
- Effects on preserve configuration and management (i.e., the exchange results in similar or improved management efficiency and/or protection for biological resources);
- Effects on ecotones or other conditions affecting species diversity (i.e., the exchange maintains topographic and structural diversity and habitat interfaces of the preserve); and/or
- Effects of species of concern not on the covered species list (i.e., the exchange does not significantly increase the likelihood that an uncovered species will meet the criteria for listing under the federal or State ESA).

To offset the loss of 0.48 acre of MHPA, the applicant is adding 0.27 acre to the MHPA in the northern portion of the site (MHPA Addition) and eliminating existing allowable uses in the MHPA totaling 0.90 acre (Master Plan Deletion). Table 3 summarizes the habitat types within the three areas.

Table 3
MHPA CORRECTION AND ADDITION ACREAGES

Habitat Type	Boundary Correction	MHPA Addition	Master Plan Deletion	Change
Southern willow riparian forest	-0.00	0.21	0.09	+0.30
Coast live oak woodland	-0.00	0.01	0.15	+0.16
Diegan coastal sage scrub	-0.00	0.00	0.09	+0.09
Eucalyptus woodland	-0.10	0.04	0.02	-0.04
Disturbed/Ruderal	-0.01	0.01	0.42	+0.42
Ornamental	-0.00	0.00	0.13	+0.13
Developed/Landscape	-0.37	0.00	0.00	-0.37
Total	**-0.48**	**0.27**	**0.90**	**+0.69**

As Table 3 shows, there will be a net increase of 0.69 acre of effective MHPA area when the Master Plan Deletion area is included. This includes 0.30 acre southern willow riparian forest, 0.16 acre of coast live oak woodland, and 0.09 acre of Diegan coastal sage scrub in the MHPA, which will provide for an overall increase in biological functions and values of the MHPA. It should also be noted that the disturbed/ruderal habitat in the Master Plan Deletion area is reverting to Diegan coastal sage scrub.

Based on the above, the BLC is appropriate because:

1) The proposed area to be corrected consists of uses that were legally permitted prior to implementation of the MSCP and have been used continuously since initial permitting in 1977. This is confirmed by the 1977 CUP approval, the 1986 approval of the kitchen addition, the existing ongoing use of the childcare facility, and 1989 historic aerial photograph.

2) No habitat, including wetlands, will be removed. The correction area consists entirely of non-native vegetation or existing oak trees that are a part of the existing use areas that do not constitute a native habitat type. The correction also includes the removal of 0.90 acre of allowed uses under the approved CUP. The Boundary Correction will in fact increase southern willow riparian forest within the MHPA by 0.30 acre, and eliminate potential future uses within 0.16 acre of coast live oak woodland and 0.09 acre of Diegan coastal sage scrub within the MHPA, resulting in a net increase in overall biological functions and values of the MHPA.

3) No buffer area would be impacted for the existing use areas. The existing uses have been in place since the late 1970's and the BLC would not result in any changes in buffer functions over what currently is provided by existing uses.

4) The removal of the area from the MHPA would not avert the applicant from having to otherwise comply with the City's MSCP Land Use Adjacency Guidelines. The area being removed from the MHPA occurs adjacent to existing uses that are not required to meet adjacency guidelines. New uses proposed would be required to comply with adjacency guidelines. No changes are proposed adjacent to the BLC that would impact adjacency issues.

Therefore, the project has been designed to completely avoid impacts within the remaining portions of the MHPA area (post-project) and is in compliance with MSCP guidelines and the City of San Diego Biology Guidelines. The BLC was approved by the USFWS and CDFW on August 20, 2013. Section 6.2 provides an analysis of potential indirect effects and MHPA land use adjacency issues.

6.2 INDIRECT IMPACTS / MHPA LAND USE ADJACENCY GUIDELINES

Indirect impacts of the project would potentially include temporary construction-related noise, temporary construction-related erosion and sedimentation, permanent human presence, permanent lighting impacts, permanent increase in stormwater and nuisance runoff, and the

introduction of invasive species. These indirect effects have been evaluated to determine their potential to affect adjacent MHPA resources. Wetland buffers are also discussed in this section.

6.2.1 Noise

Temporary noise pollution from the building and parking lot construction could have indirect impacts on diurnal wildlife. No impacts to nocturnal wildlife are anticipated as construction is scheduled for daytime hours only. Wildlife species that depend on communication to find mating partners, like avian or amphibian species, could have decreased reproductive rates as a population. Such special status species that "may occur" onsite are: nesting raptors, southern California rufous-crowned sparrow, coastal California gnatcatchers, and white- tailed kite.

Temporary construction noise pollution impacts to nesting raptors, and special status avian species in the vicinity of the project would be considered significant, but would be mitigated to below a level of significance by implementation of noise mitigation measures included in Section 6.4.

Due to the relatively small project site, limited change in the land use proposed on the site, proposed uses, and the placement of the backs of the buildings against the buffer, long-term noise impacts are expected to be limited and insignificant. A noise analysis was recently completed for the project (March 2012) that includes a discussion of both the construction and operation related impacts and mitigation measures to avoid impacts.

6.2.2 Human Presence / Access

The site currently has development that is similar in scope to the proposed development. Existing uses that predate the MSCP and are within the existing MHPA, as currently mapped, include portions of buildings, a wooden deck, turf/play areas, and a pedestrian bridge over the creek. An MHPA BLC is proposed as part of the project to adjust the MHPA around these features, as noted in Section 6.1.4. There is no change proposed that would increase the types of activities or access provided in the MHPA or wetland areas. Existing fencing separates existing and proposed centers of activity on the site from the MHPA and wetland area. Expansion of the uses on the project site is limited to indoor uses within proposed buildings and reconfigured parking areas. No significant permanent increase in human presence is anticipated from the project and no mitigation measures are proposed. No new impacts to the potential for wildlife use of the creek corridor are expected.

6.2.3 Lighting

Artificial lighting can have negative impacts on wildlife, including disorientation, changes in seasonal or daily biological cycles, or lethal attraction. For this project site, special status species that could be most impacted by artificial lighting are the nocturnal species, such as the special status bats, San Diego woodrat, and western spadefoot toad. Artificial lighting can make bats and rats more visible to prey, while the western spadefoot toad has been witnessed to migrate away from areas with artificial lighting (Buchanan 1993). Though none of these species have been seen on-site, they "may occur" due to appropriate on-site habitat.

In the proposed parking lot, no change in the frequency or intensity of night-time lighting is anticipated. Night-time parking is expected to occur at the current levels. The site of the new parking lot has historically been used as overflow parking when needed, so no new significant impacts from night time parking are anticipated. A 25 percent gradient slope located between the proposed parking lot and wetland areas will prevent headlights from shining directly into the protected habitat. The landscape plan has also included installation of shrub species along the East side of the proposed parking lot to block additional light from headlights. No night-time construction is planned.

Due to the sensitivity of onsite MHPA resources, exterior lighting may also have the potential to affect wildlife in this area. Mitigation measures defined in Section 6.4, including shielding of lights and directing lights away from the MHPA, would be implemented to avoid the potential for significant impacts from exterior lighting.

6.2.4 Landscaping

The project site has existing developed areas and ornamental plantings. The Landscape Development Plan (Appendix D) proposes changes and additions to the landscape area on the project site.

Potential impacts of landscaping on the adjacent MHPA parcel are reduced by the invasive plant and brush management requirements. The Landscape and Brush Management Plans specify that all existing invasive plant species, including the vegetative parts and root systems, shall be completely removed from the premises when the combination of species, type, location, and surrounding environmental conditions provides a means for the species to invade areas of native plant material that are on or off of the premises. The Landscape Development Plan also specifies that all landscaping shall consist of non-invasive plant species. They also specify special planting strategies within 100 feet of the Corrected MHPA boundary. Therefore, no impacts from non-native plant species are expected.

6.2.5 Grading

Manufactured slopes from developments proposed adjacent to the MHPA can have the potential to encroach inside of MHPA boundaries. The proposed development for this site contains all cut and fill slopes to areas outside of the Corrected MHPA. Therefore, no grading impacts are expected to occur within the Corrected MHPA area.

6.2.6 Drainage

The proposed project is located adjacent to the MHPA onsite; therefore, water quality and storm water management are important indirect impacts to consider for the proposed project. Site surface drainage currently drains into the perennial drainage (Los Peñasquitos Canyon Creek) on the southern portion of the site. Below is a discussion of the potential temporary (i.e., construction) and long-term water quality effects of the proposed project.

Temporary erosion and sedimentation are typical concerns for projects that involve grading and other ground disturbance activities. Erosion of exposed soils can cause sedimentation into adjacent areas outside of the project site. These effects depend on the size of the project, the topography of the area, and the control measures employed. The proposed project site will disturb approximately 1.05 acres of non-developed land (within disturbed habitats) and approximately 3.20 acres of developed land. Slopes are primarily flat in developed area, with small areas of moderate slopes proposed. The area adjacent to the proposed construction is a natural drainage designated as MHPA. Temporary construction-related erosion and sedimentation will be avoided by the implementation of the measures described in the Stormwater Management Plan. These measures, which include silt fencing, straw wattles, sand bags, filtered inlets, stabilized construction entrance, and similar BMPs are summarized in Section 6.4 and are expected to successfully avoid significant impacts during construction-phase activity.

Based on the Stormwater Management Plan for the proposed project, the proposed project would not result in an increase in permanent stormwater runoff generated from the site. The project has employed site design, source control, and treatment BMPs to reduce any potential effects of the project on water quality. Runoff is directed through the site's BMPs before discharging into the creek. The proposed new parking lot includes a filtration basin to treat runoff prior to releasing it through an underdrain structure. The proposed landscape near the MHPA has been designed with a drought-tolerant and primarily native plant palette that will minimize the generation of nuisance runoff and the need for pesticide use. Implementation of the measures described here, and in Section 7.4, and in the Stormwater Management Plan for the project would ensure that the potential water quality impacts are less than significant on adjacent resources, including adjacent MHPA areas.

6.2.7 Brush Management

Brush management activities can potentially impact habitat and travel corridor functions within the MHPA when development is proposed in close proximity. These impacts could include removal of plants that serve as important habitat area or travel corridor functions. The proposed development for this site includes a Brush Management Plan (Appendix E) designed to avoid impacts from brush management activities within the Corrected MHPA areas.

Two brush management zones have been established to prevent impacts to MHPA habitat. Several measures have been defined in the brush management plan to avoid Zone 1 impacts within the Corrected MHPA and area included in Section 6.4. With implementation of these measures, and the recognition that Brush Management Zone 2 is impact neutral, no impacts from brush management zones will occur within the MHPA. No brush management activities will be conducted in the wetland, southern willow riparian forest, and streambed habitats. Additionally, all ongoing brush management activities following completion of the project shall adhere to the Brush Management Plan.

6.2.8 Wetland Buffers

City of San Diego Biology Guidelines do not specify a minimum wetland buffer width for sites outside of the Coastal Overlay Zone, but the intent is to prevent loss of wetland function and

value by including buffer zones between wetlands and development. Buffer zones have been shown to protect wetland water quality, aid in streambank stabilization, provide wildlife habitat, increase food chain productivity, recharge groundwater, and preserve hydrological function.

6.2.8.1 *Existing Buffer*

Existing developed and landscaped areas on the site are buffered from the wetlands by a band of eucalyptus woodland that ranges from 10 to 50 feet wide, with an average width of 38 feet (Figure 10). The existing wetland buffer between paved areas on the northeastern portion of site is composed of a disturbed/ruderal area that is approximately 50-60 feet wide. The extreme northern portion of the property is an undeveloped area composed of disturbed/ruderal vegetation. It provides a buffer between the wetlands and Poway Road of approximately 125 to 150 feet. The eucalyptus woodland is an ideal buffer habitat for water quality and hydrology preservation as trees uptake much larger quantities of water than ruderal herbaceous vegetation.

6.2.8.2 *Proposed Buffer*

The proposed project does not reduce the buffer width or character in the eucalyptus woodland area of the site. The proposed Phase One building slightly reduces the width of the existing buffer between Poway Road and the wetlands; however, it leaves a buffer of 45 to 65 feet and it substantially improves the quality of the buffer through planting the area with a drought-tolerant plant palette composed partially of native species. The proposed Phase One parking lot on the northeastern portion of the property reduces the existing buffer between Poway Road and the wetlands to a highly variable width ranging from as little as 5 feet to as much as 80 feet. The reduction in upland buffer would decrease ruderal habitat that is characterized by a lack of vegetation, is dominated by non-native plant species, and is regularly mowed. A discussion of potential impacts to wetland values and functions of ruderal upland habitat loss is included in the following section.

6.2.8.3 *Preserving Wetland Values and Functions*

Potential impacts to the following wetland functions and values will be discussed below: wetland water quality, streambank stabilization, wildlife habitat, food chain productivity, groundwater recharge, and hydrological function.

<u>Wetland Water Quality</u>

From a water quality function and value perspective, the reduced buffers are likely to be at least as effective as existing buffers, due to increased plantings along Poway Road (Appendix D). Initial vegetation was mowed ruderal grass with exposed gravel in some areas. Planting of drought tolerant species will enhance water quality. Additionally, wetland water quality will be preserved through compliance with the Stormwater Management Plan during construction and through operation of the parking lot. A small storm water detention basin will be constructed at the base of the Phase One building as depicted on the Landscape Development Plan (Appendix D).

Currently, the proposed parking lot is used as overflow parking during well attended church masses (Christmas and Easter). Any oil or gas leakages from cars currently have no barrier to prevent pollution of the adjacent wetlands. With the stormwater improvements of the detention basin and storm water management plan, water quality of the adjacent wetlands will be improved.

Streambank Stabilization

It is not anticipated that the reduced buffer lengths will have any impact on the streambank stabilization potential of the adjacent wetlands. Due to the slow-flowing nature of wetlands, sedimentation is much higher as compared with the adjacent stream or river, which in turn, helps stabilize the watershed and prevent bank erosion. As no wetland losses are anticipated, sediment retention by wetlands in the watershed should remain stable.

Provide Wildlife Habitat

Impacts to wildlife from the buffer reduction would be minimal as the disturbed/ruderal areas are poor habitat. Because the area is regularly mowed, it provides no herbaceous cover for small prey species, and thus is inadequate habitat. No burrows have been seen in the disturbed areas which signify it is not appropriate habitat for snakes or small mammals. Furthermore, the soil is compacted from occasional overflow parking and would be unsuitable for burrowing species.

Only one special status species that May Occur on the site is dependent on wetlands and may be affected by the reduction of upland transitional habitat: the western spadefoot toad. While this species has been observed onsite, it is important to assess potential impacts caused by wetland buffer reduction.

The western spadefoot toad requires wetland habitat for breeding, although it is a predominately terrestrial species. They spend most of the year in burrows as deep as 0.9 meter, emerging during winter and spring rains (Ruibal et al. 1969). Given the amount of soil necessary for the toads to burrow and the high degree of erosion and bedrock exposure along the southern willow riparian habitat, it is unlikely that the species inhabits the wetland area adjacent to the buffer reduction. However, even if they were present, the southern willow riparian forest adjacent to the proposed parking lot construction has a 43 percent gradient, making the upland transitional area inaccessible to toads.

The least bell’s vireo nests primarily in willows along riparian and adjoining upland habitats (USFWS 1994). They are insectivores, obtaining prey primarily by foliage gleaning (picking prey from leaf or bark substrates). They prefer foraging between 3 to 6 meters in height (Miner 1989) and therefore would not likely use the mowed, ruderal area to forage. A nesting survey is recommended in Section 6.4, Mitigation Measures, to prevent impacts to any nesting birds. Wetland buffer reduction impacts are not anticipated for the Western spadefoot toad or least bell’s vireo.

Food Chain Productivity

There is very little data concerning the food chain productivity of ruderal upland habitat. Ruderal habitats are often characterized as disturbed landscapes. In this case, because the area is regularly mowed, it would dissuade colonization of rodents, insects, and other low trophic level species. It is not anticipated that the loss of ruderal habitat will affect the food chain of the adjacent wetland.

Recharge Groundwater

It is known that wetlands recharge groundwater, especially in areas with permeable soil and shallow aquifers, particularly in the prairie pothole region of the United States. When wetlands are converted into alternate land uses, this function is lost (Winter 1995). However, as this project is not converting wetlands, but is only reducing the upland buffer, no changes to groundwater recharge are anticipated.

Preserve Hydrological Function

Conversion of ruderal habitat to pavement often increases hydraulic loading through sheet flow during storm events. However, this project is implementing a series of protective measures to prevent this negative consequence. (1) A storm water detention basin is being installed to catch drainage from the parking lot and roof runoff from Building B; (2) drought tolerant species are being planted along the roadway to improve stormwater fluxes from Poway Road; and (3) Parking lot curbs are being installed to catch and direct water appropriately during storm events.

6.2.9 Summary

Substantial effort has been applied to identifying a site layout that maximizes wetland buffer width while also complying with all development regulations. Though sustained buffer acreage in this area would be preferable from a biological perspective, the improved buffer acreage remaining from the proposed design leave the site with equal buffer value. Also, a minimum buffer of 5 feet has been instated from previous review and feedback from the city and discussion with various environmental agencies.

6.3 CUMULATIVE IMPACTS

The proposed project would not significantly contribute to the cumulative loss of biological resources in the region. The proposed project would involve the development of church structures on a site with existing development and is consistent with current land uses. The proposed project is consistent with regional conservation planning efforts. The proposed project would be implemented consistent with the MSCP, which is designed to address the cumulative effects of projects on biological resources in the City of San Diego. Therefore, the proposed project is not anticipated to result in cumulative impacts to biological resources.

6.4 MITIGATION MEASURES

- Prior to the initiation of any site clearing or construction activities on the project site, the limits of work shall be accurately surveyed and fenced. Prior to the initiation of site clearing or construction activities, the contractor shall provide proof to the City of San Diego that the limits of work have been accurately established on the site.

- If possible, the project proponent shall avoid vegetation clearing, grading, or construction during the nesting seasons of the California gnatcatcher (March 1 through August 15) and raptors (February 1 through September 15). If work is to be conducted during these breeding seasons, pre-construction surveys for each species shall be conducted by a qualified biologist prior to the initiation of any construction activities. If no California gnatcatcher or raptors are found, no further mitigation measures are necessary for these species. However, if these species are found to be present on site, or if surveys are not completed, the following mitigation measures shall be implemented:

  - No grading or vegetation removal within occupied habitats shall occur if active nests are found. Grading may resume when the biologist confirms that the young have fledged;

  - Noise mitigation measures shall be implemented at the direction of the biologist as follows:

    - Between March 1 and August 15, no construction activities shall occur within any portion of the site where construction activities would result in noise levels exceeding 60 dBA hourly average at the edge of occupied gnatcatcher habitat. An analysis showing that noise generated by construction activities would not exceed 60 dBA hourly average at the edge of occupied habitat must be completed by a qualified acoustician (possessing current noise engineer license or registration with monitoring noise level experience with listed animal species) and approved by the city manager at least two weeks prior to the commencement of construction activities. Prior to the commencement of construction activities during the breeding season, areas restricted from such activities shall be staked or fenced under the supervision of a qualified biologist; <u>or</u>

    - At least two weeks prior to the commencement of construction activities, under the direction of a qualified acoustician, noise attenuation measures (e.g., berms, walls) shall be implemented to ensure that noise levels resulting from construction activities will not exceed 60 dBA hourly average at the edge of habitat occupied by the coastal California gnatcatcher. Concurrent with the commencement of construction activities and the construction of necessary noise attenuation facilities, noise monitoring shall be conducted at the edge of the occupied habitat area to ensure that noise levels do not exceed 60 dBA hourly average. If the noise attenuation techniques implemented are determined to be inadequate by the qualified acoustician or biologist, then the associated construction activities shall cease until such time that adequate noise attenuation is achieved or until the end of the breeding season (August 16). Construction noise monitoring shall continue

to be monitored at least twice weekly on varying days, or more frequently depending on the construction activity, to verify that noise levels at the edge of occupied habitat are maintained below 60 dBA hourly average or to the ambient noise level if it already exceeds 60 dBA hourly average. If not, other measures shall be implemented in consultation with the biologist and the City Manager, as necessary, to reduce noise levels to below 60 dBA hourly average or to the ambient noise level if it already exceeds 60 dBA hourly average. Such measures may include, but are not limited to, limitations on the placement of construction equipment and the simultaneous use of equipment.

- Construction Activities, including the arrival and departure of trucks, should occur during daytime hours;
- Construction equipment utilizing internal combustion engines shall be muffled with the equipment manufactures muffler or with one providing similar sound suppression;
- Construction staging areas should be located as far as practical from the sensitive biological area to the south; and
- Temporary barriers or suspension of mobile acoustical curtains should be utilized to provide screening of the sensitive biological area during construction activities which are determined to exceed the 75 dB L_{EQ} criteria.
- The biologist shall monitor bird activity during construction and shall adjust noise mitigation measures as necessary to avoid disturbance to nesting birds; and
- The biologist shall submit to the City a brief survey letter report to document the results of surveys, any grading or noise mitigation measures implemented, and the effectiveness of the measures on protecting birds from impacts.

- In order to prevent indirect impacts to the MHPA from invasive plant species, the proposed Landscape Development Plans avoid the use of invasive-exotic plant species, and instead use a substantially native plant palette. In addition, all existing invasive plant species, including vegetative parts and root systems, shall be completely removed from the premises when the combination of species, type, location and surrounding environment conditions provides a means for the species to invade other area of native plant material that are on or off of the site.

- All access, construction staging, and temporary construction impacts shall be confined within the limits of work or areas designated as disturbed/ruderal areas.

- Industry standard BMPs shall be used to avoid construction phase erosion on the project site and adjacent areas. Practices that would be employed during construction, as described in the Stormwater Management Plan include: gravel bag berms, sandbag barriers, entrance entrance/exits wash, stockpile management, concrete waste management, erosion control mats, scheduling, solid waste storage areas, spill prevention control, and hazardous waste management.

- Industry standard BMPs shall be employed to prevent, capture, and/or treat stormwater and nuisance runoff generated from the site, as specified in the Stormwater Management Plan. Design measures included to accomplish this include: maximizing pervious surfaces, conservation of natural areas onsite, minimizing connected impervious areas, maximizing water conservation, and vegetation of slopes with native and drought tolerant plant species. Source control measures to be included in the project include: reduction of pesticide use, distribution of Integrate Pest Management educational materials, efficient landscape and irrigation design, and storm water conveyance system signage/stenciling. Treatment control measures to be employed by the project include: grass swales and hydro cartridge drainage inserts.

- All personnel and supervisors involved in the construction effort shall take part in a contractor training to be briefed on the sensitivity of the adjacent biological resources prior to the start of construction.

- In order to avoid impacts from implementation of the Brush Management Plan, brush management shall be implemented consistent with the page 3 of the Landscape Development Plan for the project.

- In order to avoid lighting impacts to adjacent resources, all exterior building lighting and any temporary construction lighting shall be shielded and directed away from preserved open space areas and the MHPA.

- Though no mitigation for direct impacts to native biological habitats is necessary, the portion of the site included in the MHPA (after addressing the necessary Boundary Correction) shall be placed in a covenant of easement to protect it in perpetuity and to mitigate against the potential for unauthorized uses that may impact the habitat or wildlife corridor functions of the MHPA. The covenant of easement shall define allowable uses, unallowable uses, and management and monitoring activities to be conducted on site (i.e., weed control, fencing, erosion control, habitat improvements, repair of unauthorized impacts, etc.).

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Appendix A

PREPARER QUALIFICATIONS

Appendix A – Preparer Qualifications

Field Surveys

Original field surveys and preparation of the biological technical report were conducted by Mike Howard and Tom Ryan, who are no longer employed by Foothill Associates and are unavailable to make required revisions to the report. Their qualifications are included below:

Mike Howard, formally with Foothill Associates, has a strong background in ecological systems and environmental science and management. Mr. Howard has Bachelor of Science degrees in both Environmental Studies and Ecology, as well as, a Masters Degree in Applied Ecology from the University of California, Santa Barbara. He has a strong understanding of science and regulatory compliance issues. Mr. Howard has experience in a variety of technical areas including flora and fauna inventories, wetland science and delineation, regulatory compliance and permitting, habitat conservation planning, and endangered species management.
Mr. Howard has conducted a variety of biological surveys throughout southern California, including general biological inventories, vegetation community mapping, focused rare plant surveys, vernal pool flora and fauna surveys, burrowing owl surveys, California gnatcatcher surveys, and nesting bird surveys. Mr. Howard has completed the U.S. Army Corps of Engineers Wetland Delineation and Management Training and has been conducting wetland delineations in northern and southern California for over eight years. Additionally, he has extensive regulatory compliance experience in Section 401 and 404 of the Clean Water Act, Section 1600 of the California Fish and Game Code, and Section 7 of the federal Endangered Species Act. He has managed numerous regional, sub regional, and subarea habitat conservation plans in San Diego County, working with multiple stakeholders to solve difficult issues.

Tom Ryan, formally with Foothill Associates, is a wildlife biologist and avian ecologist with a strong scientific and regulatory background. He holds a Bachelor of Science degree in Biology from California State Polytechnic University, Pomona and a Master of Science degree in Biology from California State University, Long Beach. He has written and participated in a variety of biological resource assessments throughout southern California, including Biotic Constraints Analyses, Initial Studies, Biological Assessments, Natural Environment Studies, Mitigation and Monitoring Plans, and Environmental Impact Reports/Statements. He has prepared both emergency and regular Streambed Alteration Agreements and Army Corps Nationwide Permits. Mr. Ryan has experience with Threatened and Endangered species including California red-legged frog, western snowy plover, California least tern, California clapper rail, least Bell's vireo, California gnatcatcher, and southwestern willow flycatcher. He is familiar with a variety of techniques used in wildlife surveys including point counts, area searches, terrestrial belt transects, pelagic surveys, nest searches, mark and recapture, mist netting, radio telemetry, and studies of wildlife productivity. He specializes in nesting bird issues and studying avian use of local wetland, riparian and urban environments.

Report Revisions

Revisions to the biological technical report have been completed by, David Bise, Meredith Branstad, Sara Nedrich, Kevin Derby, Brian Mayerle, ,and Dick Rol. Qualifications

are included below. David Bise, Kevin Derby, Brian Mayerle, and Dick Rol are no longer employed by Foothill Associates.

David Bise, formally with Foothill Associates, holds a Bachelor of Science degree in Zoology from the University of California, Davis as well as a Master of Science degree in Wildlife Management from the University of California, Berkeley. His specialties include biological assessments, special-status species surveys, constraints analysis and regulatory compliance. He has over eleven years of professional experience in the environmental sciences including experience performing special-status species surveys, California and federal Endangered Species Act compliance, impact analysis, habitat mitigation planning and monitoring. He has extensive experience working with San Diego's biological resources, both as a field biologist and as a preparer of technical reports.

Meredith Branstad holds two Bachelor of Science degrees in Wildlife, Fish, and Conservation Biology and Landscape Architecture from the University of California, Davis. She is the Principal Biologist and Landscape Architect for Foothill Associates. Her professional experience includes raptor surveys, arborist services, wetland delineations, regulatory permit applications, recreation planning, curriculum development, construction document preparation for parks, bike trails, streetscapes, open space, and model homes, and construction coordination and monitoring. Meredith also has experience with residential landscape design and maintenance, and wildlife monitoring of reptiles, amphibians, and raptors.

Kevin Derby, formally with Foothill Associates, holds Bachelor of Arts degree in Environmental Conservation from the University of Colorado, Boulder. His background includes environmental compliance and biological sciences. Kevin has more than sixteen years of professional experience in multi-agency regulatory permitting and compliance, ecological restoration, natural resource assessments, sensitive flora and fauna species surveys, wetland delineations, CEQA compliance, NEPA compliance, fisheries biological surveys, water quality improvements, water quality and erosion/sediment control, mitigation design, construction compliance monitoring, and stream fisheries habitat restoration projects.

Brian Mayerle, formally with Foothill Associates, holds a Bachelor of Science in Ecology & Systematic Biology from California Polytechnic State University. He is an experienced ecologist with over twenty years of experience in resource analysis and management, specifically relating to habitat restoration, botanical and wildlife surveys, biological assessment, wetland delineation, and regulatory analysis and permitting.

Brian is an expert with the provisions of Sections 401 and 404 of the Clean Water Act, Sections 1601-1603 of the California Department of Fish and Game Code, CEQA, the National Environmental Policy Act (NEPA), the federal Migratory Bird Treaty Act (MBTA), and the state of California and federal Endangered Species Acts. He is also extensively experienced with many local ordinances and policies protecting natural resources in northern California, and with survey protocols established by state and federal regulatory agencies, including the USFWS, CDFW, and the USACE. Brian has conducted extensive field work throughout northern and southern California and has led teams of field biologists on complex field projects with diverse geography and resources.

Sara Nedrich holds a Bachelor of Science degree in Environment and Natural Resources and a Masters of Science degree in Environmental Science from The Ohio State University. She has conducted numerous biological assessments and biological surveys for threatened and endangered species, including fairy shrimp, giant garter snake, and California red-legged frog. She has conducted many wetland delineations in California. She has also conducted biological research concerning wetland biogeochemistry, waterfowl use and habitation in the Central Valley of California, and grazing impacts on kangaroo rat populations.

Dick Rol, formally with Foothill Associates, holds a Bachelor of Science degree in Biological Sciences from South Dakota State University and a Master of Landscape Architecture degree from Utah State University. His experience includes a wide range of biological assessment and planning work in San Diego County, including biological assessments and mapping, regulatory compliance, NCCP regional conservation planning, and habitat restoration. He has over twelve years of professional experience in natural resource planning and has managed the biological investigation, reporting, and permitting for numerous public and private development projects in San Diego.

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Appendix B

FLORA AND FAUNA LISTS

Appendix B — Flora and Fauna Lists

The following plant and animal species were observed by Foothill Associates' biologists on the subject development site.

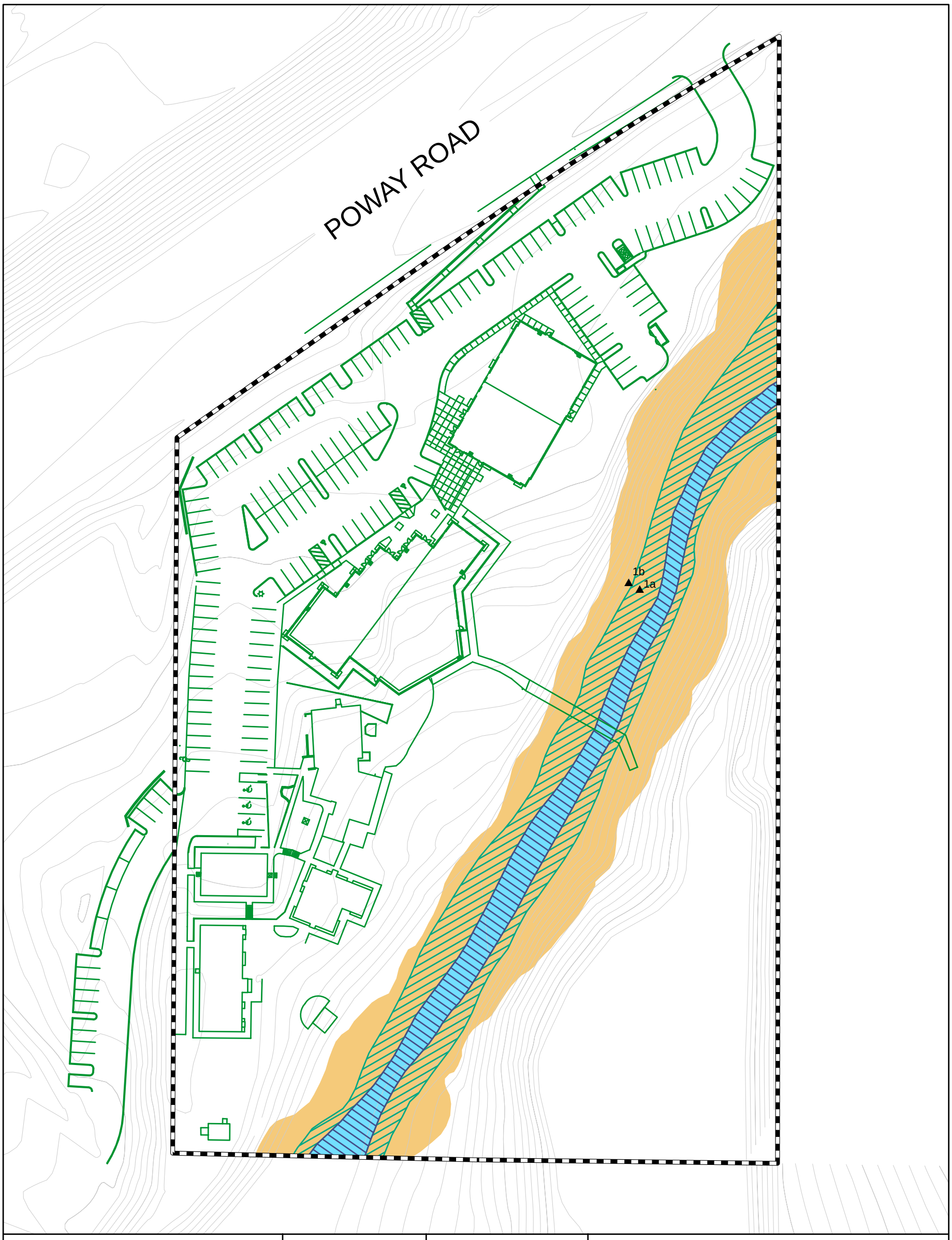
Common Name	Scientific Name
Amphibians & Reptiles	
WESTERN FENCE LIZARD	*Sceleporous occidentalis*
Birds	
RED-TAILED HAWK	*Buteo jamaicensis*
CALIFORNIA QUAIL	*Callipepla californica*
MOURNING DOVE	*Zenaida macroura*
BARN OWL	*Tyto alba*
ANNA'S HUMMINGBIRD	*Calypte anna*
BLACK-CHINNED HUMMINGBIRD	*Archilochus alexandri*
NUTTALL'S WOODPECKER	*Picoides nuttallii*
DOWNY WOODPECKER	*Picoides pubescens*
PACIFIC-SLOPE FLYCATCHER	*Empidonax difficilis*
BLACK PHOEBE	*Sayornis nigricans*
WESTERN SCRUB-JAY	*Aphelocoma californica*
AMERICAN CROW	*Corvus brachyrhynchos*
OAK TITMOUSE	*Baeolophus inornatus*
BUSHTIT	*Psaltriparus minimus*
BEWICK'S WREN	*Thryomanes bewickii*
HOUSE WREN	*Troglodytes aedon*
HERMIT THRUSH	*Catharus guttatus*
WRENTIT	*Chamaea fasciata*
NORTHERN MOCKINGBIRD	*Mimus polyglottos*
CALIFORNIA THRASHER	*Toxostoma redivivum*
EUROPEAN STARLING	*Sturnus vulgaris*
ORANGE-CROWNED WARBLER	*Vermivora celata*
YELLOW-RUMPED WARBLER	*Dendroica coronata*
COMMON YELLOWTHROAT	*Geothlypis trichas*
WESTERN TANAGER	*Piranga ludoviciana*
SPOTTED TOWHEE	*Pipilo maculatus*
CALIFORNIA TOWHEE	*Pipilo crissalis*
SONG SPARROW	*Melospiza melodia*
HOUSE FINCH	*Carpodacus mexicanus*
LESSER GOLDFINCH	*Carduelis psaltria*
HOUSE SPARROW	*Passer domesticus*
Mammals	
COYOTE	*Canis latrans*
DOMESTIC DOG	*Canis familiaris*
HOUSE CAT	*Felis domesticus*

Common Name	Scientific Name
DESERT COTTONTAIL	*Sylvilagus audubonii*
Plants	
AFRICAN GIANT REED	*Arrundo donax*
WESTERN RAGWEED	*Ambrosia psilostachya*
SCARLETT PIMPERNEL	*Anagallis arvensis*
YERBA MANSA	*Anemopsis californica*
CALIFORNIA SAGEBRUSH	*Artemisia californica*
WILD OATS	*Avena fatua*
COYOTEBRUSH	*Baccharis pilularis*
MULEFAT	*Baccharis salicifolia*
BEGGAR-TICKS	*Bidens pilosa*
BLACK MUSTARD	*Brassica nigra*
FOXTAIL CHESS	*Bromus maritensis* ssp.*rubens*
SUN CUP	*Camissonia* sp.
FIG MARIGOLD	*Carpobrotus edulis*
TOCALOTE	*Centaurea melitensis*
MINER'S LETTUCE	*Claytonia perfoliata*
POISON HEMLOCK	*Conium maculatum*
HORSEWEED	*Conyza canadensis*
BINDWEED	*Convolvulus arvensis*
FLATSEDGE	*Cyperus eragrostis*
BLUE DICKS	*Dichelostemma capitatum*
TURKEY MULLEIN	*Eremocarpus setigerus*
CALIFORNIA BUCKWHEAT	*Eriogonum fasciculatum*
WOOLY SUNFLOWER	*Eriophyllum* sp.
EUCALYPTUS	*Eucalyptus* sp.
SPURGE	*Euphorbia* sp.
FENNEL	*Foeniculum vulgare*
SEASIDE HELIOTOPE	*Heliotropium curassavicum*
TOYON	*Heteromeles arbutifolia*
TELEGRAPH WEED	*Heterotheca grandifora*
GOLDENBUSH	*Isocoma menziesii*
RUSH	*Juncus* sp.
PRICKLY LETTUCE	*Lactuca serriola*
HONEYSUCKLE	*Lonicera subspicata*
DEERWEED	*Lotus scoparius*
WILD CUCUMBER	*Marah macrocarpus*
SWEET CLOVER	*Melilotus alba*
OLEANDER	*Nerium oleander*
FOUNTAIN GRASS	*Pennisetum setaceum*
WESTERN SYCAMORE	*Platanus racemosa*
DATE PALM	*Phoenix* sp.
COMMON PLANTAIN	*Plantago major*
COAST LIVE OAK	*Quercus agrifolia*
SCRUB OAK	*Quercus berberidifolia*
SPINY REDBERRY	*Rhamnus crocea*

Common Name	Scientific Name
FUCHSIA-FLOWERED GOOSEBERRY	*Ribes speciosum*
CURLY DOCK	*Rumex crispis*
GOODDING'S BLACK WILLOW	*Salix gooddingii*
ARROYO WILLOW	*Salix lasiolepis*
RUSSIAN THISTLE	*Salsola tragus*
WHITE SAGE	*Salvia apiana*
BLUE ELDERBERRY	*Sambucus mexicanus*
CALIFORNIA PEPPER	*Schinus molle*
BLUE-EYED GRASS	*Sisyrinchium bellum*
SOW THISTLE	*Sonchus* sp.
POISON OAK	*Toxicodendron diversilobum*
SALT CEDAR	*Tamarix* sp.
CATTAIL	*Typha* sp.
CALIFORNIA WILD GRAPE	*Vitis* sp.
MEXICAN FAN PALM	*Washingtonia mexicanus*

Appendix C

WETLAND DELINEATION MAP AND DATA SHEETS



ACOE JURISDICTION	ACREAGE
Perennial Drainage	0.27
Riparian Wetland	0.49
TOTAL	0.76

CDFG & CITY JURISDICTION	ACREAGE
Southern Willow Riparian Forest	1.29
Streambed	0.27
TOTAL	1.56

OTHER FEATURES

Limit of Study

Data point

N

NOTES

- Delineated Waters of the U.S. subject to U.S. Army Corps of Engineers verification
- The Hydrologic Unit Code for this site is 18070304
- Delineation utilizes the Corp's 1987 three-parameter method for determining jurisdictional Waters of the U.S.
- 2 ft interval digital countours from SanGIS, 1999

AppendixC

WETLAND DELINEATION

NORTH CITY CHURCH

0 37.5 75 150

SCALE IN FEET

FOOTHILL ASSOCIATES

ENVIRONMENTAL CONSULTING • PLANNING • LANDSCAPE ARCHITECTURE

© 2010

DATE: 8/29/06

FILE NAME: wetland_delineation.mxd

MAPPED BY: JMH

DRAWN BY: EME

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: North City Church Applicant/Owner: Investigator: Mike Howard	Date: 8/16/06 County: SD State: CA
Do Normal Circumstances exist on the site? ■ Yes ○ No Is the site significantly disturbed (Atypical Situation)? ○ Yes ■ No Is the area a potential Problem Area? ○ Yes ■ No (If needed, explain on reverse.)	Community ID: Transect ID: Plot ID: 1A

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Associate Plant Species	Stratum	Indicator
100	1. Salix lasiolepis	T	FACW	9.		
20	2. Oenothera elata	H	FACW	10.		
20	3. Toxicodendron	H	NI	11.		
20	4. Salix lasiolepis	S	FACW	12.		
	5.			13.		
	6.			14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 3/4 = 75 %

Remarks: Riparian Forest corridor adjacent to Flowing Creek - 10-12ft wide, 1-2ft deep. Meets hydrophytic vegetation criterion.

HYDROLOGY

☐ Recorded Data (Describe in Remarks): ☐ Stream, Lake, or Tide Gauge ☐ Aerial Photographs ☐ Other ☐ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: ☐ Inundated ☐ Saturated in Upper 12 Inches ☐ Water Marks ☒ Drift Lines ☒ Sediment Deposits ☐ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ☐ Oxidized Root Channels in Upper 12 Inches ☐ Water-Stained Leaves ☐ Local Soil Survey Data ☐ FAC-Neutral Test ☐ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: N/A (in.) Depth to Free Water in Pit: N/A (in.) Depth to Saturated Soil: N/A (in.)	

Remarks: Primary shelf adjacent to creek, evidence of wetland hydrology. Meets wetland hydrology criterion.

SOILS

Map Unit Name
(Series and Phase): _____

Drainage Class: _____

Field Observations
Confirm Mapped Type? ○ Yes ○ No

Taxonomy (Subgroup): _____

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-12+	A	SAND & COBBLES			

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: No Soil Development. All Sand and Cobbles. DP on Primary Shelf adjacent to flowing creek.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	● Yes	○ No
Wetland Hydrology Present?	● Yes	○ No
Hydric Soils Present?	○ Yes	○ No

Is this Sampling Point Within a Wetland? ● Yes ○ No

Remarks:
Data Point is within a wetland. Determination Made w/o Soil criterion due to lack of Soils. Meets hydrophytic vegetation and wetland hydrology criteria.

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: North City Church Applicant/Owner: Investigator: Mike Howard	Date: 8/16/06 County: SD State: CA
Do Normal Circumstances exist on the site? ☒ Yes ☐ No Is the site significantly disturbed (Atypical Situation)? ☐ Yes ☒ No Is the area a potential Problem Area? ☐ Yes ☒ No (If needed, explain on reverse.)	Community ID: Transect ID: Plot ID: LB

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Associate Plant Species	Stratum	Indicator
30	1. Anemopsis californica	H	OBL	9.		
30	2. Plantago major	H	FACW-	10.		
20	3. Oenothera elata	H	FACW	11.		
20	4. Avena barbata	H	NI	12.		
	5.			13.		
	6.			14.		
	7.			15.		
	8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 3/4 = 75 %

Remarks: Meets hydrophytic vegetation criterion. Near edge of Riparian corridor

HYDROLOGY

☒ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: n/a (in.)

Depth to Free Water in Pit: n/a (in.)

Depth to Saturated Soil: n/a (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: No Indicators of wetland hydrology

SOILS

Map Unit Name
(Series and Phase): _____

Drainage Class: _____

Field Observations
Confirm Mapped Type? ○ Yes ○ No

Taxonomy (Subgroup): _____

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-12+	A	Sand &	cobbles		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	● Yes	○ No
Wetland Hydrology Present?	○ Yes	● No
Hydric Soils Present?	○ Yes	○ No

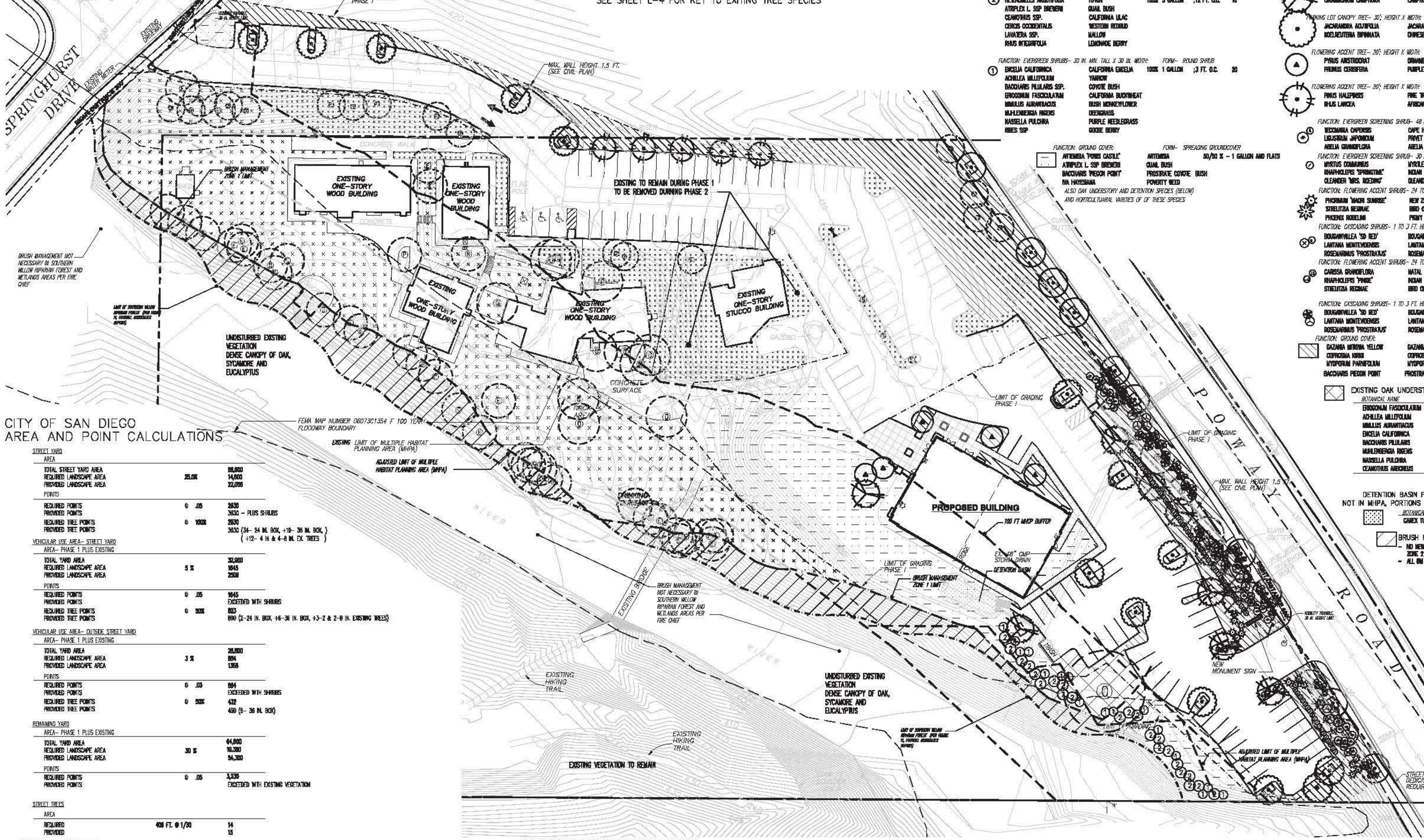
Is this Sampling Point Within a Wetland? ○ Yes ● No

Remarks: Data Point is not within a wetland. hydrophytic vegetation present but lacks evidence of hydrology

Approved by HQUSACE 3/92

Appendix D

LANDSCAPE DEVELOPMENT PLAN



RETAINING WALL PLANTING

PROVIDE ONE PLANT IN EACH (APPROXIMATELY 9 X 8 INCH SIZED) PLANTING CELL ACROSS THE ENTIRE FACE OF THE PLANTABLE WALLS. PROVIDE A EQUAL PROPORTION OF THE SPECIES LISTED, DISTRIBUTE THE SPECIES RANDOMLY.

BOTANICAL NAME	COMMON NAME	SIZE
ARTEMISIA CALIFORNIA 'CANYON GREY'	CANYON GREY CALIFORNIA SAGEBRUSH	ROSE POT (2-1/4")
BACCHARIS PILULARIS 'PIGEON POINT'	PIGEON POINT COYOTE BUSH	4" POT
CEANOTHUS THYRSIFLORUS VAR. GRISEUS 'YANKEE POINT'	YANKEE POINT CEANOTHUS	4" POT

PLANTING SHALL PROVIDE 85% SCREENING OF PLANABLE WALLS WITHIN TWO YEARS

SEE SHEET L-4 FOR KEY TO EXITING TREE SPECIES

SYMBOL	PLANT FUNCTION: BOTANICAL NAME	COMMON NAME	PLANT FORM: SIZE/MASSING	APPROX. QUANTITY
	PLANTS WITHIN 100 FEET OF MSCP BOUNDARY, OR USED WITHIN BM ZONE 1 IRRIGATED, DROUGHT TOLERANT NATIVE SPECIES CONSISTENT WITH ADJACENT HABITATS			
	BROAD EVERGREEN CANOPY TREE- 30'; HEIGHT X WIDTH:		FORM- CANOPY BROAD SPREADING OVAL	
	QUERCUS AGRIFOLIA	COAST LIVE OAK	100% 24" BOX	4
	CERCOCARPUS SPP.	MOUNTAIN MAHOGANY		
	PLATANUS RACEMOSA	CALIF. SYCAMORE		
	FUNCTION: EVERGREEN MASSING SHRUB- 48 IN. TALL X WIDTH: REGULAR PRUNING MAY BE PROVIDED TO MAINTAIN SHAPE AND SIZE		FORM- UPRIGHT ROUND SHRUB	
2	HETEROMELES ARBUTIFOLIA	TOYON	100% 5 GALLON ;12 FT. O.C.	10
	ATRIPLEX L. SSP BREWERII	QUAIL BUSH		
	CEANOTHUS SSP.	CALIFORNIA LILAC		
	CERCIS OCCIDENTALIS	WESTERN REDBUD		
	LAVATERA SSP.	MALLOW		
	RHUS INTEGRIFOLIA	LEMONADE BERRY		
	FUNCTION: EVERGREEN SHRUBS- 30 IN. MIN. TALL X 30 IN. WIDTH:		FORM- ROUND SHRUB	
1	ENCELIA CALIFORNICA	CALIFORNIA ENCELIA	100% 1 GALLON ;3 FT. O.C.	20
	ACHILLEA MILLEFOLIUM	YARROW		
	BACCHARIS PILULARIS SSP.	COYOTE BUSH		
	ERIOGONUM FASCICULATUM	CALIFORNIA BUCKWHEAT		
	MIMULUS AURANTIACUS	BUSH MONKEYFLOWER		
	MUHLENBERGIA RIGENS	DEERGRASS		
	NASSELLA PULCHRA	PURPLE NEEDLEGRASS		
	RIBES SSP	GOOSE BERRY		
	FUNCTION: GROUND COVER:		FORM- SPREADING GROUNDCOVER	
	ARTEMISIA 'POWIS CASTLE'	ARTEMISIA	50/50 % - 1 GALLON AND FLATS	
	ATRIPLEX L. SSP BREWERII	QUAIL BUSH		
	BACCHARIS 'PIGEON POINT'	PROSTRATE COYOTE BUSH		
	IVA HAYESIANA	POVERTY WEED		

ALSO OAK UNDERSTORY AND DETENTION SPECIES (BELOW) AND HORTICULTUARAL VARITES OF OF THESE SPECIES

PLANT LEGEND

SPECIES LISTED OR SPECIES WITH SIMILAR CHARACTERISTICS SHALL BE UTILIZED:

SYMBOL	PLANT FUNCTION: BOTANICAL NAME	COMMON NAME	PLANT FORM: SIZE/MASSING	APPROX. QUANTITY
	PLANTS NOT WITHIN 100 FEET OF MSCP BOUNDARY, NOT IN ANY BRUSH MANAGEMENT ZONE IRRIGATED, NON-INVASIVE			
	ROOT ZONE (8 X 5 FT.)			
	STREET TREE- 25+ HEIGHT:		FORM- BROAD UPRIGHT OVAL	
	PLATANUS RACEMOSA	CAL SYCAMORE	100% 36" BOX	11
	QUERCUS ILEX	HOLLY OAK		
	BROAD EVERGREEN CANOPY TREE- 30'; HEIGHT X WIDTH:		FORM- CANOPY BROAD SPREADING OVAL	
	QUERCUS AGRIFOLIA	COAST LIVE OAK	100% 24" BOX	18
	CINNAMOMUM CAMPHORA	CAMPHOR TREE		
	PARKING LOT CANOPY TREE- 30'; HEIGHT X WIDTH:		FORM- CANOPY BROAD SPREADING OVAL	
	JACARANDA ACUTIFOLIA	JACARANDA	100% 36" BOX	21
	KOELREUTERIA BIPINNATA	CHINESE FLAME TREE		
	FLOWERING ACCENT TREE- 20'; HEIGHT X WIDTH:		FORM- MEDIUM UPRIGHT VASE	
	PYRUS ARISTOCRAT	ORNAMENTAL PEAR	100% 24" BOX	16
	PRUNUS CERASIFERA	PURPLE LEAF PLUM		
	FLOWERING ACCENT TREE- 20'; HEIGHT X WIDTH:		FORM- MEDIUM DENSE TREE	
	PINUS HALEPENSIS	PINE TREE	100% 24" BOX	11
	RHUS LANCEA	AFRICAN SUMAC		
	FUNCTION: EVERGREEN SCREENING SHRUB- 48 IN. MIN. TALL X WIDTH:		FORM- UPRIGHT ROUND SHRUB	
	TECOMARIA CAPENSIS	CAPE HONEYSUCKLE	100% 5 GALLON ;3 FT. O.C.	53
	LIGUSTRUM JAPONICUM	PRIVET		
	ABELIA GRANDIFLORA	ABELIA		
	FUNCTION: EVERGREEN SCREENING SHRUB- 30 IN. MIN. TALL X 30 IN. WIDTH:		FORM- ROUND SHRUB	
	MYRTUS COMMUNIS	MYRTLE	100% 5 GALLON ;3 FT. O.C.	43
	RHAPHIOLEPIS 'SPRINGTIME'	INDIAN HAWTHORN		
	OLEANDER 'MRS. ROEDING'	OLEANDER		
	FUNCTION: FLOWERING ACCENT SHRUBS- 24 TO 36 IN. HIGH X WIDTH:		FORM- ARCHING SHRUB	
	PHORMIUM 'MAORI SUNRISE'	NEW ZEALAND FLAX	100% 5 GALLON ;3 FT. O.C.	61
	STRELITZIA REGINAE	BIRD OF PARADISE		
	PHOENIX ROBELINI	PIGMY DATE PALM		
	FUNCTION: CASCADING SHRUBS- 1 TO 3 FT. HIGH X 5 FT. WIDTH:		FORM- SPREADING CASCADING SHRUB	
	BOUGAINVILLEA 'SD RED'	BOUGAINVILLEA	100% 5 GALLON ;8 FT. O.C.	42
	LANTANA MONTEVIDENSIS	LANTANA		
	ROSEMARINUS 'PROSTRATUS'	ROSEMARY		
	FUNCTION: FLOWERING ACCENT SHRUBS- 24 TO 36 IN. HIGH X WIDTH:		FORM- ARCHING SHRUB	
	CARISSA GRANDIFLORA	NATAL PLUM	100% 5 GALLON ;3 FT. O.C.	58
	RHAPHIOLEPIS 'PINKIE'	INDIAN HAWTHORN		
	STRELITZIA REGINAE	BIRD OF PARADISE		
	FUNCTION: CASCADING SHRUBS- 1 TO 3 FT. HIGH X 5 FT. WIDTH:		FORM- SPREADING CASCADING SHRUB	
	BOUGAINVILLEA 'SD RED'	BOUGAINVILLEA	100% 5 GALLON ;8 FT. O.C.	22
	LANTANA MONTEVIDENSIS	LANTANA		
	ROSEMARINUS 'PROSTRATUS'	ROSEMARY		
	FUNCTION: GROUND COVER:		FORM- SPREADING GROUNDCOVER	
	GAZANIA MITSUWA YELLOW	GAZANIA	100% FLATS	
	COPROSMA KIRKII	COPROSMA		
	MYOPORUM PARVIFOLIUM	MYOPORUM		
	BACCHARIS PIEGON POINT	PROSTRATE COYOTE BUSH		

EXISTING OAK UNDERSTORY PLANTINGS - NON IRRIGATED

BOTANICAL NAME	COMMON NAME	SIZE	DENSITY (PLANTS / ACRE)
ERIOGONUM FASCICULATUM	CALIFORNIA BUCKWHEAT	1 GALLON	300
ACHILLEA MILLEFOLIUM	YARROW	100%	200
MIMULUS AURANTIACUS	BUSH MONKEYFLOWER		200
ENCELIA CALIFORNICA	CALIFORNIA ENCELIA		250
BACCHARIS PILULARIS	COYOTE BUSH		300
MUHLENBERGIA RIGENS	DEERGRASS		450
NASSELLA PULCHRA	PURPLE NEEDLEGRASS		400
CEANOTHUS ARBOREUS	CALIFORNIA LILAC		400
		TOTAL	2400

DETENTION BASIN PLANTING

NOT IN MHPA, PORTIONS WITHIN 100 FEET OF MHPA, BM ZONE 1 - IRRIGATED

BOTANICAL NAME	COMMON NAME		
CAREX TUMULICOLA	FOOTHILL SEDGE	1 GALLON	24 IN. O.C.

BRUSH MANAGEMENT ZONE 2

- NO NEW LANDSCAPING IS PROPOSED FOR BRUSH MANAGEMENT ZONE 2 AREAS
- ALL BM ZONE 2 AREA ARE EXISTING LANDSCAPE TO REMAIN

EXISTING LANDSCAPE TO REMAIN

NOT WITHIN 100 FEET OF MHPA

WITHIN MHPA OR 100 FEET OF MHPA

INVASIVE PLANT NOTE

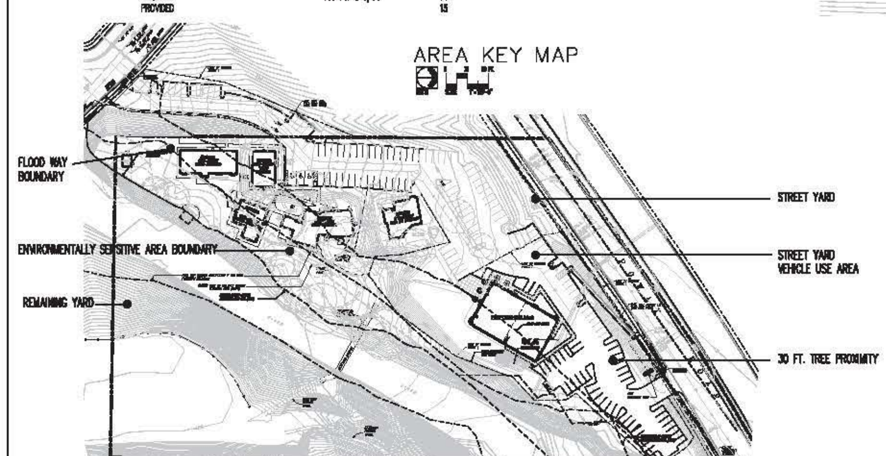
ALL EXISTING INVASIVE PLANT SPECIES, INCLUDING VEGETATIVE PARTS AND ROOT SYSTEMS, SHALL BE COMPLETELY REMOVED FROM THE PREMISES WHEN THE COMBINATION OF SPECIES, TYPE, LOCATION AND SURROUNDING ENVIRONMENTAL CONDITIONS PROVIDES A MEANS FOR THE SPECIES TO INVADE OTHER AREAS OF NATIVE PLANT MATERIAL THAT ARE ON OR OFF OF THE PREMISES.

ALL LANDSCAPING SHALL CONSIST OF NON-INVASIVE PLANT SPECIES NO INVASIVE NON NATIVE PLANT SPECIES SHALL BE INTRODUCED WITHIN 100 FEET OF AREAS WITH NATIVE OR NATURALIZED VEGETATION.

CITY OF SAN DIEGO AREA AND POINT CALCULATIONS

STREET YARD		
AREA		
TOTAL STREET YARD AREA		88,600
REQUIRED LANDSCAPE AREA	25.0%	14,600
PROVIDED LANDSCAPE AREA		22,056
POINTS		
REQUIRED POINTS	@ .05	2930
PROVIDED POINTS		3630 - PLUS SHRUBS
REQUIRED TREE POINTS	@ 100%	2930
PROVIDED TREE POINTS		3630 (34- 24 IN. BOX, +19- 36 IN. BOX,) (+12- 4 IN & 4-8 IN. EX. TREES)
VEHICULAR USE AREA- STREET YARD		
AREA- PHASE 1 PLUS EXISTING		
TOTAL YARD AREA		32,900
REQUIRED LANDSCAPE AREA	5 %	1645
PROVIDED LANDSCAPE AREA		2509
POINTS		
REQUIRED POINTS	@ .05	1645
PROVIDED POINTS		EXCEEDED WITH SHRUBS
REQUIRED TREE POINTS	@ 50%	823
PROVIDED TREE POINTS		890 (2-24 IN. BOX, +6-36 IN. BOX, +3-2 & 2-8 IN. EXISTING TREES)
VEHICULAR USE AREA- OUTSIDE STREET YARD		
AREA- PHASE 1 PLUS EXISTING		
TOTAL YARD AREA		28,800
REQUIRED LANDSCAPE AREA	3 %	864
PROVIDED LANDSCAPE AREA		1368
POINTS		
REQUIRED POINTS	@ .03	864
PROVIDED POINTS		EXCEEDED WITH SHRUBS
REQUIRED TREE POINTS	@ 50%	432
PROVIDED TREE POINTS		450 (9- 36 IN. BOX)
REMAINING YARD		
AREA- PHASE 1 PLUS EXISTING		
TOTAL YARD AREA		64,600
REQUIRED LANDSCAPE AREA	30 %	19,380
PROVIDED LANDSCAPE AREA		54,300
POINTS		
REQUIRED POINTS	@ .05	3,230
PROVIDED POINTS		EXCEEDED WITH EXISTING VEGETATION
STREET TREES		
AREA		
REQUIRED	408 FT. @ 1/30	14
PROVIDED		15

AREA KEY MAP



LANDSCAPE CONCEPT STATEMENT

PLANTING CONCEPT

THE LANDSCAPE CONCEPT PROVIDES FOR AESTHETIC AND FUNCTIONAL TREATMENTS OF CHURCH BUILDING ADDITION. TWO EXHIBITS ILLUSTRATE THE PHASED IMPLEMENTATION OF THE PROJECT. TREES AND FLOWERING SHRUBS ENHANCE THE SITE AND EMPHASIZE ENTRANCES. THE SITE CONTAINS SEVERAL LARGE EXISTING TREES.

IRRIGATION CONCEPT

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HIGH WATER USE PLANTS SHALL BE LIMITED TO NOT MORE THAN 10 PERCENT OFTHE TOTAL DEVELOPED LANDSCAPE AREA. ALL OTHER PLANTINGS SHALL BE COMPRISED OF LOW WATER USE PLANT MATERIAL.

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MULCH

ALL REQUIRED PLANTING AREAS SHALL BE COVERED WITH MULCH TO A MINIMUM DEPTH OF 2 INCHES, EXCLUDING SLOPES REQUIRING REVEGETATION AND AREAS PLANTED WITH GROUND COVER. ALL EXPOSED SOIL AREA WITHOUT VEGETATION SHALL ALSO BE MULCHED TO THIS MINIMUM DEPTH (LDC 142.0413(B)).

MINIMUM TREE SEPARATION DISTANCE

IMPROVEMENT / MINIMUM DISTANCE TO STREET TREE:

TRAFFIC SIGNALS (STOP SIGN)-	20 FEET
SEWER LINES-	10 FEET
OTHER UNDERGROUND UTILITY LINES-	5 FEET
ABOVE GROUND UTILITY STRUCTURES-	10 FEET
DRIVEWAY (ENTRYS)-	10 FEET
INTERSECTIONS (INTERSECTING CURB LINES OF TWO STREETS)-	25 FEET

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THE FOLLOWING PROTECTION FOR EXISTING TREES TO REMAIN ON SITE WILL BE PROVIDED:

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4- THE EXISTING GRADE WILL BE MAINTAINED WITHIN THE DRIP LINE OF EXISTING TREES ON SITE.
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6- MAINTAIN AND DOCUMENT A TREE WATERING SCHEDULE DURING CONSTRUCTION.
7- ALL DAMAGED TREES WILL BE REPLACED WITH ONE OF EQUAL OR GREATER SIZE.

BRUSH MANAGEMENT NOTE

THE MODIFIED BRUSH MANAGEMENT PLAN HAS BEEN APPROVED BY THE DEPUTY FIRE MARSHALL AND THE LANDSCAPE SECTION OF THE DEVELOPMENT SERVICES DEPARTMENT.

PHASE 1 LANDSCAPE DEVELOPMENT PLAN

NORTH SCALE 0 30 60 FT. 1"=30'-0"

AHLES LANDSCAPE ARCHITECTURE INC.
P.O. Box 1503
Rancho Santa Fe, California 92067
858.756.8963

CA# 2535

PROJECT NO.: 0711

LANDSCAPE DEVELOPMENT PLAN

NORTH CITY PRESBYTERIAN CHURCH

San Diego, California

PREVIOUS: 30 JUL 07

REFERENCE: PTS 150585

SHEET: L-1

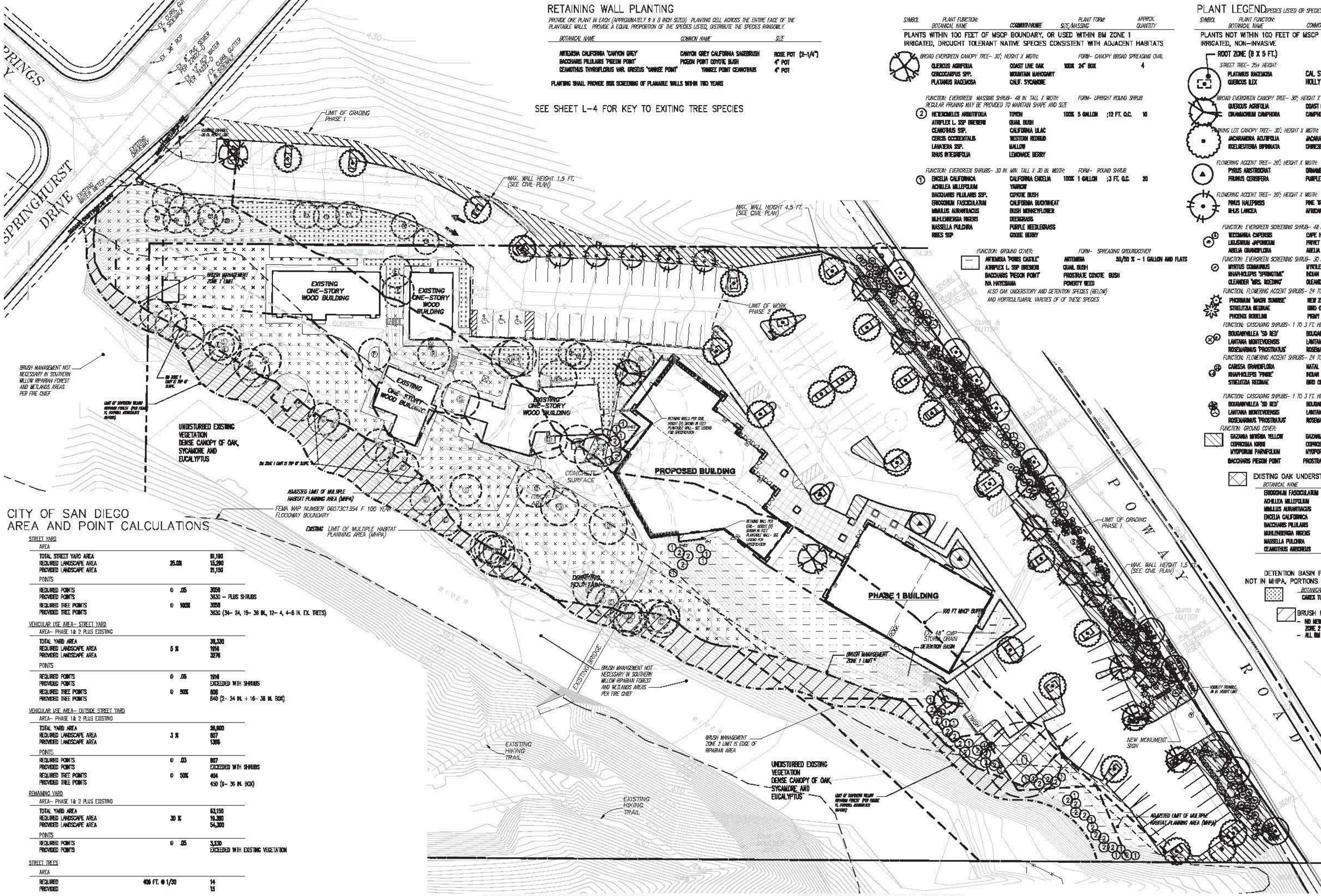
PREPARED BY:
NAME: AHLES LANDSCAPE ARCHITECTURE PO BOX 150. RANCHO SANTA FE,, CA 92067
PHONE #: 858.756.8963

PROJECT ADDRESS: - SAN DIEGO, CA.

PROJECT NAME: NORTH CITY PRESBYTERIAN CHURCH -

SHEET TITLE: LANDSCAPE DEVELOPMENT PLAN

REVISION 14:	
REVISION 13:	
REVISION 12:	
REVISION 11:	CYCLE- 29 NOV 13
REVISION 10:	CYCLE- 1 MAR 13
REVISION 9:	CYCLE- 31 JUL 12
REVISION 8:	BIO FIG 4- 16 SEP 10
REVISION 7:	1 JUL 10
REVISION 6:	MHPA— 3 MAY 10
REVISION 5:	BM— 16 FEB 10
REVISION 4:	16 NOV 09
REVISION 3:	20 APR 09
REVISION 2:	3 MAR 09
REVISION 1:	10 AUG 08
ORIGINAL DATE:	10 AUG 07
SHEET	1 OF 4
DEP#	



RETAINING WALL PLANTING

PROVIDE ONE PLANT IN EACH (APPROXIMATELY 9 X 8 INCH SIZED) PLANTING CELL ACROSS THE ENTIRE FACE OF THE PLANTABLE WALLS. PROVIDE A EQUAL PROPORTION OF THE SPECIES LISTED, DISTRIBUTE THE SPECIES RANDOMLY.

BOTANICAL NAME	COMMON NAME	SIZE
ARTEMISIA CALIFORNIA 'CANYON GREY'	CANYON GREY CALIFORNIA SAGEBRUSH	ROSE POT (2-1/4")
BACCHARIS PILULARIS 'PIGEON POINT'	PIGEON POINT COYOTE BUSH	4" POT
CEANOTHUS THYRSIFLORUS VAR. GRISEUS 'YANKEE POINT'	YANKEE POINT CEANOTHUS	4" POT

PLANTING SHALL PROVIDE 100% SCREENING OF PLANABLE WALLS WITHIN TWO YEARS

SEE SHEET L-4 FOR KEY TO EXITING TREE SPECIES

SYMBOL	PLANT FUNCTION: BOTANICAL NAME	COMMON NAME	PLANT FORM: SIZE/MASSING	APPROX. QUANTITY
	PLANTS WITHIN 100 FEET OF MSCP BOUNDARY, OR USED WITHIN BM ZONE 1 IRRIGATED, DROUGHT TOLERANT NATIVE SPECIES CONSISTENT WITH ADJACENT HABITATS			
	BROAD EVERGREEN CANOPY TREE- 30'; HEIGHT X WIDTH:		*FORM- CANOPY BROAD SPREADING OVAL*	
	QUERCUS AGRIFOLIA	COAST LIVE OAK	100% 24" BOX	4
	CERCOCARPUS SPP.	MOUNTAIN MAHOGANY		
	PLATANUS RACEMOSA	CALIF. SYCAMORE		
	FUNCTION: EVERGREEN MASSING SHRUB- 48 IN. TALL X WIDTH: REGULAR PRUNING MAY BE PROVIDED TO MAINTAIN SHAPE AND SIZE		*FORM- UPRIGHT ROUND SHRUB*	
(2)	HETEROMELES ARBUTIFOLIA	TOYON	100% 5 GALLON ;12 FT. O.C.	10
	ATRIPLEX L. SSP BREWERI	QUAIL BUSH		
	CEANOTHUS SSP.	CALIFORNIA LILAC		
	CERCIS OCCIDENTALIS	WESTERN REDBUD		
	LAVATERA SSP.	MALLOW		
	RHUS INTEGRIFOLIA	LEMONADE BERRY		
	FUNCTION: EVERGREEN SHRUBS- 30 IN. MIN. TALL X 30 IN. WIDTH:		*FORM- ROUND SHRUB*	
(1)	ENCELIA CALIFORNICA	CALIFORNIA ENCELIA	100% 1 GALLON ;3 FT. O.C.	20
	ACHILLEA MILLEFOLIUM	YARROW		
	BACCHARIS PILULARIS SSP.	COYOTE BUSH		
	ERIOGONUM FASCICULATUM	CALIFORNIA BUCKWHEAT		
	MIMULUS AURANTIACUS	BUSH MONKEYFLOWER		
	MUHLENBERGIA RIGENS	DEERGRASS		
	NASSELLA PULCHRA	PURPLE NEEDLEGRASS		
	RIBES SSP	GOOSE BERRY		
	FUNCTION: GROUND COVER:		*FORM- SPREADING GROUNDCOVER*	
	ARTEMISIA 'POWIS CASTLE'	ARTEMISIA	50/50 % - 1 GALLON AND FLATS	
	ATRIPLEX L. SSP BREWERI	QUAIL BUSH		
	BACCHARIS 'PIGEON POINT'	PROSTRATE COYOTE BUSH		
	IVA HAYESIANA	POVERTY WEED		

ALSO OAK UNDERSTORY AND DETENTION SPECIES (BELOW) AND HORTICULTUARAL VARITIES OF OF THESE SPECIES

PLANT LEGEND

SPECIES LISTED OR SPECIES WITH SIMILAR CHARACTERISTICS SHALL BE UTILIZED:

SYMBOL	PLANT FUNCTION: BOTANICAL NAME	COMMON NAME	PLANT FORM: SIZE/MASSING	APPROX. QUANTITY
	PLANTS NOT WITHIN 100 FEET OF MSCP BOUNDARY, NOT IN ANY BRUSH MANAGEMENT ZONE IRRIGATED, NON-INVASIVE			
ROOT ZONE (8 X 5 FT.)	*STREET TREE- 25+ HEIGHT:*		*FORM- BROAD UPRIGHT OVAL*	
	PLATANUS RACEMOSA	CAL. SYCAMORE	100% 36" BOX	11
	QUERCUS ILEX	HOLLY OAK		
	BROAD EVERGREEN CANOPY TREE- 30'; HEIGHT X WIDTH:		*FORM- CANOPY BROAD SPREADING OVAL*	
	QUERCUS AGRIFOLIA	COAST LIVE OAK	100% 24" BOX	18
	CINNAMOMUM CAMPHORA	CAMPHOR TREE		
	PARKING LOT CANOPY TREE- 30'; HEIGHT X WIDTH:		*FORM- CANOPY BROAD SPREADING OVAL*	
	JACARANDRA ACUTIFOLIA	JACARANDRA	100% 36" BOX	21
	KOELREUTERIA BIPINNATA	CHINESE FLAME TREE		
	FLOWERING ACCENT TREE- 20'; HEIGHT X WIDTH:		*FORM- MEDIUM UPRIGHT VASE*	
	PYRUS ARISTROCRAT	ORNAMENTAL PEAR	100% 24" BOX	16
	PRUNUS CERISIFERA	PURPLE LEAF PLUM		
	FLOWERING ACCENT TREE- 20'; HEIGHT X WIDTH:		*FORM- MEDIUM DENSE TREE*	
	PINUS HALEPENSIS	PINE TREE	100% 24" BOX	11
	RHUS LANCEA	AFRICAN SUMAC		
	FUNCTION: EVERGREEN SCREENING SHRUB- 48 IN. MIN. TALL X WIDTH:		*FORM- UPRIGHT ROUND SHRUB*	
	TECOMARIA CAPENSIS	CAPE HONEYSUCKLE	100% 5 GALLON ;3 FT. O.C.	53
	LIGUSTRUM JAPONICUM	PRIVET		
	ABELIA GRANDIFLORA	ABELIA		
	FUNCTION: EVERGREEN SCREENING SHRUB- 30 IN. MIN. TALL X 30 IN. WIDTH:		*FORM- ROUND SHRUB*	
	MYRTUS COMMUNIS	MYRTLE	100% 5 GALLON ;3 FT. O.C.	43
	RHAPHIOLEPIS 'SPRINGTIME'	INDIAN HAWTHORN		
	OLEANDER 'MRS. ROEDING'	OLEANDER		
	FUNCTION: FLOWERING ACCENT SHRUBS- 24 TO 36 IN. HIGH X WIDTH:		*FORM- ARCHING SHRUB*	
	PHORMIUM 'MAORI SUNRISE'	NEW ZEALAND FLAX	100% 5 GALLON ;3 FT. O.C.	61
	STRELITZIA REGINAE	BIRD OF PARADISE		
	PHOENIX ROBELINI	PIGMY DATE PALM		
	FUNCTION: CASCADING SHRUBS- 1 TO 3 FT. HIGH X 5 FT. WIDTH:		*FORM- SPREADING CASCADING SHRUB*	
	BOUGAINVILLEA 'SD RED'	BOUGAINVILLEA	100% 5 GALLON ;8 FT. O.C.	42
	LANTANA MONTEVIDENSIS	LANTANA		
	ROSEMARINUS 'PROSTRATUS'	ROSEMARY		
	FUNCTION: FLOWERING ACCENT SHRUBS- 24 TO 36 IN. HIGH X WIDTH:		*FORM- ARCHING SHRUB*	
	CARISSA GRANDIFLORA	NATAL PLUM	100% 5 GALLON ;3 FT. O.C.	58
	RHAPHIOLEPIS 'PINKIE'	INDIAN HAWTHORN		
	STRELITZIA REGINAE	BIRD OF PARADISE		
	FUNCTION: CASCADING SHRUBS- 1 TO 3 FT. HIGH X 5 FT. WIDTH:		*FORM- SPREADING CASCADING SHRUB*	
	BOUGAINVILLEA 'SD RED'	BOUGAINVILLEA	100% 5 GALLON ;8 FT. O.C.	22
	LANTANA MONTEVIDENSIS	LANTANA		
	ROSEMARINUS 'PROSTRATUS'	ROSEMARY		
	FUNCTION: GROUND COVER:		*FORM- SPREADING GROUNDCOVER*	
	GAZANIA MITSUWA YELLOW	GAZANIA	100% FLATS	
	COPROSMA KIRKII	COPROSMA		
	MYOPORUM PARVIFOLIUM	MYOPORUM		
	BACCHARIS PIGEON POINT	PROSTRATE COYOTE BUSH		

EXISTING OAK UNDERSTORY PLANTINGS – NON IRRIGATED

BOTANICAL NAME	COMMON NAME	SIZE	DENSITY (PLANTS / ACRE)
ERIOGONUM FASCICULATUM	CALIFORNIA BUCKWHEAT	1 GALLON 100%	300
ACHILLEA MILLEFOLIUM	YARROW		200
MIMULUS AURANTIACUS	BUSH MONKEYFLOWER		200
ENCELIA CALIFORNICA	CALIFORNIA ENCELIA		250
BACCHARIS PILULARIS	COYOTE BUSH		300
MUHLENBERGIA RIGENS	DEERGRASS		450
NASSELLA PULCHRA	PURPLE NEEDLEGRASS		400
CEANOTHUS ARBOREUS	CALIFORNIA LILAC		400
		TOTAL	2400

DETENTION BASIN PLANTING

NOT IN MHPA, PORTIONS WITHIN 100 FEET OF MHPA, BM ZONE 1 – IRRIGATED

BOTANICAL NAME	COMMON NAME		
CAREX TUMULICOLA	FOOTHILL SEDGE	1 GALLON	24 IN. O.C.

BRUSH MANAGEMENT ZONE 2
- NO NEW LANDSCAPING IS PROPOSED FOR BRUSH MANAGEMENT ZONE 2 AREAS
- ALL BM ZONE 2 AREA ARE EXISTING LANDSCAPE TO REMAIN

EXISTING LANDSCAPE TO REMAIN

NOT WITHIN 100 FEET OF MHPA

WITHIN MHPA OR 100 FEET OF MHPA

INVASIVE PLANT NOTE

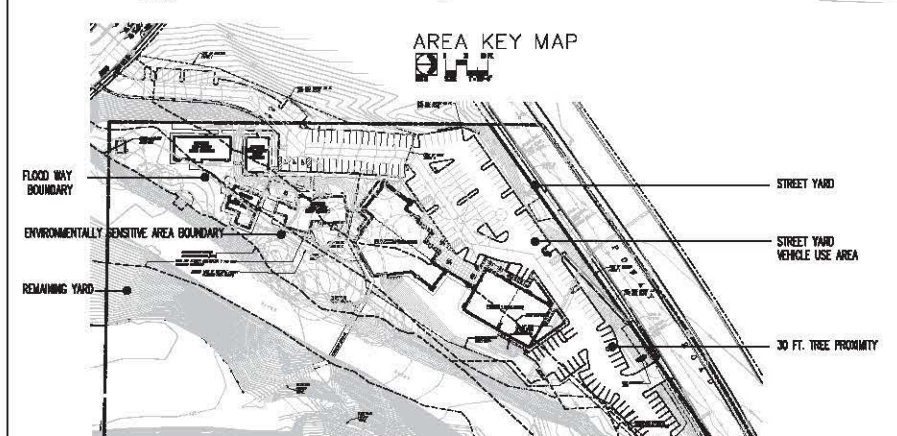
ALL EXISTING INVASIVE PLANT SPECIES, INCLUDING VEGETATIVE PARTS AND ROOT SYSTEMS, SHALL BE COMPLETELY REMOVED FROM THE PREMISES WHEN THE COMBINATION OF SPECIES, TYPE, LOCATION AND SURROUNDING ENVIRONMENTAL CONDITIONS PROVIDES A MEANS FOR THE SPECIES TO INVADE OTHER AREAS OF NATIVE PLANT MATERIAL THAT ARE ON OR OFF OF THE PREMISES.

ALL LANDSCAPING SHALL CONSIST OF NON-INVASIVE PLANT SPECIES NO INVASIVE NON NATIVE PLANT SPECIES SHALL BE INTRODUCED WITHIN 100 FEET OF AREAS WITH NATIVE OR NATURALIZED VEGETATION.

CITY OF SAN DIEGO AREA AND POINT CALCULATIONS

STREET YARD		
AREA		
TOTAL STREET YARD AREA		61,100
REQUIRED LANDSCAPE AREA	25.0%	15,280
PROVIDED LANDSCAPE AREA		21,150
POINTS		
REQUIRED POINTS	@ .05	3058
PROVIDED POINTS		3630 - PLUS SHRUBS
REQUIRED TREE POINTS	@ 100%	3058
PROVIDED TREE POINTS		3630 (34- 24, 19- 36 IN., 12- 4, 4-8 IN. EX. TREES)
VEHICULAR USE AREA- STREET YARD		
AREA- PHASE 1& 2 PLUS EXISTING		
TOTAL YARD AREA		38,330
REQUIRED LANDSCAPE AREA	5 %	1916
PROVIDED LANDSCAPE AREA		3276
POINTS		
REQUIRED POINTS	@ .05	1916
PROVIDED POINTS		EXCEEDED WITH SHRUBS
REQUIRED TREE POINTS	@ 50%	808
PROVIDED TREE POINTS		840 (2- 24 IN. + 16- 36 IN. BOX)
VEHICULAR USE AREA- OUTSIDE STREET YARD		
AREA- PHASE 1& 2 PLUS EXISTING		
TOTAL YARD AREA		26,900
REQUIRED LANDSCAPE AREA	3 %	807
PROVIDED LANDSCAPE AREA		1366
POINTS		
REQUIRED POINTS	@ .03	807
PROVIDED POINTS		EXCEEDED WITH SHRUBS
REQUIRED TREE POINTS	@ 50%	404
PROVIDED TREE POINTS		450 (9- 36 IN. BOX)
REMAINING YARD		
AREA- PHASE 1& 2 PLUS EXISTING		
TOTAL YARD AREA		63,150
REQUIRED LANDSCAPE AREA	30 %	19,380
PROVIDED LANDSCAPE AREA		54,300
POINTS		
REQUIRED POINTS	@ .05	3,230
PROVIDED POINTS		EXCEEDED WITH EXISTING VEGETATION
STREET TREES		
AREA		
REQUIRED	408 FT. @ 1/30	14
PROVIDED		15

AREA KEY MAP



LANDSCAPE CONCEPT STATEMENT

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PHASE 2 LANDSCAPE DEVELOPMENT PLAN

NORTH

SCALE 0 30 60 FT. 1"=30'-0"

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AHLES LANDSCAPE ARCHITECTURE INC.
P.O. Box 1503
Rancho Santa Fe, California 92067
858.756.8963

CA# 2535

PROJECT NO.: 0711

LANDSCAPE DEVELOPMENT PLAN

NORTH CITY PRESBYTERIAN CHURCH

San Diego, California

PREVIOUS: 30 JUL 07

REFERENCE: PTS 150585

SHEET: L-2

PREPARED BY:
NAME: AHLES LANDSCAPE ARCHITECTURE
PO BOX 150.
RANCHO SANTA FE,, CA 92067
PHONE #: 858.756.8963

PROJECT ADDRESS:
–
SAN DIEGO, CA.

PROJECT NAME:
NORTH CITY PRESBYTERIAN CHURCH
–

SHEET TITLE:
LANDSCAPE DEVELOPMENT PLAN

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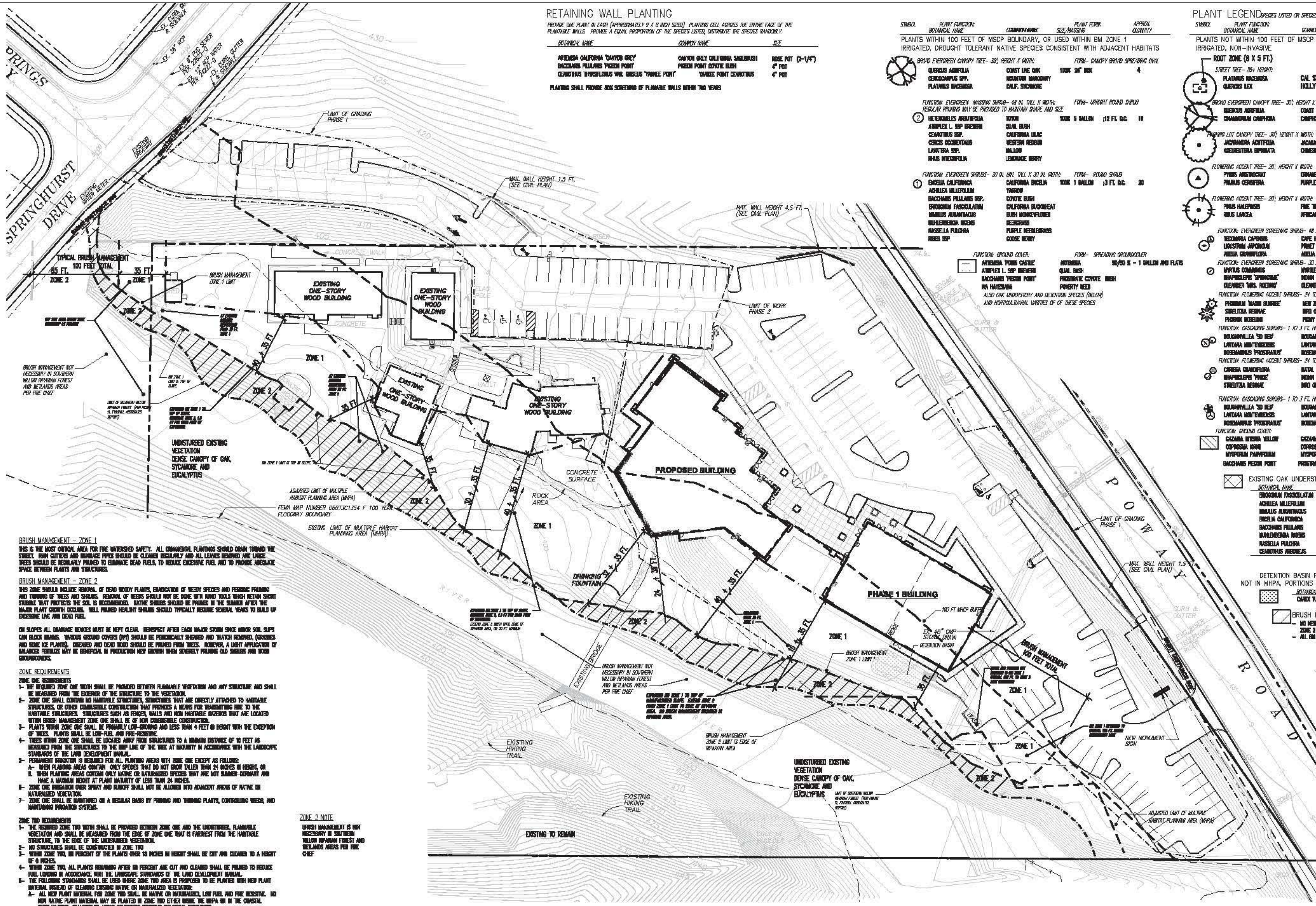

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CEANOTHUS THYRSIFLORUS VAR. GRISEUS 'YANKEE POINT'	YANKEE POINT CEANOTHUS	4" POT

PLANTING SHALL PROVIDE 80% SCREENING OF PLANABLE WALLS WITHIN TWO YEARS

SYMBOL	PLANT FUNCTION: BOTANICAL NAME	COMMON NAME	PLANT FORM: SIZE/MASSING		APPROX. QUANTITY
PLANTS WITHIN 100 FEET OF MSCP BOUNDARY, OR USED WITHIN BM ZONE 1 IRRIGATED, DROUGHT TOLERANT NATIVE SPECIES CONSISTENT WITH ADJACENT HABITATS					
	BROAD EVERGREEN CANOPY TREE- 30'; HEIGHT X WIDTH:		FORM- CANOPY BROAD SPREADING OVAL		
	QUERCUS AGRIFOLIA	COAST LIVE OAK	100% 24" BOX		4
	CERCOCARPUS SPP.	MOUNTAIN MAHOGANY			
	PLATANUS RACEMOSA	CALIF. SYCAMORE			
	FUNCTION: EVERGREEN MASSING SHRUB- 48 IN. TALL X WIDTH: REGULAR PRUNING MAY BE PROVIDED TO MAINTAIN SHAPE AND SIZE		FORM- UPRIGHT ROUND SHRUB		
2	HETEROMELES ARBUTIFOLIA	TOYON	100% 5 GALLON	;12 FT. O.C.	18
	ATRIPLEX L. SSP BREWERII	QUAIL BUSH			
	CEANOTHUS SSP.	CALIFORNIA LILAC			
	CERCIS OCCIDENTALIS	WESTERN REDBUD			
	LAVATERA SSP.	MALLOW			
	RHUS INTEGRIFOLIA	LEMONADE BERRY			
	FUNCTION: EVERGREEN SHRUBS- 30 IN. MIN. TALL X 30 IN. WIDTH:		FORM- ROUND SHRUB		
1	ENCELIA CALIFORNICA	CALIFORNIA ENCELIA	100% 1 GALLON	;3 FT. O.C.	20
	ACHILLEA MILLEFOLIUM	YARROW			
	BACCHARIS PILULARIS SSP.	COYOTE BUSH			
	ERIOGONUM FASCICULATUM	CALIFORNIA BUCKWHEAT			
	MIMULUS AURANTIACUS	BUSH MONKEYFLOWER			
	MUHLENBERGIA RIGENS	DEERGRASS			
	NASSELLA PULCHRA	PURPLE NEEDLEGRASS			
	RIBES SSP	GOOSE BERRY			
	FUNCTION: GROUND COVER:		FORM- SPREADING GROUNDCOVER		
	ARTEMISIA 'PORTS CASTLE'	ARTEMISIA	50/50 % - 1 GALLON AND FLATS		
	ATRIPLEX L. SSP BREWERII	QUAIL BUSH			
	BACCHARIS 'PIGEON POINT'	PROSTRATE COYOTE BUSH			
	IVA HAYESIANA	POVERTY WEED			
	ALSO OAK UNDERSTORY AND DETENTION SPECIES (BELOW) AND HORTICULTUARAL VARITIES OF OF THESE SPECIES				

PLANT LEGEND

SPECIES LISTED OR SPECIES WITH SIMILAR CHARACTERISTICS SHALL BE UTILIZED:

SYMBOL	PLANT FUNCTION: BOTANICAL NAME	COMMON NAME	PLANT FORM: SIZE/MASSING		APPROX. QUANTITY
PLANTS NOT WITHIN 100 FEET OF MSCP BOUNDARY, NOT IN ANY BRUSH MANAGEMENT ZONE IRRIGATED, NON-INVASIVE					
ROOT ZONE (8 X 5 FT.)	STREET TREE- 25+ HEIGHT:		FORM- BROAD UPRIGHT OVAL		
	PLATANUS RACEMOSA	CAL SYCAMORE	100% 36" BOX		11
	QUERCUS ILEX	HOLLY OAK			
	BROAD EVERGREEN CANOPY TREE- 30'; HEIGHT X WIDTH:		FORM- CANOPY BROAD SPREADING OVAL		
	QUERCUS AGRIFOLIA	COAST LIVE OAK	100% 24" BOX		18
	CINNAMOMUM CAMPHORA	CAMPHOR TREE			
	PARKING LOT CANOPY TREE- 30'; HEIGHT X WIDTH:		FORM- CANOPY BROAD SPREADING OVAL		
	JACARANDA ACUTIFOLIA	JACARANDA	100% 36" BOX		21
	KOELREUTERIA BIPINNATA	CHINESE FLAME TREE			
	FLOWERING ACCENT TREE- 20'; HEIGHT X WIDTH:		FORM- MEDIUM UPRIGHT VASE		
	PYRUS ARISTOCRAT	ORNAMENTAL PEAR	100% 24" BOX		16
	PRUNUS CERASIFERA	PURPLE LEAF PLUM			
	FLOWERING ACCENT TREE- 20'; HEIGHT X WIDTH:		FORM- MEDIUM DENSE TREE		
	PINUS HALEPENSIS	PINE TREE	100% 24" BOX		11
	RHUS LANCEA	AFRICAN SUMAC			
	FUNCTION: EVERGREEN SCREENING SHRUB- 48 IN. MIN. TALL X WIDTH:		FORM- UPRIGHT ROUND SHRUB		
	TECOMARIA CAPENSIS	CAPE HONEYSUCKLE	100% 5 GALLON	;3 FT. O.C.	53
	LIGUSTRUM JAPONICUM	PRIVET			
	ABELIA GRANDIFLORA	ABELIA			
	FUNCTION: EVERGREEN SCREENING SHRUB- 30 IN. MIN. TALL X 30 IN. WIDTH:		FORM- ROUND SHRUB		
	MYRTUS COMMUNIS	MYRTLE	100% 5 GALLON	;3 FT. O.C.	43
	RHAPHIOLEPIS 'SPRINGTIME'	INDIAN HAWTHORN			
	OLEANDER 'MRS. ROEDING'	OLEANDER			
	FUNCTION: FLOWERING ACCENT SHRUBS- 24 TO 36 IN. HIGH X WIDTH:		FORM- ARCHING SHRUB		
	PHORMIUM 'MAORI SUNRISE'	NEW ZEALAND FLAX	100% 5 GALLON	;3 FT. O.C.	61
	STRELITZIA REGINAE	BIRD OF PARADISE			
	PHOENIX ROEBELINII	PIGMY DATE PALM			
	FUNCTION: CASCADING SHRUBS- 1 TO 3 FT. HIGH X 5 FT. WIDTH:		FORM- SPREADING CASCADING SHRUB		
	BOUGAINVILLEA 'SD RED'	BOUGAINVILLEA	100% 5 GALLON	;6 FT. O.C.	42
	LANTANA MONTEVIDENSIS	LANTANA			
	ROSEMARINUS 'PROSTRATUS'	ROSEMARY			
	FUNCTION: FLOWERING ACCENT SHRUBS- 24 TO 36 IN. HIGH X WIDTH:		FORM- ARCHING SHRUB		
	CARISSA GRANDIFLORA	NATAL PLUM	100% 5 GALLON	;3 FT. O.C.	38
	RHAPHIOLEPIS 'PINKIE'	INDIAN HAWTHORN			
	STRELITZIA REGINAE	BIRD OF PARADISE			
	FUNCTION: CASCADING SHRUBS- 1 TO 3 FT. HIGH X 5 FT. WIDTH:		FORM- SPREADING CASCADING SHRUB		
	BOUGAINVILLEA 'SD RED'	BOUGAINVILLEA	100% 5 GALLON	;6 FT. O.C.	22
	LANTANA MONTEVIDENSIS	LANTANA			
	ROSEMARINUS 'PROSTRATUS'	ROSEMARY			
	FUNCTION: GROUND COVER:		FORM- SPREADING GROUNDCOVER		
	GAZANIA MITSUWA YELLOW	GAZANIA	100% FLATS		
	COPROSMA KIRKII	COPROSMA			
	MYOPORUM PARVIFOLIUM	MYOPORUM			
	BACCHARIS PIGEON POINT	PROSTRATE COYOTE BUSH			

EXISTING OAK UNDERSTORY PLANTINGS – NON IRRIGATED

BOTANICAL NAME	COMMON NAME	SIZE	DENSITY (PLANTS / ACRE)
ERIOGONUM FASCICULATUM	CALIFORNIA BUCKWHEAT	1 GALLON 100%	300
ACHILLEA MILLEFOLIUM	YARROW		200
MIMULUS AURANTIACUS	BUSH MONKEYFLOWER		200
ENCELIA CALIFORNICA	CALIFORNIA ENCELIA		250
BACCHARIS PILULARIS	COYOTE BUSH		300
MUHLENBERGIA RIGENS	DEERGRASS		450
NASSELLA PULCHRA	PURPLE NEEDLEGRASS		400
CEANOTHUS ARBOREUS	CALIFORNIA LILAC		400
		TOTAL	2400

DETENTION BASIN PLANTING

NOT IN MHPA, PORTIONS WITHIN 100 FEET OF MHPA, BM ZONE 1 – IRRIGATED

BOTANICAL NAME	COMMON NAME		
CAREX TUMULICOLA	FOOTHILL SEDGE	1 GALLON	24 IN. O.C.

BRUSH MANAGEMENT ZONE 2
- NO NEW LANDSCAPING IS PROPOSED FOR BRUSH MANAGEMENT ZONE 2 AREAS
- ALL BM ZONE 2 AREA ARE EXISTING LANDSCAPE TO REMAIN

EXISTING LANDSCAPE TO REMAIN
- NOT WITHIN 100 FEET OF MHPA
- WITHIN MHPA OR 100 FEET OF MHPA

INVASIVE PLANT NOTE

ALL EXISTING INVASIVE PLANT SPECIES, INCLUDING VEGETATIVE PARTS AND ROOT SYSTEMS, SHALL BE COMPLETELY REMOVED FROM THE PREMISES WHEN THE COMBINATION OF SPECIES, TYPE, LOCATION AND SURROUNDING ENVIRONMENTAL CONDITIONS PROVIDES A MEANS FOR THE SPECIES TO INVADE OTHER AREAS OF NATIVE PLANT MATERIAL THAT ARE ON OR OFF OF THE PREMISES.

ALL LANDSCAPING SHALL CONSIST OF NON-INVASIVE PLANT SPECIES. NO INVASIVE NON NATIVE PLANT SPECIES SHALL BE INTRODUCED WITHIN 100 FEET OF AREAS WITH NATIVE OR NATURALIZED VEGETATION.

BRUSH MANAGEMENT – ZONE 1

THIS IS THE MOST CRITICAL AREA FOR FIRE WATERSHED SAFETY. ALL ORNAMENTAL PLANTINGS SHOULD DRAIN TOWARD THE STREET. RAIN GUTTERS AND DRAINAGE PIPES SHOULD BE CLEANED REGULARLY AND ALL LEAVES REMOVED AND LARGE TREES SHOULD BE REGULARLY PRUNED TO ELIMINATE DEAD FUELS, TO REDUCE EXCESSIVE FUEL AND TO PROVIDE ADEQUATE SPACE BETWEEN PLANTS AND STRUCTURES.

BRUSH MANAGEMENT – ZONE 2

THIS ZONE SHOULD INCLUDE REMOVAL OF DEAD WOODY PLANTS, ERADICATION OF WEEDY SPECIES AND PERIODIC PRUNING AND THINNING OF TREES AND SHRUBS. REMOVAL OF WEEDS SHOULD NOT BE DONE WITH HAND TOOLS WHICH RETAIN SHORT STUBBLE THAT PROTECTS THE SOIL IS RECOMMENDED. NATIVE SHRUBS SHOULD BE PRUNED IN THE SUMMER AFTER THE MAJOR PLANT GROWTH OCCURS. WELL PRUNED HEALTHY SHRUBS SHOULD TYPICALLY REQUIRE SEVERAL YEARS TO BUILD UP EXCESSIVE LIVE AND DEAD FUEL.

ON SLOPES ALL DRAINAGE DEVICES MUST BE KEPT CLEAR. REINSPECT AFTER EACH MAJOR STORM SINCE MINOR SOIL SLIPS CAN BLOCK DRAINS. VARIOUS GROUND COVERS (IVY) SHOULD BE PERIODICALLY SHEARED AND THATCH REMOVED, (GRASSES AND SOME ICE PLANTS). DISEASED AND DEAD WOOD SHOULD BE PRUNED FROM TREES. HOWEVER, A LIGHT APPLICATION OF BALANCED FERTILIZE MAY BE BENEFICIAL IN PRODUCTION NEW GROWTH WHEN SEVERELY PRUNING OLD SHRUBS AND WOODY GROUNDCOVERS.

ZONE REQUIREMENTS

ZONE ONE REQUIREMENTS

1- THE REQUIRED ZONE ONE WIDTH SHALL BE PROVIDED BETWEEN FLAMMABLE VEGETATION AND ANY STRUCTURE AND SHALL BE MEASURED FROM THE EXTERIOR OF THE STRUCTURE TO THE VEGETATION.
2- ZONE ONE SHALL CONTAIN NO HABITABLE STRUCTURES, STRUCTURES THAT ARE DIRECTLY ATTACHED TO HABITABLE STRUCTURES, OR OTHER COMBUSTIBLE CONSTRUCTION THAT PROVIDES A MEANS FOR TRANSMITTING FIRE TO THE HABITABLE STRUCTURES. STRUCTURES SUCH AS FENCES, WALLS AND NON HABITABLE GAZEBOS THAT ARE LOCATED WITHIN BRUSH MANAGEMENT ZONE ONE SHALL BE OF NON COMBUSTIBLE CONSTRUCTION.
3- PLANTS WITHIN ZONE ONE SHALL BE PRIMARILY LOW-GROWING AND LESS THAN 4 FEET IN HEIGHT WITH THE EXCEPTION OF TREES. PLANTS SHALL BE LOW-FUEL AND FIRE-RESISTIVE.
4- TREES WITHIN ZONE ONE SHALL BE LOCATED AWAY FROM STRUCTURES TO A MINIMUM DISTANCE OF 10 FEET AS MEASURED FROM THE STRUCTURES TO THE DRIP LINE OF THE TREE AT MATURITY IN ACCORDANCE WITH THE LANDSCAPE STANDARDS OF THE LAND DEVELOPMENT MANUAL.
5- PERMANENT IRRIGATION IS REQUIRED FOR ALL PLANTING AREAS WITH ZONE ONE EXCEPT AS FOLLOWS:
   A- WHEN PLANTING AREAS CONTAIN ONLY SPECIES THAT DO NOT GROW TALLER THAN 24 INCHES IN HEIGHT, OR
   B. WHEN PLANTING AREAS CONTAIN ONLY NATIVE OR NATURALIZED SPECIES THAT ARE NOT SUMMER-DORMANT AND HAVE A MAXIMUM HEIGHT AT PLANT MATURITY OF LESS THAN 24 INCHES.
6- ZONE ONE IRRIGATION OVER SPRAY AND RUNOFF SHALL NOT BE ALLOWED INTO ADJACENT AREAS OF NATIVE OR NATURALIZED VEGETATION.
7- ZONE ONE SHALL BE MAINTAINED ON A REGULAR BASIS BY PRUNING AND THINNING PLANTS, CONTROLLING WEEDS, AND MAINTAINING IRRIGATION SYSTEMS.

ZONE TWO REQUIREMENTS

1- THE REQUIRED ZONE TWO WIDTH SHALL BE PROVIDED BETWEEN ZONE ONE AND THE UNDISTURBED, FLAMMABLE VEGETATION AND SHALL BE MEASURED FROM THE EDGE OF ZONE ONE THAT IS FARTHEST FROM THE HABITABLE STRUCTURE, TO THE EDGE OF THE UNDISTURBED VEGETATION.
2- NO STRUCTURES SHALL BE CONSTRUCTED IN ZONE TWO
3- WITHIN ZONE TWO, 50 PERCENT OF THE PLANTS OVER 18 INCHES IN HEIGHT SHALL BE CUT AND CLEARED TO A HEIGHT OF 6 INCHES.
4- WITHIN ZONE TWO, ALL PLANTS REMAINING AFTER 50 PERCENT ARE CUT AND CLEARED SHALL BE PRUNED TO REDUCE FUEL LOADING IN ACCORDANCE WITH THE LANDSCAPE STANDARDS OF THE LAND DEVELOPMENT MANUAL.
5- THE FOLLOWING STANDARDS SHALL BE USED WHERE ZONE TWO AREA IS PROPOSED TO BE PLANTED WITH NEW PLANT MATERIAL INSTEAD OF CLEARING EXISTING NATIVE OR NATURALIZED VEGETATION:
   A- ALL NEW PLANT MATERIAL FOR ZONE TWO SHALL BE NATIVE OR NATURALIZED, LOW FUEL AND FIRE RESISTIVE. NO NON NATIVE PLANT MATERIAL MAY BE PLANTED IN ZONE TWO EITHER INSIDE THE MHPA OR IN THE COASTAL OVERLAY ZONE, ADJACENT TO AREAS CONTAINING SENSITIVE BIOLOGICAL RESOURCES.
   B. NEW PLANTS SHALL BE LOW GROWING WITH A MAXIMUM HEIGHT AT MATURITY OF 2 FEET. SINGLE SPECIMENS OF FIRE RESISTIVE NATIVE TREES MAY EXCEED THIS LIMITATION IF THEY ARE LOCATED TO REDUCE THE CHANCE OF TRANSMITTING FIRE FROM NATIVE OR NATURALIZED VEGETATION TO HABITABLE STRUCTURES.
   C. ALL NEW ZONE TWO PLANTINGS SHALL BE TEMPORARILY IRRIGATED UNTIL ESTABLISHED. PERMANENT IRRIGATION IS NOT ALLOWED IN ZONE TWO. ONLY LOW FLOW, LOW GALLONAGE SPRAY HEADS MAY BE USED IN ZONE TWO. OVER SPRAY AND RUNOFF FROM THE IRRIGATION SHALL NOT DRIFT OR FLOW INTO ADJACENT AREAS OF NATIVE OF NATURALIZED VEGETATION.
   D. WHERE ZONE TWO IS BEING REVEGETATED AS A REQUIREMENT OF SECTION 142.0411(A), A REVEGETATION SHALL COMPLY WITH THE SPACING STANDARDS IN THE LAND DEVELOPMENT MANUAL. FIFTY PERCENT OF THE PLANTING AREA SHALL BE PLANTED WITH MATERIAL THAT DOES NOT GROW TALLER THAT 24 INCHES./ THE REMAINING PLANTING AREA MAY BE PLANTED WITH TALLER MATERIAL, BUT THIS MATERIAL SHALL BE MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS FOR EXISTING PLANT MATERIAL IN ZONE TWO
6- ZONE TWO SHALL BE MAINTAINED ON A REGULAR BASIS BY PRUNING AND THINNING PLANTS, CONTROLLING WEEDS, AND MAINTAINING IRRIGATION SYSTEMS.

BRUSH MANAGEMENT – MAINTENANCE NOTES

REGULAR INSPECTIONS AND LANDSCAPE MAINTENANCE ARE NECESSARY TO MINIMIZE THE POTENTIAL DAMAGE OR LOSS OF PROPERTY FROM BRUSH FIRES AND OTHER NATURAL HAZARDS SUCH AS EROSION AND SLOPE FAILURES.

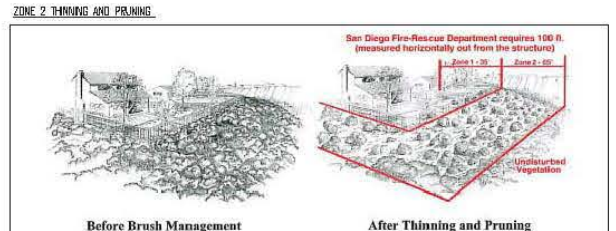
BRUSH MANAGEMENT NOTE

THE MODIFIED BRUSH MANAGEMENT PLAN HAS BEEN APPROVED BY THE DEPUTY FIRE MARSHALL AND THE LANDSCAPE SECTION OF THE DEVELOPMENT SERVICES DEPARTMENT.

ZONE 2 NOTE

BRUSH MANAGEMENT IS NOT NECESSARY IN SOUTHERN WILLOW RIPARIAN FOREST AND WETLANDS AREAS PER FIRE CHIEF

ZONE 2 THINNING AND PRUNING



Before Brush Management   After Thinning and Pruning

BRUSH MANAGEMENT ZONES

BRUSH MANAGEMENT ZONE WIDTH REQUIREMENTS- PER LDC 142-04H

ZONE 1 – MINIMUM WIDTH 35 FT.
CONSISTS OF PAVEMENT AND PERMANENTLY IRRIGATED ORNAMENTAL PLANTING

ZONE 2 – MINIMUM WIDTH 65 FT.
CONSISTS OF THINNED AND NATIVE OR NATURALIZED VEGETATION

WHERE INDICATED ON THIS PLAN, ZONE 1 IS INCREASED IN WIDTH WITH A CORRESPONDING DECREASE IN ZONE 2 OF ONE AND ONE HALF FOOT FOR EACH FOOT OF ZONE ONE INCREASE

ADJACENT TO EXISTING BUILDINGS, WHERE INDICATED ON THIS PLAN, ZONE 1 IS DECREASED IN WIDTH WITH A CORRESPONDING INCREASE IN ZONE 2 OF ONE FOOT FOR EACH FOOT OF ZONE ONE INCREASE.

A PORTION OF THE BRUSH MANAGEMENT ZONE ONE IS ON SLOPE WITH A GRADIENT GREATER THAN 4:1. THE PROPERTY RECEIVED TENTATIVE MAP APPROVAL BEFORE NOVEMBER 15, 1989.

BRUSH MANAGEMENT PLAN

NORTH   SCALE 0 30 60 FT. 1"=30'-0"

NOTE

THE MODIFIED BRUSH MANAGEMENT PLAN HAS BEEN APPROVED BY THE DEPUTY FIRE MARSHALL AND THE LANDSCAPE SECTION OF THE DEVELOPMENT SERVICES DEPARTMENT.

AHLES LANDSCAPE ARCHITECTURE INC.
P.O. Box 1503
Rancho Santa Fe, California
92067
858.756.8963
CA# 2536

PROJECT NO.: 0711

LANDSCAPE DEVELOPMENT PLAN

NORTH CITY PRESBYTERIAN CHURCH

San Diego, California

PREVIOUS: 30 JUL 07

REFERENCE: PTS 150585

SHEET: L-3

PREPARED BY:
NAME: AHLES LANDSCAPE ARCHITECTURE
PO BOX 150.
RANCHO SANTA FE,, CA 92067
PHONE #: 858.756.8963

PROJECT ADDRESS:
–
SAN DIEGO, CA.

PROJECT NAME:
NORTH CITY
PRESBYTERIAN CHURCH
–

SHEET TITLE:
LANDSCAPE DEVELOPMENT PLAN
BRUSH MANAGEMENT PLAN

REVISION 14:	
REVISION 13:	
REVISION 12:	
REVISION 11:	CYCLE– 29 NOV 13
REVISION 10:	CYCLE– 1 MAR 13
REVISION 9:	CYCLE– 31 JUL 12
REVISION 8:	BIO FIG 4– 16 SEP 10
REVISION 7:	1 JUL 10
REVISION 6:	MHPA–– 3 MAY 10
REVISION 5:	BM–– 16 FEB 10
REVISION 4:	16 NOV 09
REVISION 3:	20 APR 09
REVISION 2:	3 MAR 09
REVISION 1:	10 AUG 08
ORIGINAL DATE:	10 AUG 07
SHEET 3	OF 4
DEP#	

NORTH CITY PRESBYTERIAN CHURCH

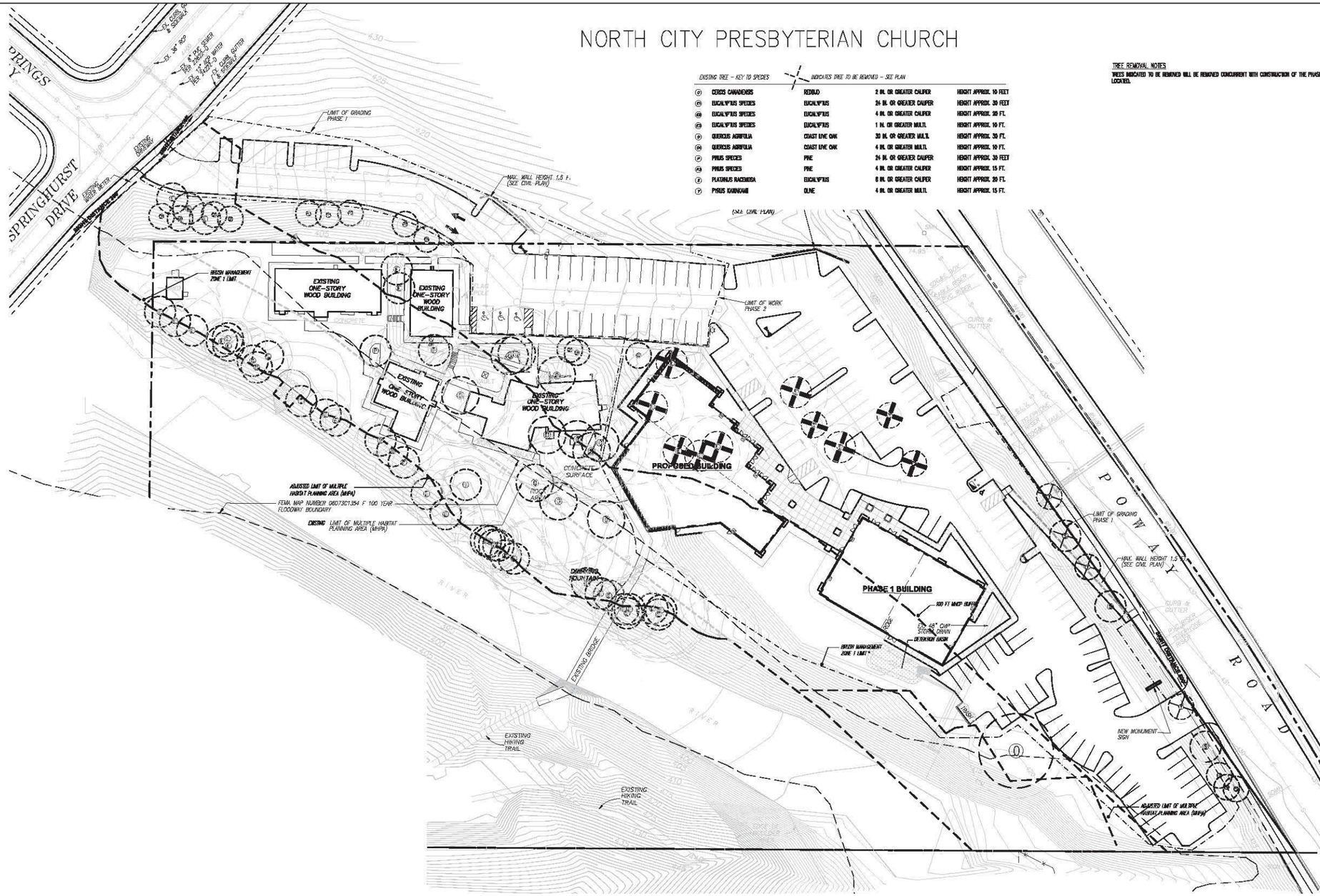
(C)	CERCIS CANADENSIS	REDBUD	2 IN. OR GREATER CALIPER	HEIGHT APPROX. 10 FEET
(EU)	EUCALYPTUS SPECIES	EUCALYPTUS	24 IN. OR GREATER CALIPER	HEIGHT APPROX. 30 FEET
(EU)	EUCALYPTUS SPECIES	EUCALYPTUS	4 IN. OR GREATER CALIPER	HEIGHT APPROX. 30 FT.
(EU)	EUCALYPTUS SPECIES	EUCALYPTUS	1 IN. OR GREATER MULTI.	HEIGHT APPROX. 10 FT.
(Q)	QUERCUS AGRIFOLIA	COAST LIVE OAK	30 IN. OR GREATER MULTI.	HEIGHT APPROX. 30 FT.
(Q)	QUERCUS AGRIFOLIA	COAST LIVE OAK	4 IN. OR GREATER MULTI.	HEIGHT APPROX. 10 FT.
(P)	PINUS SPECIES	PINE	24 IN. OR GREATER CALIPER	HEIGHT APPROX. 30 FEET
(P)	PINUS SPECIES	PINE	4 IN. OR GREATER CALIPER	HEIGHT APPROX. 15 FT.
(P)	PLATANUS RACEMOSA	EUCALYPTUS	8 IN. OR GREATER CALIPER	HEIGHT APPROX. 20 FT.
(P)	PYRUS KAINKANI	OLIVE	4 IN. OR GREATER MULTI.	HEIGHT APPROX. 15 FT.

EXISTING TREE - KEY TO SPECIES

INDICATES TREE TO BE REMOVED - SEE PLAN

TREE REMOVAL NOTES

TREES INDICATED TO BE REMOVED WILL BE REMOVED CONCURRENT WITH CONSTRUCTION OF THE PHASE IN WHICH IT IS LOCATED.



EXISTING TREE AND REMOVAL PLAN

NORTH

0 30 60 FT.

SCALE 1"=30'-0"

AHLES LANDSCAPE ARCHITECTURE INC.

P.O. Box 1503
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CA# 2838

PROJECT NO.: 0711

LANDSCAPE DEVELOPMENT PLAN

NORTH CITY PRESBYTERIAN CHURCH

San Diego, California

PREVIOUS: 30 JUL 07

REFERENCE: – PTS 150585

SHEET:

L-4

PREPARED BY:

NAME: AHLES LANDSCAPE ARCHITECTURE
PO BOX 150,
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PHONE #: 858.756.8963

PROJECT ADDRESS:
–
SAN DIEGO, CA.

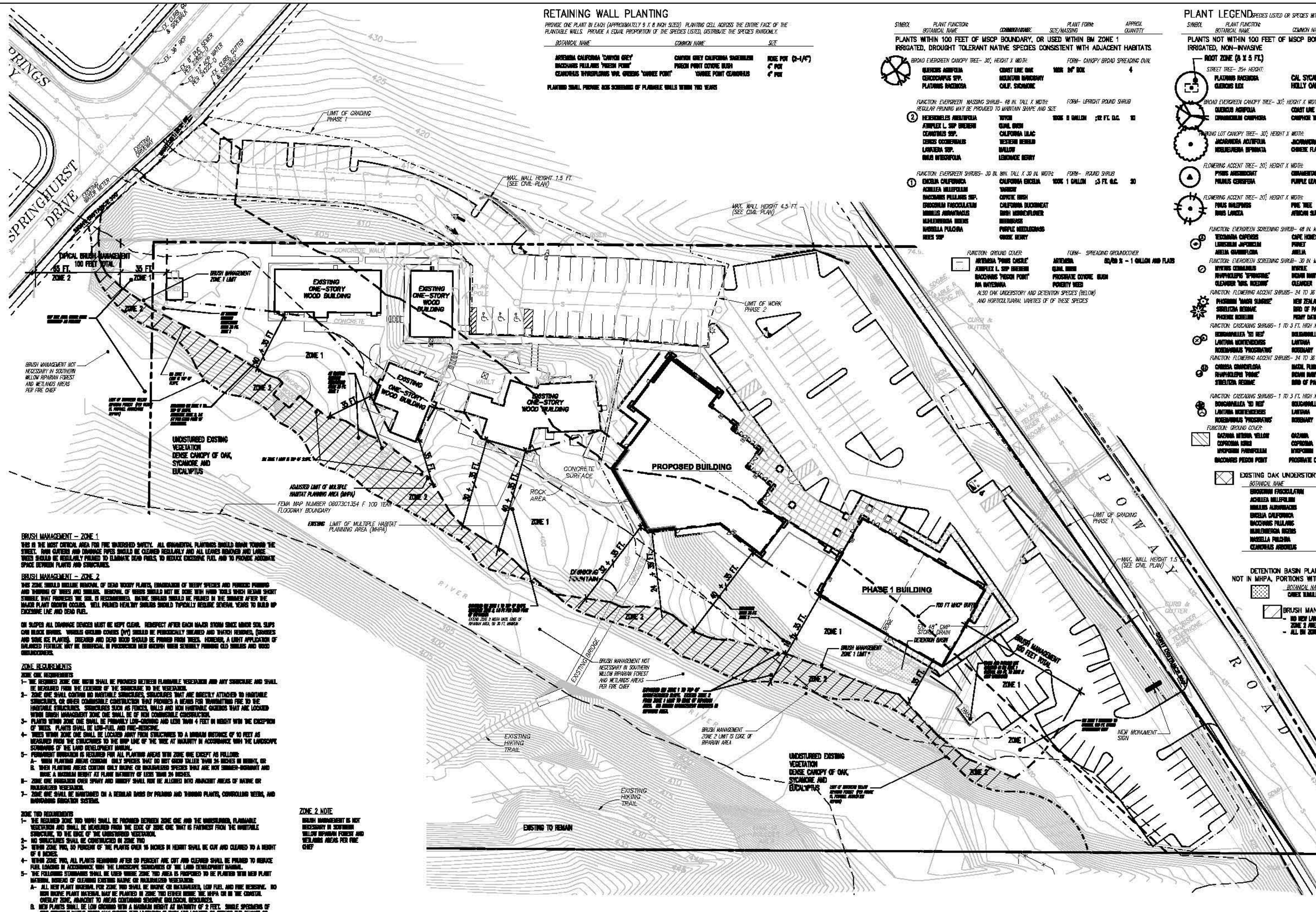
PROJECT NAME:
NORTH CITY
PRESBYTERIAN CHURCH
–

SHEET TITLE:
LANDSCAPE DEVELOPMENT PLAN
EXISTING TREES

REVISION 14:	
REVISION 13:	
REVISION 12:	
REVISION 11:	CYCLE- 29 NOV 13
REVISION 10:	CYCLE- 1 MAR 13
REVISION 9:	CYCLE- 31 JUL 12
REVISION 8:	BIO FIG 4- 16 SEP 10
REVISION 7:	1 JUL 10
REVISION 6:	MHPA- 3 MAY 10
REVISION 5:	BM- 16 FEB 10
REVISION 4:	16 NOV 09
REVISION 3:	20 APR 09
REVISION 2:	3 MAR 09
REVISION 1:	10 AUG 08
ORIGINAL DATE:	10 AUG 07
SHEET	4 OF 4
DEPV	

Appendix E

BRUSH MANAGEMENT PLAN



RETAINING WALL PLANTING

PROVIDE ONE PLANT IN EACH (APPROXIMATELY 9 X 8 INCH SIZED) PLANTING CELL ACROSS THE ENTIRE FACE OF THE PLANTABLE WALLS. PROVIDE A EQUAL PROPORTION OF THE SPECIES LISTED, DISTRIBUTE THE SPECIES RANDOMLY.

BOTANICAL NAME	COMMON NAME	SIZE
ARTEMISIA CALIFORNICA 'CANYON GREY'	CANYON GREY CALIFORNIA SAGEBRUSH	ROSE POT (2-1/4")
BACCHARIS PILULARIS 'PIGEON POINT'	PIGEON POINT COYOTE BUSH	4" POT
CEANOTHUS THYRSIFLORUS VAR. GRISEUS 'YANKEE POINT'	YANKEE POINT CEANOTHUS	4" POT

PLANTING SHALL PROVIDE 80% SCREENING OF PLANTABLE WALLS WITHIN TWO YEARS

PLANT LEGEND

PLANTS WITHIN 100 FEET OF MSCP BOUNDARY, OR USED WITHIN BM ZONE 1 IRRIGATED, DROUGHT TOLERANT NATIVE SPECIES CONSISTENT WITH ADJACENT HABITATS

PLANTS NOT WITHIN 100 FEET OF MSCP BOUNDARY, NOT IN ANY BRUSH MANAGEMENT ZONE IRRIGATED, NON-INVASIVE

EXISTING OAK UNDERSTORY PLANTINGS – NON IRRIGATED

DETENTION BASIN PLANTING
NOT IN MHPA, PORTIONS WITHIN 100 FEET OF MHPA, BM ZONE 1 – IRRIGATED

BRUSH MANAGEMENT ZONE 2

EXISTING LANDSCAPE TO REMAIN

INVASIVE PLANT NOTE

BRUSH MANAGEMENT – ZONE 1

THIS IS THE MOST CRITICAL AREA FOR FIRE WATERSHED SAFETY. ALL ORNAMENTAL PLANTINGS SHOULD DRAIN TOWARD THE STREET. RAIN GUTTERS AND DRAINAGE PIPES SHOULD BE CLEANED REGULARLY AND ALL LEAVES REMOVED AND LARGE TREES SHOULD BE REGULARLY PRUNED TO ELIMINATE DEAD FUELS, TO REDUCE EXCESSIVE FUEL AND TO PROVIDE ADEQUATE SPACE BETWEEN PLANTS AND STRUCTURES.

BRUSH MANAGEMENT – ZONE 2

THIS ZONE SHOULD INCLUDE REMOVAL OF DEAD WOODY PLANTS, ERADICATION OF WEEDY SPECIES AND PERIODIC PRUNING AND THINNING OF TREES AND SHRUBS. REMOVAL OF WEEDS SHOULD NOT BE DONE WITH HAND TOOLS WHICH RETAIN SHORT STUBBLE THAT PROTECTS THE SOIL IS RECOMMENDED. NATIVE SHRUBS SHOULD BE PRUNED IN THE SUMMER AFTER THE MAJOR PLANT GROWTH OCCURS. WELL PRUNED HEALTHY SHRUBS SHOULD TYPICALLY REQUIRE SEVERAL YEARS TO BUILD UP EXCESSIVE LIVE AND DEAD FUEL.

ON SLOPES ALL DRAINAGE DEVICES MUST BE KEPT CLEAR. REINSPECT AFTER EACH MAJOR STORM SINCE MINOR SOIL SLIPS CAN BLOCK DRAINS. WOODY GROUND COVERS (IVY) SHOULD BE PERIODICALLY SHEARED AND THATCH REMOVED, (GRASSES AND SOME ICE PLANTS). DISEASED AND DEAD WOOD SHOULD BE PRUNED FROM TREES. HOWEVER, A LIGHT APPLICATION OF BALANCED FERTILIZER MAY BE BENEFICIAL IN PRODUCING NEW GROWTH WHEN SEVERELY PRUNING OLD SHRUBS AND WOOD GROUNDCOVERS.

ZONE REQUIREMENTS

ZONE ONE REQUIREMENTS

1- THE REQUIRED ZONE ONE WIDTH SHALL BE PROVIDED BETWEEN FLAMMABLE VEGETATION AND ANY STRUCTURE AND SHALL BE MEASURED FROM THE EXTERIOR OF THE STRUCTURE TO THE VEGETATION.
2- ZONE ONE SHALL CONTAIN NO HABITABLE STRUCTURES, STRUCTURES THAT ARE DIRECTLY ATTACHED TO HABITABLE STRUCTURES, OR OTHER COMBUSTIBLE CONSTRUCTION THAT PROVIDES A MEANS FOR TRANSMITTING FIRE TO THE HABITABLE STRUCTURES. STRUCTURES SUCH AS FENCES, WALLS AND NON HABITABLE GAZEBOS THAT ARE LOCATED WITHIN BRUSH MANAGEMENT ZONE ONE SHALL BE OF NON COMBUSTIBLE CONSTRUCTION.
3- PLANTS WITHIN ZONE ONE SHALL BE PRIMARILY LOW-GROWING AND LESS THAN 4 FEET IN HEIGHT WITH THE EXCEPTION OF TREES. PLANTS SHALL BE LOW-FUEL AND FIRE-RESISTIVE.
4- TREES WITHIN ZONE ONE SHALL BE LOCATED AWAY FROM STRUCTURES TO A MINIMUM DISTANCE OF 10 FEET AS MEASURED FROM THE STRUCTURES TO THE DRIP LINE OF THE TREE AT MATURITY IN ACCORDANCE WITH THE LANDSCAPE STANDARDS OF THE LAND DEVELOPMENT MANUAL.
5- PERMANENT IRRIGATION IS REQUIRED FOR ALL PLANTING AREAS WITH ZONE ONE EXCEPT AS FOLLOWS:
A- WHEN PLANTING AREAS CONTAIN ONLY SPECIES THAT DO NOT GROW TALLER THAN 24 INCHES IN HEIGHT, OR
B. WHEN PLANTING AREAS CONTAIN ONLY NATIVE OR NATURALIZED SPECIES THAT ARE NOT SUMMER-DORMANT AND HAVE A MAXIMUM HEIGHT AT PLANT MATURITY OF LESS THAN 24 INCHES.
6- ZONE ONE IRRIGATION OVER SPRAY AND RUNOFF SHALL NOT BE ALLOWED INTO ADJACENT AREAS OF NATIVE OR NATURALIZED VEGETATION.
7- ZONE ONE SHALL BE MAINTAINED ON A REGULAR BASIS BY PRUNING AND THINNING PLANTS, CONTROLLING WEEDS, AND MAINTAINING IRRIGATION SYSTEMS.

ZONE TWO REQUIREMENTS

1- THE REQUIRED ZONE TWO WIDTH SHALL BE PROVIDED BETWEEN ZONE ONE AND THE UNDISTURBED, FLAMMABLE VEGETATION AND SHALL BE MEASURED FROM THE EDGE OF ZONE ONE THAT IS FARTHEST FROM THE HABITABLE STRUCTURE, TO THE EDGE OF THE UNDISTURBED VEGETATION.
2- NO STRUCTURES SHALL BE CONSTRUCTED IN ZONE TWO
3- WITHIN ZONE TWO, 50 PERCENT OF THE PLANTS OVER 18 INCHES IN HEIGHT SHALL BE CUT AND CLEARED TO A HEIGHT OF 6 INCHES.
4- WITHIN ZONE TWO, ALL PLANTS REMAINING AFTER 50 PERCENT ARE CUT AND CLEARED SHALL BE PRUNED TO REDUCE FUEL LOADING IN ACCORDANCE WITH THE LANDSCAPE STANDARDS OF THE LAND DEVELOPMENT MANUAL.
5- THE FOLLOWING STANDARDS SHALL BE USED WHERE ZONE TWO AREA IS PROPOSED TO BE PLANTED WITH NEW PLANT MATERIAL INSTEAD OF CLEARING EXISTING NATIVE OR NATURALIZED VEGETATION:
A- ALL NEW PLANT MATERIAL FOR ZONE TWO SHALL BE NATIVE OR NATURALIZED, LOW FUEL AND FIRE RESISTIVE. NO NON NATIVE PLANT MATERIAL MAY BE PLANTED IN ZONE TWO EITHER INSIDE THE MHPA OR IN THE COASTAL OVERLAY ZONE, ADJACENT TO AREAS CONTAINING SENSITIVE BIOLOGICAL RESOURCES.
B. NEW PLANTS SHALL BE LOW GROWING WITH A MAXIMUM HEIGHT AT MATURITY OF 2 FEET. SINGLE SPECIMENS OF FIRE RESISTIVE NATIVE TREES MAY EXCEED THIS LIMITATION IF THEY ARE LOCATED TO REDUCE THE CHANCE OF TRANSMITTING FIRE FROM NATIVE OR NATURALIZED VEGETATION TO HABITABLE STRUCTURES.
C. ALL NEW ZONE TWO PLANTINGS SHALL BE TEMPORARILY IRRIGATED UNTIL ESTABLISHED. PERMANENT IRRIGATION IS NOT ALLOWED IN ZONE TWO. ONLY LOW FLOW, LOW GALLONAGE SPRAY HEADS MAY BE USED IN ZONE TWO. OVER SPRAY AND RUNOFF FROM THE IRRIGATION SHALL NOT DRIFT OR FLOW INTO ADJACENT AREAS OF NATIVE OF NATURALIZED VEGETATION.
D. WHERE ZONE TWO IS BEING REVEGETATED AS A REQUIREMENT OF SECTION 142.0411(A), A REVEGETATION SHALL COMPLY WITH THE SPACING STANDARDS IN THE LAND DEVELOPMENT MANUAL. FIFTY PERCENT OF THE PLANTING AREA SHALL BE PLANTED WITH MATERIAL THAT DOES NOT GROW TALLER THAT 24 INCHES/ THE REMAINING PLANTING AREA MAY BE PLANTED WITH TALLER MATERIAL, BUT THIS MATERIAL SHALL BE MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS FOR EXISTING PLANT MATERIAL IN ZONE TWO
6- ZONE TWO SHALL BE MAINTAINED ON A REGULAR BASIS BY PRUNING AND THINNING PLANTS, CONTROLLING WEEDS, AND MAINTAINING IRRIGATION SYSTEMS.

BRUSH MANAGEMENT – MAINTENANCE NOTES

REGULAR INSPECTIONS AND LANDSCAPE MAINTENANCE ARE NECESSARY TO MINIMIZE THE POTENTIAL DAMAGE OR LOSS OF PROPERTY FROM BRUSH FIRES AND OTHER NATURAL HAZARDS SUCH AS EROSION AND SLOPE FAILURES.

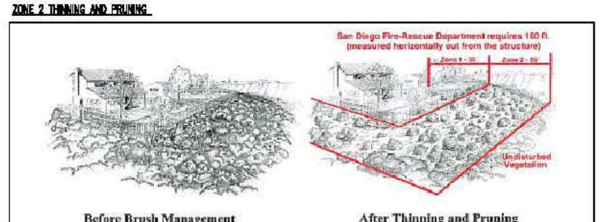
BRUSH MANAGEMENT NOTE

THE MODIFIED BRUSH MANAGEMENT PLAN HAS BEEN APPROVED BY THE DEPUTY FIRE MARSHALL AND THE LANDSCAPE SECTION OF THE DEVELOPMENT SERVICES DEPARTMENT.

ZONE 2 NOTE

BRUSH MANAGEMENT IS NOT NECESSARY IN SOUTHERN WILLOW RIPARIAN FOREST AND WETLANDS AREAS PER FIRE CHIEF

ZONE 2 THINNING AND PRUNING



Before Brush Management   After Thinning and Pruning

BRUSH MANAGEMENT ZONES

BRUSH MANAGEMENT ZONE WIDTH REQUIREMENTS– PER LDC 142-04H

ZONE 1 – MINIMUM WIDTH 35 FT.
CONSISTS OF PAVEMENT AND PERMANENTLY IRRIGATED ORNAMENTAL PLANTING

ZONE 2 – MINIMUM WIDTH 65 FT.
CONSISTS OF THINNED AND NATIVE OR NATURALIZED VEGETATION

WHERE INDICATED ON THIS PLAN, ZONE 1 IS INCREASED IN WIDTH WITH A CORRESPONDING DECREASE IN ZONE 2 OF ONE AND ONE HALF FOOT FOR EACH FOOT OF ZONE ONE INCREASE

ADJACENT TO EXISTING BUILDINGS, WHERE INDICATED ON THIS PLAN, ZONE 1 IS DECREASED IN WIDTH WITH A CORRESPONDING INCREASE IN ZONE 2 OF ONE FOOT FOR EACH FOOT OF ZONE ONE INCREASE.

A PORTION OF THE BRUSH MANAGEMENT ZONE ONE IS ON SLOPE WITH A GRADIENT GREATER THAN 4:1. THE PROPERTY RECEIVED TENTATIVE MAP APPROVAL BEFORE NOVEMBER 16, 1989.

BRUSH MANAGEMENT PLAN

NORTH   SCALE 0 30 60 FT.   1"=30'-0"

NOTE

THE MODIFIED BRUSH MANAGEMENT PLAN HAS BEEN APPROVED BY THE DEPUTY FIRE MARSHALL AND THE LANDSCAPE SECTION OF THE DEVELOPMENT SERVICES DEPARTMENT.

AHLES
LANDSCAPE
ARCHITECTURE INC.

P.O. Box 1503
Rancho Santa Fe, California
92067
858.756.8963

CA# 2538

PROJECT NO.: 0711

LANDSCAPE DEVELOPMENT PLAN

NORTH CITY PRESBYTERIAN CHURCH

San Diego, California

PREVIOUS: 30 JUL 07

REFERENCE: PTS 150585

SHEET: L-3

PREPARED BY:
NAME: AHLES LANDSCAPE ARCHITECTURE
PO BOX 1501
RANCHO SANTA FE,, CA 92067
PHONE #: 858.756.8963

PROJECT ADDRESS:
SAN DIEGO, CA.

PROJECT NAME:
NORTH CITY
PRESBYTERIAN CHURCH

SHEET TITLE:
LANDSCAPE DEVELOPMENT PLAN
BRUSH MANAGEMENT PLAN

REVISION 14:	
REVISION 13:	
REVISION 12:	
REVISION 11:	CYCLE– 29 NOV 13
REVISION 10:	CYCLE– 1 MAR 13
REVISION 9:	CYCLE– 31 JUL 12
REVISION 8:	BIO FIG 4– 16 SEP 10
REVISION 7:	1 JUL 10
REVISION 6:	MHPA–– 3 MAY 10
REVISION 5:	BM–– 16 FEB 10
REVISION 4:	16 NOV 09
REVISION 3:	20 APR 09
REVISION 2:	3 MAR 09
REVISION 1:	10 AUG 08
ORIGINAL DATE:	10 AUG 07
SHEET 3	OF 4
DEP#	

TECHNICAL MEMORANDUM:

Coarse Sediment Analysis for:

North City Presbyterian Church

Prepared For:

Spears & Associates

Prepared by:

Luis Parra, PhD, CPSWQ, ToR, D.WRE.
R.C.E. 66377

REC Consultants
2442 Second Avenue
San Diego, CA 92101
Telephone: (619) 232-9200

1. SUMMARY

The purpose of this Technical Memo is to demonstrate that the North City Presbyterian Church project avoids any Critical Coarse Sediment Yield Area (CCSYA) draining directly to Peñasquitos Creek. The methodology explained in Appendix H of the City of San Diego BMP Design Manual (updated by the Critical Coarse Sediment Technical Advisory Committee on March 2016, from which the City of San Diego, The County of San Diego, Technical Experts and representatives of the Water Quality Control Board were represented, see Appendix 1) will be used to conclude that the Potential Critical Coarse Sediment Yield Areas (PCCSYAs) within the project are avoided and no further action is required.

2. METHODOLOGY TO IDENTIFY CCSYAs

2.1 Identification of CCSYAs

The Watershed Management Area Analysis (WMAA) PCCSYA Map prepared by the County of San Diego (commonly known as the Rash Map where PCCSYA are depicted in red) is used initially to identify PCCSYA in the project. Figure 1 displays the red areas identified for the project, all of them adjacent to Peñasquitos Creek.

2.2 Refinement Options

2.2.1 Depositional Analysis

If it can be demonstrated that the potential source of coarse sediment is deposited in existing system prior to reaching the first downstream unlined water of the state, then PCCSYA can be removed from further considerations. Depositional systems may include natural sinks, existing structural BMPs, existing hardened MS4 systems or other existing similar features that produce a peak velocity from the discrete 2-year, 24 hour runoff event of less than 3 ft/s in the system being analyzed.

It is clear for the location of the PCCSYA next to the banks of the creek that a deposition of coarse sediments before reaching Peñasquitos Creek will not occur, as the PCCSYA drain directly into the creek. Therefore, this refinement option is considered unnecessary for this project.

2.2.2 Threshold Channel Analysis

A threshold channel is a stream channel in which channel boundary material has no significant movement during the design flow. If there is no movement of bed load in the stream channel, then it is not anticipated that reductions in sediment supply will be detrimental to stream stability because the channel bed consists of the parent material and not coarse sediment supplied from upstream. In such a situation, changes in sediment supply are not considered a geomorphic condition of concern. At this point, a threshold channel analysis was not performed because it is unnecessary: it will be demonstrated per section 2.2.4 and 3 that CCSYAs will be avoided.

2.2.3 Coarse Sediment Source Area Verification

A sieve analysis has not been performed, and it is not required as sections 2.2.4 and 3 will prove that PCCSYAs will be avoided by the project. Therefore, this optional analysis is not included.

2.2.4 Verification of Geomorphic Landscape Units (GLUs)

GLU analysis was performed in detail. A verification of the slope, land use and geology of the project size confirms that GLU analysis will not remove PCCSYA areas; however, it will help to identify GLU areas more precisely to prove that the proposed project will avoid any impact on such areas.

Appendix 1 shows Worksheet H.6-1 from new Appendix H completed according to the GLU analysis performed by REC, with added information provided by Spears and Associates.

From the GLU figures prepared, the PCCSYAs of Figure 1 are now CCSYAs and have been delineated with site-specific precision in figure H.7.A for pre-development conditions, and consequently, inF H.7.B for post-development conditions. It is clear from Figure H.7.B that CCSYAs are different than those shown on Figure 1. Post-development conditions will avoid CCSYAs in the property. Consequently, the protection measurement used by the project will be avoidance (See section 3).

2.3 Conclusion of the Refinement Options

After a refinement analysis a PCCSYA has two options: it is either a Critical Coarse Sediment Yield Area (CCSYA) or it becomes a Non Critical Coarse Sediment Yield Area (Non-CCSYA). Only one of the refinement options need to produce a positive result for PCCSYA to become a Non-CCSYA. If no positive result occurs, then PCCSYA becomes CCSYA. CCSYAs have been identified in Figure H.7.B. Those areas will be avoided by the re-development project.

3. AVOIDANCE AND BYPASS

The project can avoid the PCCSYAs included within its boundaries as those areas are located adjacent to Peñasquitos Creek and are not part of the impacted areas by the project. Post-development conditions will avoid CCSYAs in the property as slopes larger than 10% with a land use of Forest will be avoided (slopes adjacent to Peñasquitos Creek will not be graded or impacted).

4. DEMONSTRATE NO NET IMPACT

Calculations of No net impact based on a continuous simulation model and a sediment yield model will not be necessary for this project as Section 3 demonstrates that the PCCSYAs classified as CCSYAs will be avoided by the project.

5. CONCLUSIONS OF THE STUDY

Peñasquitos Creek slopes downstream of the project area (and within the property area) are considered CCSYAs once the GLU analysis is completed (Figure H.7.A). Those areas are smaller and more precisely defined (Figure H.7.B) than the areas identified by the "Rash" Map (Figure 1), and will be avoided in Post-Development Conditions by the re-development project of the North City Presbyterian Church.

6. LIST OF APPENDICES

- Appendix 1:
  - Worksheet H.6-1
  - Figures H-1, H.2A, H.2B, H.3, H.5A, H.5B, H.7A, H.7B
  - Figure 1

APPENDIX 1:

- Worksheet H.6-1.
- Figures H-1, H.2A, H.2B, H.3, H.5A, H.5B, H.7A, H.7B
- Figure 1

Verification of GLUs		Worksheet H.6-1
Detailed project-level review of GLUs may be performed to verify the presence or absence of potential critical coarse sediment yield areas within the project site and/or upstream areas. Use this form to document the evaluation of slope, geology, and land cover combined to determine the site-specific GLUs. Complete all sections of this form.		
Project Name: North City Presbyterian Church.		
Project Tracking Number / Permit Application Number: APN : 316-040-36-00		
1	What are the pre-project slopes? All slopes exist in the project (see figure H.1).	☒ 0% to 10% (1) ☒ 10% to 20% (2) ☒ 20% to 40% (3) ☒ >40% (4)
2	What is the underlying geology? Refer to Appendix H.6 to classify geologic categories into a geology grouping. Note: site-specific geology may be determined in the field by a qualified geologist. See figures H.2.A & H.2.B	☒ Coarse bedrock (CB) (Kgd) ☐ Coarse sedimentary impermeable (CSI) ☒ Coarse sedimentary permeable (CSP) (Qya) ☐ Fine bedrock (FB) ☐ Fine sedimentary impermeable (FSI) ☐ Fine sedimentary permeable (FSP) ☐ Other (O)
3	What is the pre-project land cover? Refer to Appendix H.6 for land cover category definitions. See figure H.3 Note: Land cover shall be determined from aerial photography and/or field visit.	☐ Agriculture/grass ☒ Forest (ID # 47) ☒ Developed ☐ Scrub/shrub ☐ Other ☐ Unknown
4	List the GLU(s) within the project site and/or upstream areas. Note the GLU nomenclature format is as follows: Geology – Land Cover – Slope Category (e.g. "CB-Agricultural/Grass-3" for a GLU consisting of coarse bedrock geology, agricultural/grass land cover, and 20% to 40% slope).	16 combinations: 4 slopes (0-10%, 10%-20%, 20%-40%, >40%) x 2 Geology Types (CB, ESP) x 2 Land Covers (Forest, Dev)

Worksheet H.6-1; Page 2 of 2			
5	Photo(s) Insert photos representative of the slopes, land cover, and geology. See figures H.5.A & H.5.B.		
6	Are any of the GLUs found within the project boundary and/or upstream areas (listed in row 4) also listed in Table H.6-1?	☒ Yes	Go to 7
		☐ No	Go to 8
7	End – Provide management measures for preservation of coarse sediment supply as described in this guidance document, or the project applicant may elect to determine whether downstream systems would be sensitive to reduction of coarse sediment yield from the project site and/or perform site-specific method for mapping critical coarse sediment yield areas. Avoidance : See 9, Notes. Also see Fig. H.7.A & B.		
8	End – Site-specific GLUs do not warrant preservation of coarse sediment supply, no measures for protection of critical coarse sediment yield areas onsite are necessary. Optional: use the note section below to provide justification for these findings.		
9	Notes All GLU areas that are PCCSYAs are downstream of the project and adjacent to Peñasquitos Creek. Those areas will not be graded/impacted by the project and will be avoided. Therefore, project does not impact PCCSYAs identified by GLU analysis.		

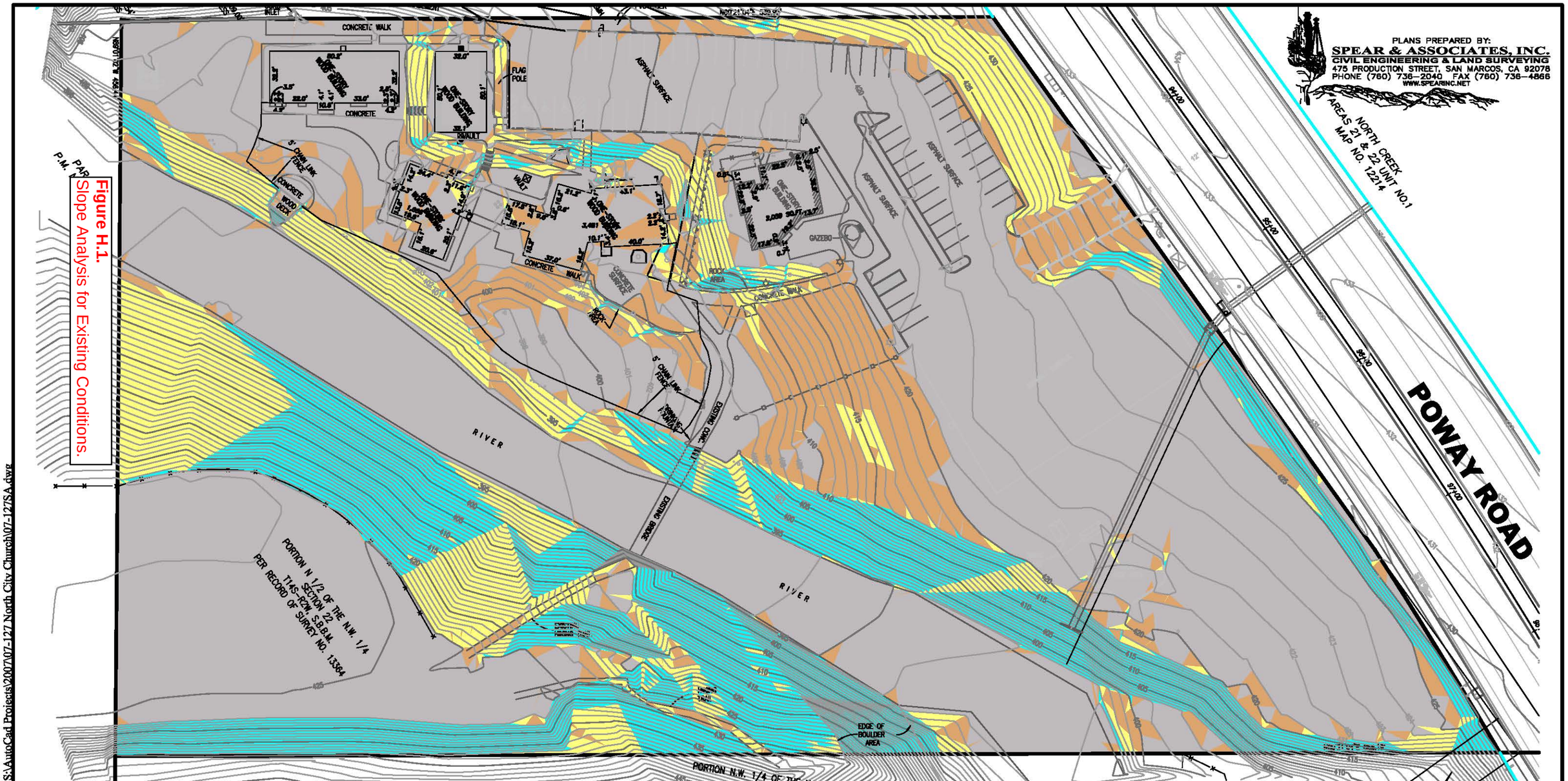


Figure H.1.
Slope Analysis for Existing Conditions.

Slope Analysis Table				
Number	Minimum Slope	Maximum Slope	Color	Square footage
1	0.00%	10.00%		191170
2	10.00%	20.00%		35029
3	20.00%	40.00%		41445
4	40.00%	100.00%		53177

LICENSED LAND SURVEYOR
RAMON J. SPEAR
EXP. 12-31-16
NO. 6404
STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:

RAMON J. SPEAR P.L.S.. 6404 DATE
EXP. 12/31/16

TOPOGRAPHY BY FIELD SURVEY
ADDRESS: 11717 POWAY ROAD
SAN DIEGO, CA 92064
APN: 316-040-36-00

60 30 0 60 120 180

SCALE: 1" = 60'

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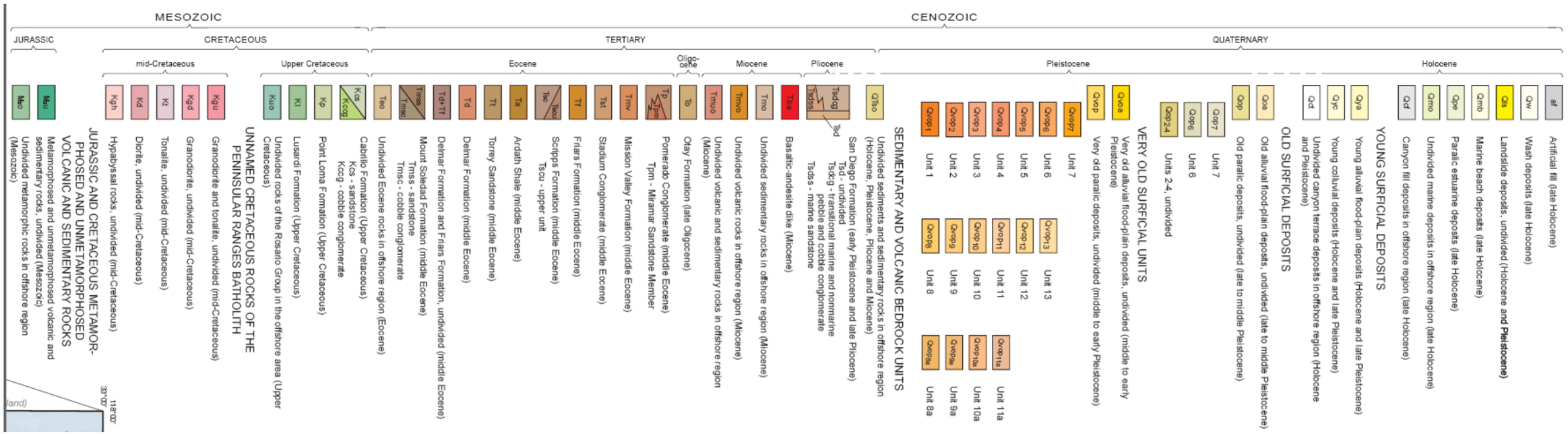


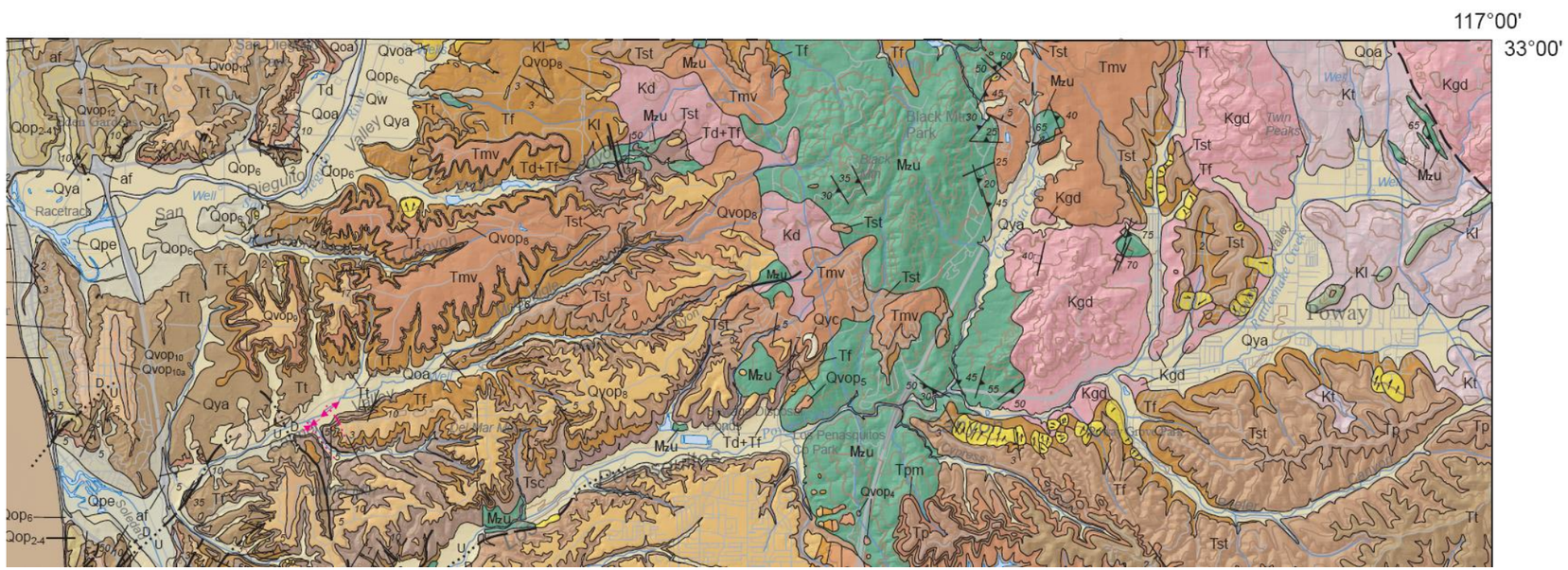


Figure H.2.A. General Legend and Overall Geology in the Area of the Project

Figure H.2.B. Project Location in the General Geology Map

R·E·C Consultants, Inc.

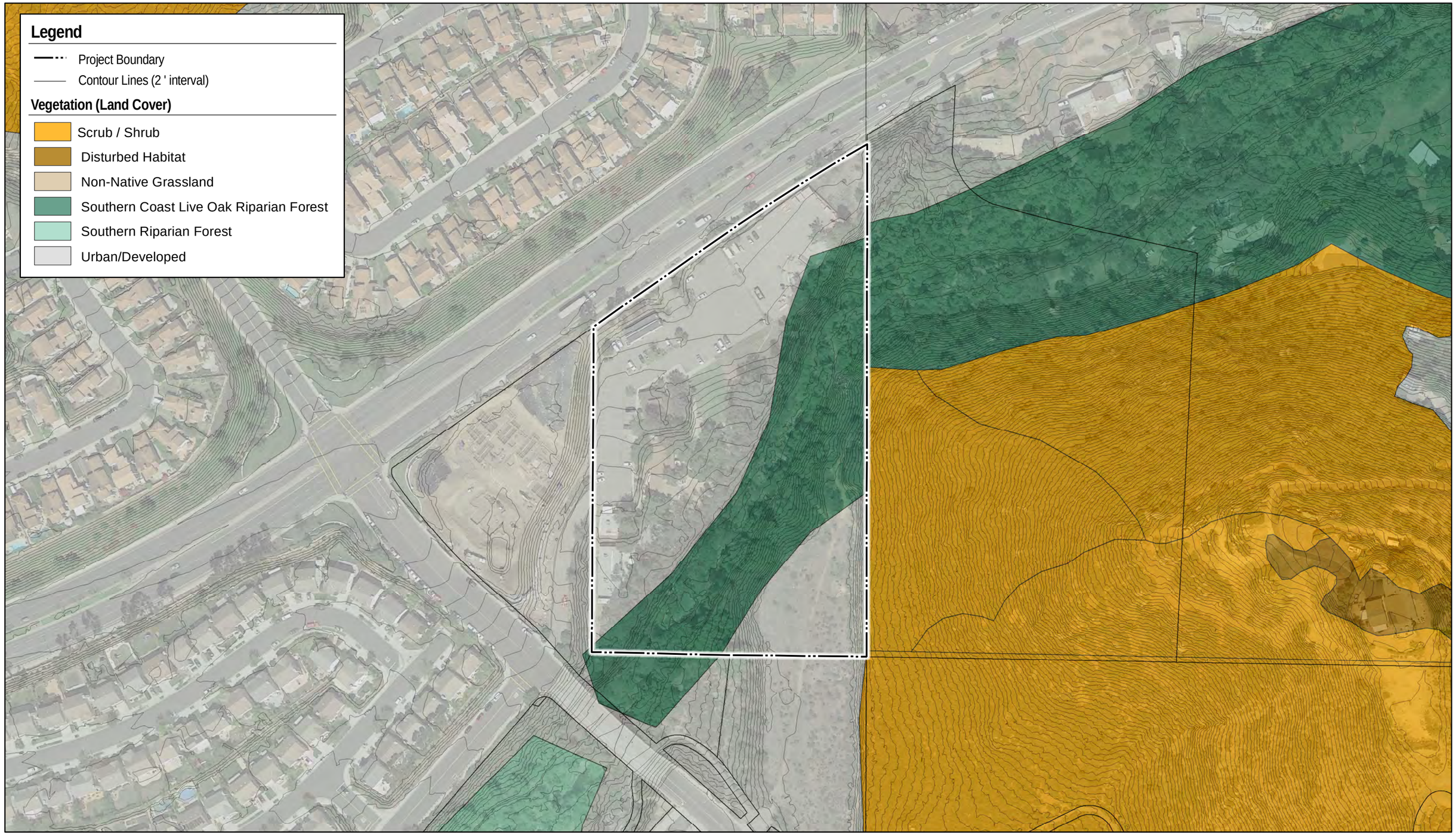
Project Boundary and Geology

NORTH CITY CHURCH

Feet 0 500 1,000

Data Source: ESRI Basemap, San Diego County Regional WMAA

December 2015



R·E·C Consultants, Inc.

Project Boundary and Vegetation (Land Cover)

NORTH CITY CHURCH

FIGURE H.3. Existing Land Cover

Feet
0 75 150

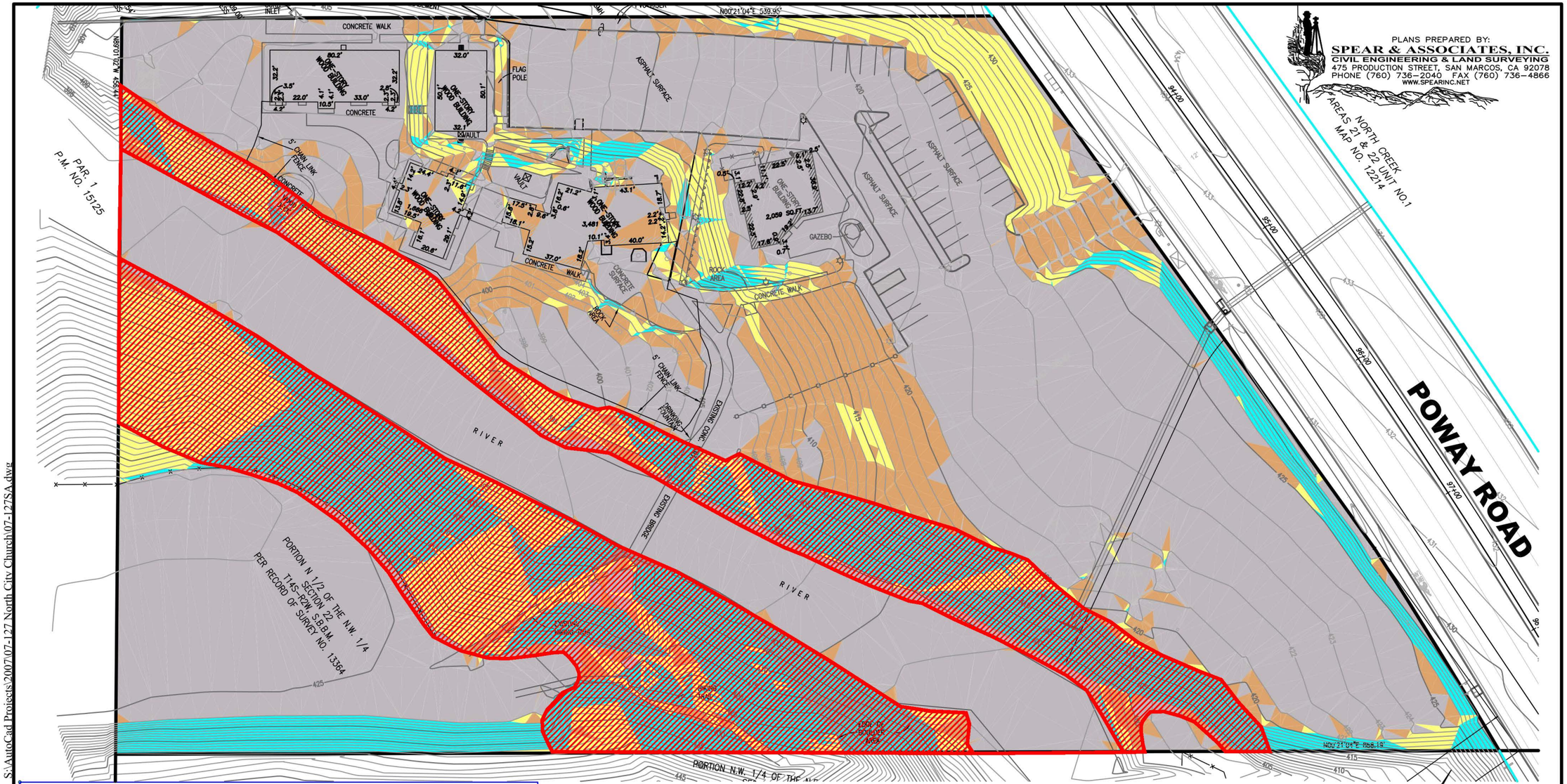
Data Source: ESRI Basemap, San Diego County Regional WMAA

December 2015

Figure H.5.A Aerial View (via Google) of Existing Project Area and Peñasquitos Creek.

Figure H.5.B Bird's Eye View (via Bing) of Existing Project Area and Peñasquitos Creek.

FIGURE H.7.A PCCSYAs according to GLU Analysis (Pre–Development).



Slope Analysis Table				
Number	Minimum Slope	Maximum Slope	Color	Square footage
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4	40.00%	100.00%		53177

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NO. 6404
STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:

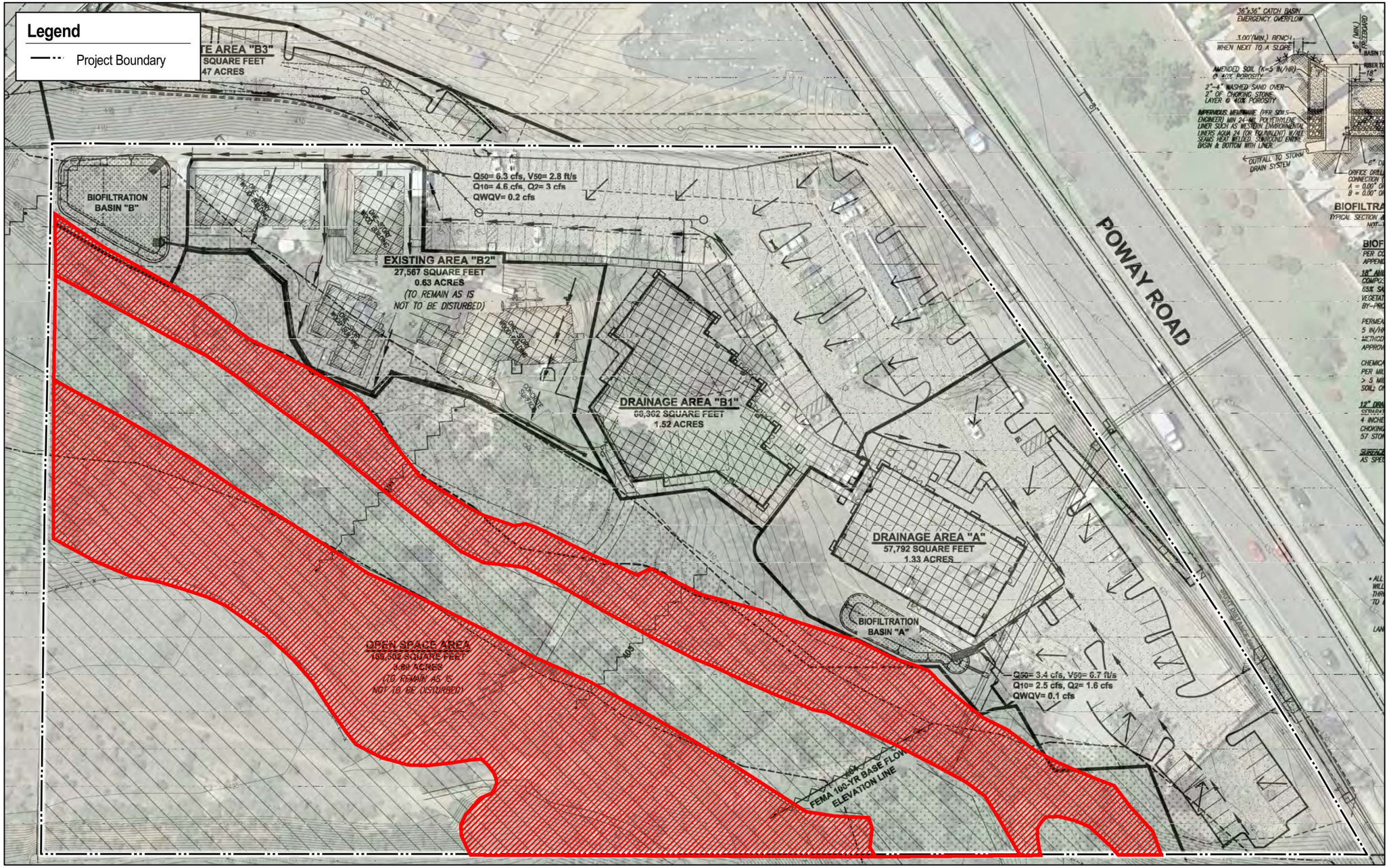
RAMON J. SPEAR P.L.S.. 6404 DATE
EXP. 12/31/16

TOPOGRAPHY BY FIELD SURVEY
ADDRESS: 11717 POWAY ROAD
SAN DIEGO, CA 92064
APN: 316–040–36–00

60 30 0 60 120 180

SCALE: 1" = 60'

FIGURE H.7.B PCCSYAs according to GLU Analysis (Post–Development).



R·E·C Consultants, Inc. **Project Site**

NORTH CITY CHURCH

Feet 0 30 60

Data Source: ESRI Basemap, San Diego County Regional WMAA

December 2015

R·E·C Consultants, Inc.

Project Boundary and Potential Critical Coarse Sediment Yield Areas

NORTH CITY PRESBYTERIAN CHURCH

1 inch = 100 feet

0 50 100 Feet

Data Source: ESRI Basemap, San Diego County Regional WMAA, National Hydrography Dataset (USGS).

March 2016

A Focused Traffic Study

For

The New Sanctuary Building Construction At The

Existing North City Presbyterian Church

On Poway Road at Springhurst Drive

Dated

1st Revision

January 12, 2009

2nd Revision

June 13, 2009

3rd Revision

September 20, 2010

4th Revision

January 21, 2016

5th Revision

September 21, 2016

6th Revision

November 11, 2016

7th Revision

January 3, 2017

By

Federhart & Associates
2825 Nimitz Blvd. #G
San Diego, CA 92106
Jim Federhardt
(619) 226-2123

REGISTERED PROFESSIONAL ENGINEER
JAMES W. FEDERHART
No. 136
Exp. 9/30/17
TRAFFIC
STATE OF CALIFORNIA

James W. Federhart

Executive Summary

The existing North City Presbyterian Church is planning for the construction of two new sanctuaries over a long period of time since they have outgrown their present one built in 1982.

This Traffic Study found no existing traffic impacts on the critical intersections or segments of the fully constructed, classified, adjacent street network.

Phase 1 which will be built in 2018, will more than double the size of the existing sanctuary (2.639K9) and generate 110 weekday ADT's and 440 Sunday daily trips. No existing buildings will be removed and no significant traffic impacts were found after Phase 1 in the near term (2018) time period.

Phase 2, which completes the project will be built many years in the future, and will have about three times the existing seating in its sanctuary and has 16083 sq. ft. of floor space. However, since two existing buildings will be removed or remodeled to make room for it, it will have a net increase of 13137 sq. ft. that will generate 197 weekday ADT's and 788 Sunday daily trips (see Table 4 and below it).

With Phase 2 traffic added to the Horizon year traffic, intersections and segments were found to be at acceptable LOS's in the Horizon year. Phase 2 traffic was also found to have no significant traffic impacts in the 2035 Horizon year.

With the development of Phase 1, the existing church driveway to / from the campus for right turns only will be relocated 290 feet to the far eastern corner of the church campus thus allowing the City staff desired restriping of the east bound Poway Road lanes as shown on Figure 17 and Page 29. Additionally, the existing church Springhurst driveway will be converted to two way traffic.

The existing church was found to have an adequate existing transit service along Poway Road, with far side bus stops at the corner of Poway Road and Springhurst Drive. This bus service is provided by Route 944 of the Metropolitan Transit System and is fully described on Pages 27 and 28.

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TRAFFIC AND PARKING STUDY

JF 1509
January 21, 2016

A Focused Traffic Study for the New Sanctuary Building Construction at the Existing, North City Presbyterian Church on Poway Road at Springhurst Dr.

Introduction

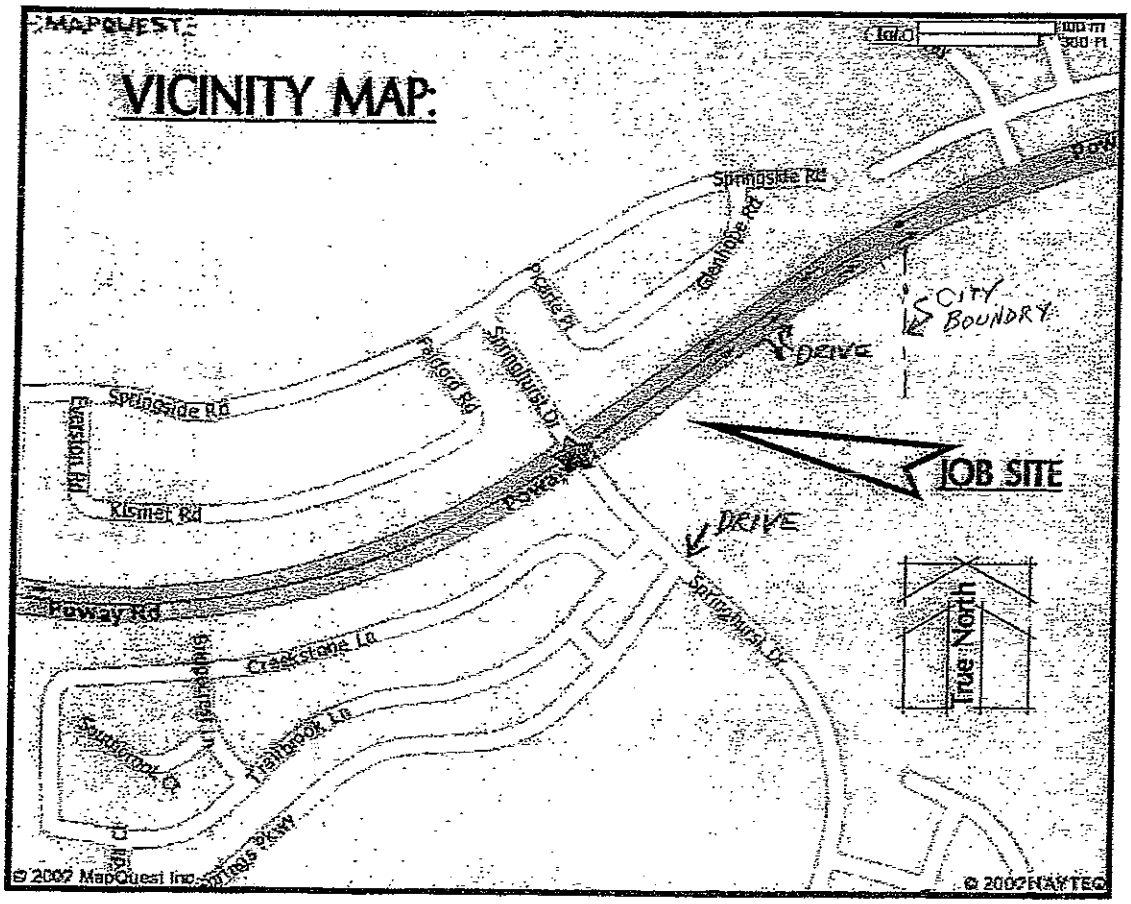
The planned project consists of the Phase 1 construction of a 7,309 sq. ft. sanctuary in 2018 to replace the 2,639 sq. ft. sanctuary built in 1982, Then, many years from then, in Phase 2, the final sanctuary of 16,083 sq. ft. will be constructed while the Phase 1 sanctuary building reverts to a multi-purpose recreation building.

Figures 2 and 3 are the site plans for the Phase 1 and 2 projects respectively. Note that besides these new buildings, there exist 6 other, one story wood or stucco buildings on the site that were built in 1978 or 1982–most of which are planned to remain after Phase 2 is built many years in the future. Figure 1 shows the location of the project along the City of Poway / San Diego boundary.

The following is a description of the existing six buildings:

	Size in sq. ft.	Use	Year Built
Bldg. C	2.059K	Offices	1978
Bldg. D	3.581K	Pre-School	1978
Bldg. E	1.666K	Fellowship	1982
Bldg. F	1.604K	Nursery	1982
Bldg. G	2.639K	Worship Hall	1982
Bldg. H	0.199K	Storage	Unknown

Note that all the above existing buildings will remain after Phase 1 and it is only with the construction of Phase 2 (The Final Phase) that some existing buildings will be removed or remodeled. The Phase 1 sanctuary (Building B) will be constructed on a presently vacant, area of the site so all existing buildings can stay in use.



PROJECT LOCATION

FIGURE 1

NOTES

1. VARIES USED FOR AREA INCREASES SHALL BE PERMANENTLY MAINTAINED.
2. THIS PROJECT SHALL COMPLY WITH THE 2007 EDITION OF THE CALIFORNIA BUILDING CODE (CBC), WHICH ADOPTS THE 2006 IBC, THE 2007 CALIFORNIA ELECTRICAL CODE (CEC), WHICH ADOPTS THE 2005 NEC, THE 2007 CALIFORNIA MECHANICAL CODE (CMC), WHICH ADOPTS THE 2006 UMC, THE 2007 CALIFORNIA PLUMBING CODE (CPC), WHICH ADOPTS THE 2006 UPC, THE 2007 CALIFORNIA FIRE CODE (CFC), WHICH ADOPTS THE 2006 IFC, IN ADDITION TO ALL THEIR RESPECTIVE 2007 CALIFORNIA AMENDMENTS, AND THE 2005 EDITION OF THE CALIFORNIA ENERGY EFFICIENCY STANDARDS.
3. NO HAZARDOUS MATERIALS SHALL BE STORED AND/OR USED IN THIS BUILDING IN EXCESS OF THE QUANTITIES LISTED IN CBC TABLES 3-D AND 3-E.

ALL PROPERTY LINES, EASEMENTS, STREET AND EXISTING AND PROPOSED STRUCTURES ARE SHOWN ON THIS SITE PLAN.

A GRADING PERMIT IS REQUIRED FOR THIS PROJECT.

FIRE HYDRANTS TO COMPLY WITH THE CITY'S ENGINEERING DEPARTMENT STANDARDS AND SPECIFICATIONS FOR ON-SITE FIRE HYDRANTS.

ALL CURBING WHICH OUTLINES THE ACCESS ROADWAY SHALL BE PAINTED RED. WHITE, 4" HIGH LETTERING READING "NO PARKING – FIRE LANE" SHALL BE STENCILED EVERY 30'-0" ON THE RED CURB. IF NO CURB IS PRESENT, AN 8" WIDE RED STRIPE SHALL BE PAINTED ON THE PAVEMENT. THIS 8" STRIPE SHALL BE MARKED WITH 4" HIGH WHITE LETTERING EXACTLY AS IF IT WERE A CURB.

8. PROVIDE BUILDING ADDRESS NUMBERS, VISIBLE AND LEGIBLE FROM THE STREET PER FHPS POLICY P-00-6 (UFC 901.4.4)
9. NO TREES OR SHRUBS EXCEEDING 3 FEET IN HEIGHT AT MATURITY MAY BE INSTALLED WITHIN 10 FEET OF ANY SEWER LATERALS.

MISCELLANEOUS PROJECT DATA

BUILDING	USE	APPROXIMATE HOURS OF OPERATION	APPROX. YR. BUILT
PROPOSED "A"	WORSHIP	SAT 4PM-8PM SUN 8AM-7:30PM	N/A
PROPOSED "B"	PHASE 1: WORSHIP	SAT 4PM-10PM SUN 8AM-7:30PM	N/A
	PHASE 2:FELLOWSHIP HALL and MULT-PURPOSE GYM	MON-THRU SAM-10PM FRI 10AM-11PM SAT 8AM-11PM SUN 8AM-7:30PM	
EXISTING "C"	OFFICES	MON-FRI 8PM-11PM TUE-THRU 8AM-5PM FRI 8AM-12PM SAT 8AM-11AM	1978
EXISTING "D"	PRE-SCHOOL	MON-FRI 8AM-4PM SUN 8AM-7:30PM	1978
EXISTING "E"	FELLOWSHIP CENTER	MON-FRI 8AM-4PM SAT 8AM-11PM SUN 8AM-7:30PM	1982
EXISTING "F"	NURSERY	MON-FRI 8AM-4PM SAT 8AM-11PM SUN 8AM-7:30PM	1982
EXISTING "G"	WORSHIP	SAT 8AM-11PM SUN 8AM-7:30PM	1982

SITE INFORMATION (PHASE 1)

LOT AREA	321,936.67 SQ.FT.	7.39 ACRES	
PROPOSED BUILDING "B" COVERAGE	7,309.00 SQ.FT.	2.27 %	
EXIST BUILDING "C" COVERAGE	2,059.00 SQ.FT.	0.64 %	
EXIST BUILDING "D" COVERAGE	3,581.00 SQ.FT.	1.11 %	
EXIST BUILDING "E" COVERAGE	1,966.00 SQ.FT.	0.52 %	
EXIST BUILDING "F" COVERAGE	1,804.00 SQ.FT.	0.50 %	
EXIST BUILDING "G" COVERAGE	2,639.00 SQ.FT.	0.82 %	
TOTAL BLDG COVERAGE	19,858.00 SQ.FT.	5.96 %	
TOTAL BUILDING AREA	18,859.00 SQ.FT.	5.85 %	
LANDSCAPE AREA	243,184.67 SQ.FT.	75.54 %	
PAVING AREA	59,834.00 SQ.FT.	18.60 %	

PARKING TABULATION

BUILDING "B"- # of FIXED SEATS: 414.00 @ 1 PARKING SPACE PER 3 FIXED SEATS = 138.00

AUTO PARKING REQUIRED 138.00

127 AUTOMOBILE SPACES PROVIDED
1 VAN ACCESSIBLE SPACE PROVIDED
5 ACCESSIBLE SPACES PROVIDED
12 CLEAN AIR VEHICLE/CAR POOL SPACES PROVIDED (6% MIN.)
8 SHORT TERM BICYCLE SPACE PROVIDED (5% MIN.)
1 LONG TERM BICYCLE SPACE PROVIDED (5% MIN. of 20 Employees)

AUTO PARKING PROVIDED 145.00

OWNER

GRACE PRESBYTERIAN CHURCH
dba NORTH CITY PRESBYTERIAN CHURCH
11717 POWAY ROAD
POWAY, CALIFORNIA 92064

SITE/BLDG INFO

A.P.N.: 316-040-36-00
ADDRESS: 11717 POWAY ROAD
ZONE: AR-1-1
TYPE OF CONSTRUCTION: TYPE III-A (1-HR)
OCCUPANCY: A2.1

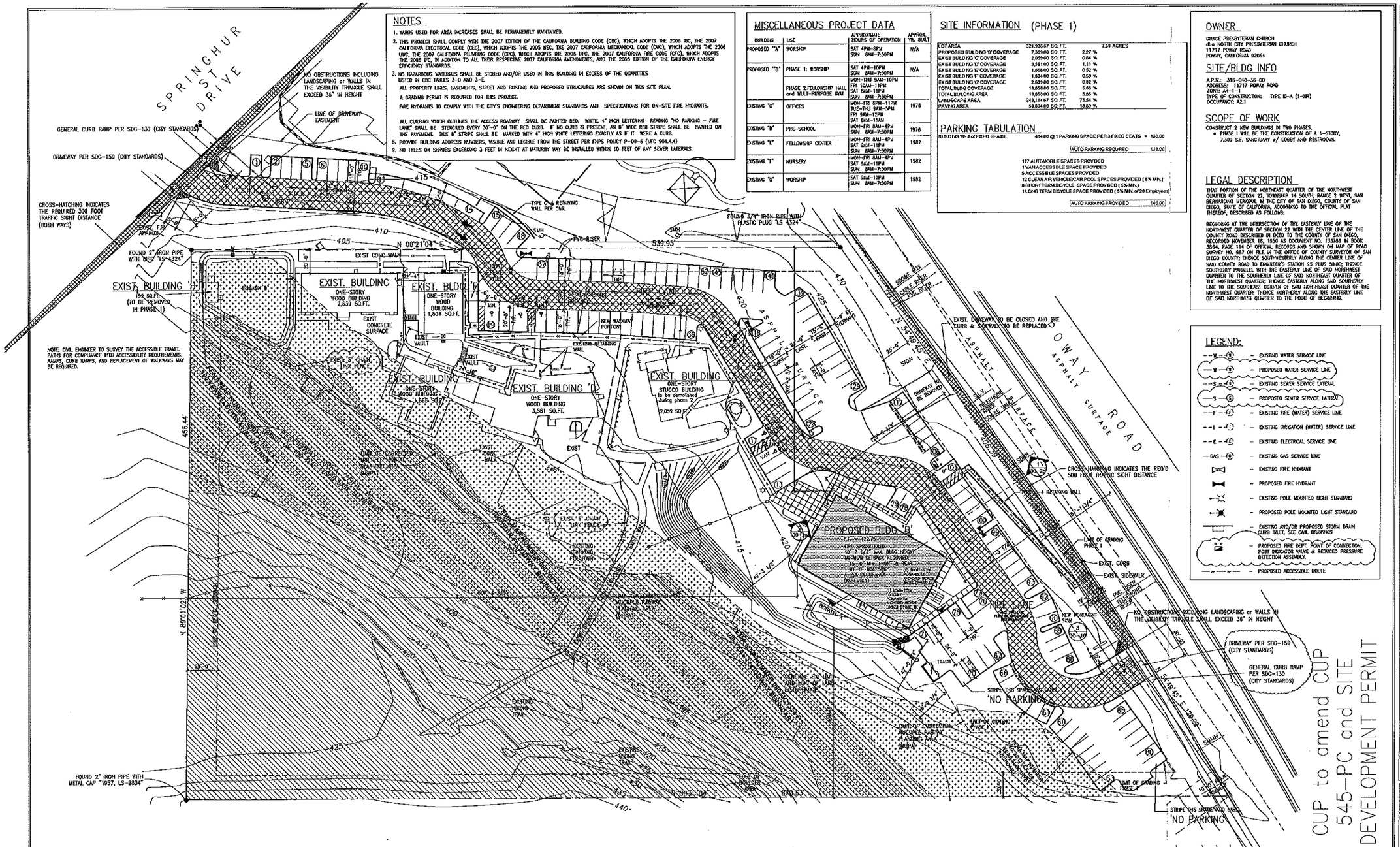
SCOPE OF WORK

CONSTRUCT 2 NEW BUILDINGS IN TWO PHASES.
- PHASE 1 WILL BE THE CONSTRUCTION OF A 1-STORY, 7,309 S.F. SANCTUARY w/ LOBBY AND RESTROOMS.

LEGAL DESCRIPTION

THAT PORTION OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 22, TOWNSHIP 14 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE EASTERLY LINE OF THE NORTHWEST QUARTER OF SECTION 22 WITH THE CENTER LINE OF THE COUNTY ROAD DESCRIBED IN DEED TO THE COUNTY OF SAN DIEGO, RECORDED NOVEMBER 16, 1950 AS DOCUMENT NO. 131248 IN BOOK 3864, PAGE 114 OF OFFICIAL RECORDS AND SHOWN ON MAP OF ROAD SURVEY NO. 987 ON FILE IN THE OFFICE OF COUNTY SURVEYOR OF SAN DIEGO COUNTY; THENCE SOUTHWESTERLY ALONG THE CENTER LINE OF SAID COUNTY ROAD TO ENGINEER'S STATION 95 PLUS 50.00; THENCE SOUTHERLY PARALLEL WITH THE EASTERLY LINE OF SAID NORTHWEST QUARTER TO THE SOUTHERLY LINE OF SAID NORTHEAST QUARTER OF THE NORTHWEST QUARTER; THENCE EASTERLY ALONG SAID SOUTHERLY LINE TO THE SOUTHEAST CORNER OF SAID NORTHEAST QUARTER OF THE NORTHWEST QUARTER; THENCE NORTHERLY ALONG THE EASTERLY LINE OF SAID NORTHWEST QUARTER TO THE POINT OF BEGINNING.



LEGEND:

- EXISTING WATER SERVICE LINE
- PROPOSED WATER SERVICE LINE
- EXISTING SEWER SERVICE LATERAL
- PROPOSED SEWER SERVICE LATERAL
- EXISTING FIRE (WATER) SERVICE LINE
- EXISTING IRRIGATION (WATER) SERVICE LINE
- EXISTING ELECTRICAL SERVICE LINE
- EXISTING GAS SERVICE LINE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- EXISTING POLE MOUNTED LIGHT STANDARD
- PROPOSED POLE MOUNTED LIGHT STANDARD
- EXISTING AND/OR PROPOSED STORM DRAIN CURB INLET, SEE CIVIL DRAWINGS
- PROPOSED FIRE DEPT. POINT OF CONNECTION, POST INDICATOR VALVE & REDUCED PRESSURE DETECTION ASSEMBLY.
- PROPOSED ACCESSIBLE ROUTE

KENNETH D. SMITH
ARCHITECT
& ASSOCIATES, INC.
500 FESLER ST. · SUITE 102
EL CAJON · CA · 92020
Ph / 619.444.2182
Fax / 619.442.2699

LICENSED ARCHITECT KENNETH DUANE SMITH No. C23315 Exp. 2/28/17 STATE OF CALIFORNIA

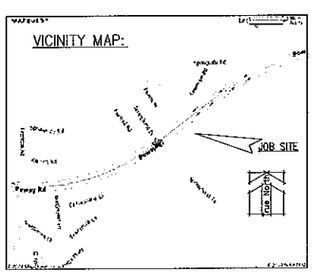
DATE: 9-8-16
JOB No: 03073
DRAWN BY: PS
CHECKED BY: RDN

REVISIONS:

project: NEW BUILDINGS FOR: North City Presbyterian Church SAN DIEGO, CALIFORNIA

DD-1
OF 12 SHEETS

VICINITY MAP:



PROJECT TEAM:

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GENERAL CONTRACTOR: HAMANN CONSTRUCTION
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EL CAJON, CA 92020
(619) 440-7424
CONTACT: JOHN BELCHER

STRUCTURAL ENGINEER: B2H ENGINEERING, INC.
17150 VIA DEL CAMPO, SUITE 305
SAN DIEGO, CA 92127
(858) 673-8415
CONTACT: DEVAN BROWN, EXT. 343

ELECTRICAL CONTRACTOR: HAMANN CONSTRUCTION ELECTRICAL DIVISION
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(619) 440-7424
CONTACT: GARY SEUSS

PLUMBING CONTRACTOR: LOYD & HOMERTON PLUMBING INC.
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(619) 444-3040
(619) 444-0761 (fax)
CONTACT: LARRY KELLY Jr.

MECHANICAL CONTRACTOR: SLAYTON MECHANICAL CONTRACTORS INC.
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(619) 390-4900
CONTACT: BOB SWIDGART

CIVIL ENGINEER: SPEAR & ASSOCIATES, INC.
475 PRODUCTION STREET
SAN MARCOS, CA 92078
(760) 736-2048
(760) 735-4068 (fax)
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RANCHO SANTA FE, CA. 92091
(858) 756-8563
CONTACT: STEVEN AILES

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1441 MONTIEL ROAD, SUITE 115
ESCONDIDO, CA. 92026
(760) 746-4955
CONTACT: DAN MATH

LOT MINIMUM REQUIREMENTS

LOT AREA = TEN ACRES
LOT WIDTH = 200 LINEAR FEET
STREET FRONTAGE = 200 LINEAR FEET
LOT DEPTH = 200 LINEAR FEET
LOT COVERAGE = 10% OF SITE AREA

FIRE DEPARTMENT NOTES

1. POST INDICATOR VALVES, FIRE DEPART CONNECTIONS, AND ALARM BELL ARE TO BE LOCATED ON THE ADDRESS/ACCESS SIDE OF THE STRUCTURE. (UFC 1001.4)
2. BOTH BUILDINGS SHALL BE EQUIPPED WITH A FIRE ALARM SYSTEM SATISFACTORY TO THE FIRE MARSHAL.

REVISION 8 9-15-15
REVISION 7 8-1-14
REVISION 6 2-15-14
REVISION 5 6-10-13
REVISION 4 8-6-12
REVISION 3 7-8-10
REVISION 2 4-24-09
REVISION 1 3-3-08
ORIGINAL DATE: 9-12-07

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NOTES

1. YARDS USED FOR AREA INCREASES SHALL BE PERMANENTLY MAINTAINED.
2. THIS PROJECT SHALL COMPLY WITH THE 2007 EDITION OF THE CALIFORNIA BUILDING CODE (CBC), WHICH ADOPTS THE 2006 IBC, THE 2007 CALIFORNIA ELECTRICAL CODE (CEC), WHICH ADOPTS THE 2005 NEC, THE 2007 CALIFORNIA MECHANICAL CODE (CMC), WHICH ADOPTS THE 2006 UMC, THE 2007 CALIFORNIA PLUMBING CODE (CPC), WHICH ADOPTS THE 2006 UPC, THE 2007 CALIFORNIA FIRE CODE (CFC), WHICH ADOPTS THE 2006 IFC, IN ADDITION TO ALL THEIR RESPECTIVE 2007 CALIFORNIA AMENDMENTS, AND THE 2005 EDITION OF THE CALIFORNIA ENERGY EFFICIENCY STANDARDS.
3. NO HAZARDOUS MATERIALS SHALL BE STORED AND/OR USED IN THIS BUILDING IN EXCESS OF THE QUANTITIES LISTED IN CBC TABLES 3-D AND 3-E.

ALL PROPERTY LINES, EASEMENTS, STREET AND EXISTING AND PROPOSED STRUCTURES ARE SHOWN ON THIS SITE PLAN.

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8. PROVIDE BUILDING ADDRESS NUMBERS, VISIBLE AND LEGIBLE FROM THE STREET PER FHPS POLICY P-00-8 (UFC 901.4.4)
9. NO TREES OR SHRUBS EXCEEDING 3 FEET IN HEIGHT AT MATURITY MAY BE INSTALLED WITHIN 10 FEET OF ANY SEWER LATERALS.

MISCELLANEOUS PROJECT DATA

BUILDING	USE	APPROXIMATE HOURS OF OPERATION	APPROX. YR. BUILT
PROPOSED "A"	WORSHIP	SAT 4PM–6PM SUN 8AM–7:30PM	N/A
PROPOSED "B"	PHASE 1: WORSHIP	SAT 4PM–10PM SUN 8AM–7:30PM	N/A
	PHASE 2:FELLOWSHIP HALL and MULT-PURPOSE GYM	MON–THU 9AM–10PM FRI 10AM–11PM SAT 8AM–11PM SUN 8AM–7:30PM	
EXISTING "C"	OFFICES	MON–FRI 6PM–11PM TUE–THU 9AM–5PM FRI 9AM–12PM SAT 8AM–11AM	1978
EXISTING "D"	PRE-SCHOOL	MON–FRI 8AM–4PM SUN 8AM–7:30PM	1978
EXISTING "E"	FELLOWSHIP CENTER	MON–FRI 8AM–4PM SAT 9AM–11PM SUN 8AM–7:30PM	1982
EXISTING "F"	NURSERY	MON–FRI 8AM–4PM SAT 9AM–11PM SUN 8AM–7:30PM	1982
EXISTING "G"	WORSHIP	SAT 9AM–11PM SUN 8AM–7:30PM	1982

SITE INFORMATION (PHASE 2)

LOT AREA	321,936.67 SQ. FT.		7.39 ACRES
PROPOSED BUILDING 'A' COVERAGE	16,083.00	5.00	
PROPOSED BUILDING 'B' COVERAGE	7,309.00 SQ. FT.	2.27 %	
EXIST BUILDING 'C' COVERAGE	0.00 SQ. FT.	0.00 %	
EXIST BUILDING 'D' COVERAGE	3,581.00 SQ. FT.	1.11 %	
EXIST BUILDING 'E' COVERAGE	778.67 SQ. FT.	0.24 %	
EXIST BUILDING 'F' COVERAGE	1,604.00 SQ. FT.	0.50 %	
EXIST BUILDING 'G' COVERAGE	2,639.00 SQ. FT.	0.82 %	
TOTAL BLDG COVERAGE	31,994.67 SQ. FT.	9.94 %	
TOTAL UPPER FLOORS	9,420.00 SQ. FT.	2.93 %	
TOTAL BUILDING AREA	41,414.67 SQ. FT.	12.86 %	
LANDSCAPE AREA	217,327.00 SQ. FT.	67.51 %	
PAVING AREA	63,195.00 SQ. FT.	19.63 %	

PARKING TABULATION

BUILDING 'A'- # of FIXED SEATS: 502 @ 1 PARKING SPACE PER 3 FIXED SEATS = 167.33

AUTO PARKING REQUIRED	167.33

151 AUTOMOBILE SPACES PROVIDED
1 VAN ACCESSIBLE SPACE PROVIDED
5 ACCESSIBLE SPACES PROVIDED
12 CLEAN AIR VEHICLE/CAR POOL SPACES PROVIDED (8% MIN.)
8 SHORT TERM BICYCLE SPACE PROVIDED (5% MIN)
1 LONG TERM BICYCLE SPACE PROVIDED (5% MIN. of 20 Employee

AUTO PARKING PROVIDED	171

OWNER

GRACE PRESBYTERIAN CHURCH
dba NORTH CITY PRESBYTERIAN CHURCH
11717 POWAY ROAD
POWAY, CALIFORNIA 92064

SITE/BLDG INFO

A.P.N.: 316-040-36-00
ADDRESS: 11717 POWAY ROAD
ZONE: AR-1-1
TYPE OF CONSTRUCTION: TYPE III-A (1-HR)
OCCUPANCY: A2.1

SCOPE OF WORK

- PHASE II WILL BE THE CONSTRUCTION OF A 2-STORY 16,083 S.F. SANCTUARY, LOBBY, RESTROOMS, FELLOWSHIP and CLASSROOMS. AT THIS TIME THE PHASE I BUILDING (BUILDING 'B') WILL BE CONVERTED TO A MULTI-PURPOSE RECREATION BUILDING and BLDG 'C' WILL BE DEMOLISHED.

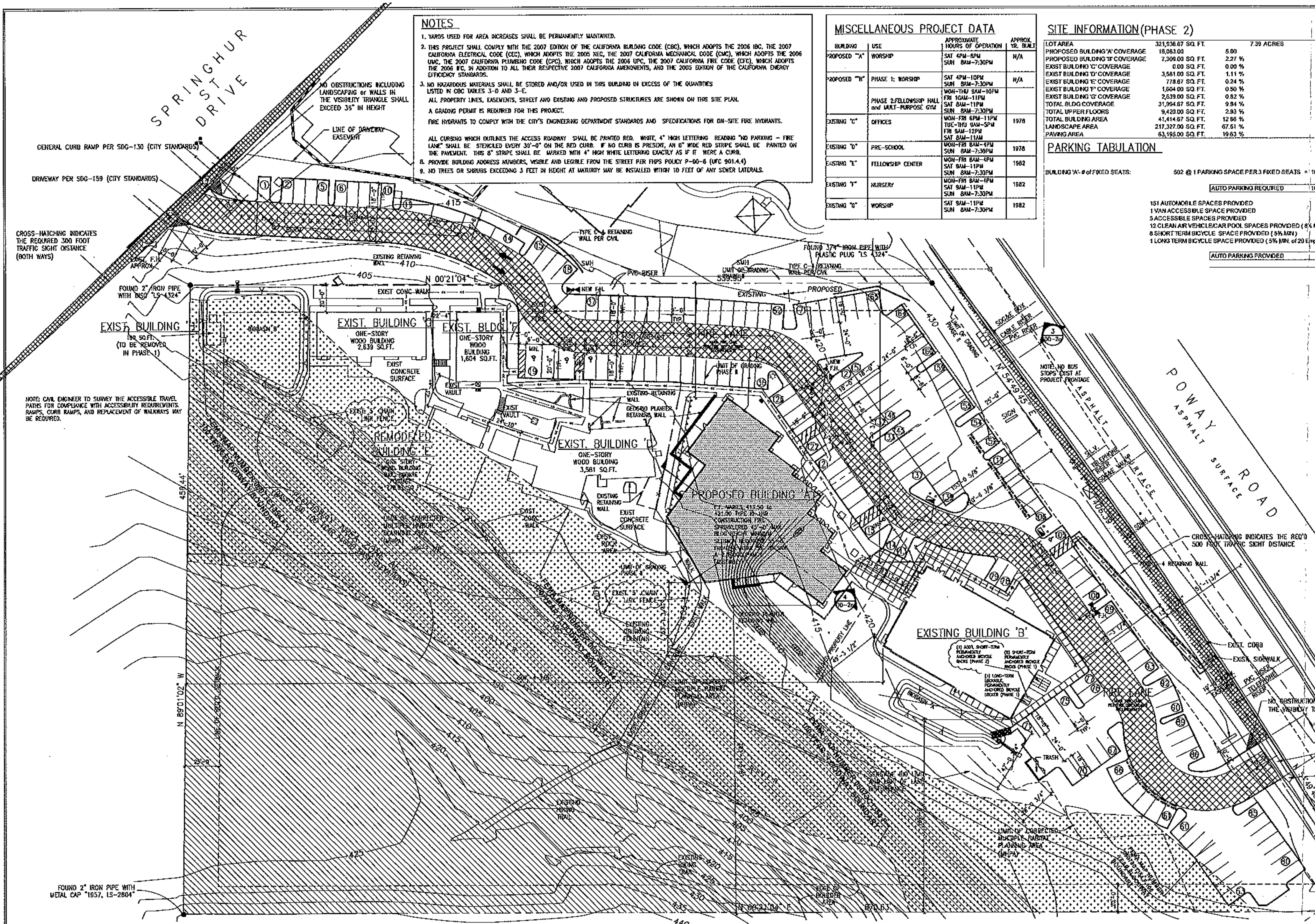
LEGAL DESCRIPTION

THAT PORTION OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 22, TOWNSHIP 14 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE EASTERLY LINE OF THE NORTHWEST QUARTER OF SECTION 22 WITH THE CENTER LINE OF THE COUNTY ROAD DESCRIBED IN DEED TO THE COUNTY OF SAN DIEGO, RECORDED NOVEMBER 18, 1950 AS DOCUMENT NO. 133788 IN BOOK 3864, PAGE 114 OF OFFICIAL RECORDS AND SHOWN ON MAP OF ROAD SURVEY NO. 987 ON FILE IN THE OFFICE OF COUNTY SURVEYOR OF SAN DIEGO COUNTY; THENCE SOUTHWESTERLY ALONG THE CENTER LINE OF SAID COUNTY ROAD TO ENGINEER'S STATION 95 PLUS 50.00; THENCE SOUTHERLY PARALLEL WITH THE EASTERLY LINE OF SAID NORTHWEST QUARTER TO THE SOUTHERLY LINE OF SAID NORTHEAST QUARTER OF THE NORTHWEST QUARTER; THENCE EASTERLY ALONG SAID SOUTHERLY LINE TO THE SOUTHEAST CORNER OF SAID NORTHEAST QUARTER OF THE NORTHWEST QUARTER; THENCE NORTHERLY ALONG THE EASTERLY LINE OF SAID NORTHWEST QUARTER TO THE POINT OF BEGINNING.

LEGEND:

- EXISTING WATER SERVICE LINE
- PROPOSED WATER SERVICE LINE
- EXISTING SEWER SERVICE LATERAL
- PROPOSED SEWER SERVICE LATERAL
- EXISTING FIRE (WATER) SERVICE LINE
- EXISTING IRRIGATION (WATER) SERVICE LINE
- EXISTING ELECTRICAL SERVICE LINE
- EXISTING GAS SERVICE LINE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- EXISTING POLE MOUNTED LIGHT STANDARD
- PROPOSED POLE MOUNTED LIGHT STANDARD
- EXISTING AND/OR PROPOSED STORM DRAIN CURB INLET, SEE CIVIL DRAWINGS
- PROPOSED FIRE DEPT. POINT OF CONNECTION, POST INDICATOR VALVE & REDUCED PRESSURE DETECTION ASSEMBLY.
- PROPOSED ACCESSIBLE ROUTE



LAND USE ADJACENCY GUIDELINES

LAND USES PLANNED OR EXISTING ADJACENT TO THE MHPA INCLUDE SINGLE AND MULTIPLE FAMILY RESIDENTIAL, ACTIVE RECREATION, COMMERCIAL, INDUSTRIAL, AGRICULTURAL, LANDFILLS, AND EXTRACTIVE USES. LAND USES ADJACENT TO THE MHPA WILL BE MANAGED TO ENSURE MINIMAL IMPACTS TO THE MHPA. CONSIDERATION WILL BE GIVEN TO GOOD PLANNING PRINCIPLES IN RELATION TO ADJACENT LAND USES AS DESCRIBED BELOW. THE FOLLOWING ARE ADJACENCY GUIDELINES THAT WILL BE ADDRESSED, ON A PROJECT-BY-PROJECT BASIS, DURING EITHER THE PLANNING (NEW DEVELOPMENT) OR MANAGEMENT (NEW AND EXISTING DEVELOPMENT) STAGES TO MINIMIZE IMPACTS AND MAINTAIN THE FUNCTION OF THE MHPA. IMPLEMENTATION OF THESE GUIDELINES IS ADDRESSED FURTHER IN SECTION 1.5, FRAMEWORK MANAGEMENT PLAN. MANY OF THESE ISSUES WILL BE IDENTIFIED AND ADDRESSED THROUGH THE CEQA PROCESS.

DRAINAGE

1. ALL NEW AND PROPOSED PARKING LOTS AND DEVELOPED AREAS IN AND ADJACENT TO THE PRESERVE MUST NOT DRAIN DIRECTLY INTO THE MHPA. ALL DEVELOPED AND PAVED AREAS MUST PREVENT THE RELEASE OF TOXINS, CHEMICALS, PETROLEUM PRODUCTS, EXOTIC PLANT MATERIALS AND OTHER ELEMENTS THAT MIGHT DEGRADE OR HARM THE NATURAL ENVIRONMENT OR ECOSYSTEM PROCESSES WITHIN THE MHPA. THIS CAN BE ACCOMPLISHED USING A VARIETY OF METHODS INCLUDING NATURAL DETENTION BASINS, GRASS SWALES OR MECHANICAL TRAPPING DEVICES. THESE SYSTEMS SHOULD BE MAINTAINED APPROXIMATELY ONCE A YEAR, OR AS OFTEN AS NEEDED, TO ENSURE PROPER FUNCTIONING. MAINTENANCE SHOULD INCLUDE DREDGING OUT SEDIMENTS IF NEEDED, REMOVING EXOTIC PLANT MATERIALS, AND ADDING CHEMICAL-NEUTRALIZING COMPOUNDS (E.G., CLAY COMPOUNDS) WHEN NECESSARY AND APPROPRIATE.

TOXICS

2. LAND USES, SUCH AS RECREATION AND AGRICULTURE, THAT USE CHEMICALS OR GENERATE BY-PRODUCTS SUCH AS MANURE, THAT ARE POTENTIALLY TOXIC OR IMPACTIVE TO WILDLIFE, SENSITIVE SPECIES, HABITAT, OR WATER QUALITY NEED TO INCORPORATE MEASURES TO REDUCE IMPACTS CAUSED BY THE APPLICATION AND/OR DRAINAGE OF SUCH MATERIALS INTO THE MHPA. SUCH MEASURES SHOULD INCLUDE DRAINAGE/DETENTION BASINS, SWALES, OR HOLDING AREAS WITH NON-INVASIVE GRASSES OR WETLAND-TYPE NATIVE VEGETATION TO FILTER OUT THE TOXIC MATERIALS. REGULAR MAINTENANCE SHOULD BE PROVIDED. WHERE APPLICABLE, THIS REQUIREMENT SHOULD BE INCORPORATED INTO LEASES ON PUBLICLY OWNED PROPERTY AS LEASES COME UP FOR RENEWAL.

LIGHTING

3. LIGHTING OF ALL DEVELOPED AREAS ADJACENT TO THE MHPA SHOULD BE DIRECTED AWAY FROM THE MHPA. WHERE NECESSARY, DEVELOPMENT SHOULD PROVIDE ADEQUATE SHIELDING WITH NON-INVASIVE PLANT MATERIALS (PREFERABLY NATIVE), BERMING, AND/OR OTHER METHODS TO PROTECT THE MHPA AND SENSITIVE SPECIES FROM NIGHT LIGHTING.

NOISE

4. USES IN OR ADJACENT TO THE MHPA SHOULD BE DESIGNED TO MINIMIZE NOISE IMPACTS. BERMS OR WALLS SHOULD BE CONSTRUCTED ADJACENT TO COMMERCIAL AREAS, RECREATIONAL AREAS, AND ANY OTHER USE THAT MAY INTRODUCE NOISES THAT COULD IMPACT OR INTERFERE WITH WILDLIFE UTILIZATION OF THE MHPA. EXCESSIVELY NOISY USES OR ACTIVITIES ADJACENT TO BREEDING AREAS MUST INCORPORATE NOISE REDUCTION MEASURES AND BE CURTAILED DURING THE BREEDING SEASON OF SENSITIVE SPECIES. ADEQUATE NOISE REDUCTION MEASURES SHOULD ALSO BE INCORPORATED FOR THE REMAINDER OF THE YEAR.

BARRIERS

5. NEW DEVELOPMENT ADJACENT TO THE MHPA MAY BE REQUIRED TO PROVIDE BARRIERS (E.G., NON-INVASIVE VEGETATION, ROCKS/BOULDERS, FENCES, WALLS, AND/OR SIGNAGE) ALONG THE MHPA BOUNDARIES TO DIRECT PUBLIC ACCESS TO APPROPRIATE LOCATIONS AND REDUCE DOMESTIC ANIMAL PREDATION.

INVASIVES

6. NO INVASIVE NON-NATIVE PLANT SPECIES SHALL BE INTRODUCED INTO AREAS ADJACENT TO THE MHPA.

BRUSH MANAGEMENT

7. NEW RESIDENTIAL DEVELOPMENT LOCATED ADJACENT TO AND TOPOGRAPHICALLY ABOVE THE MHPA (E.G., ALONG CANYON EDGES) MUST BE SET BACK FROM SLOPE EDGES TO INCORPORATE ZONE 1 BRUSH MANAGEMENT AREAS ON THE DEVELOPMENT PAD AND OUTSIDE OF THE MHPA. ZONES 2 AND 3 WILL BE COMBINED INTO ONE ZONE (ZONE 2) AND MAY BE LOCATED IN THE MHPA UPON GRANTING OF AN EASEMENT TO THE CITY (OR OTHER ACCEPTABLE AGENCY) EXCEPT WHERE NARROW WILDLIFE CORRIDORS REQUIRE IT TO BE LOCATED OUTSIDE OF THE MHPA. ZONE 2 WILL BE INCREASED BY 30 FEET, EXCEPT IN AREAS WITH A LOW FIRE HAZARD SEVERITY RATING WHERE NO ZONE 2 WOULD BE REQUIRED. BRUSH MANAGEMENT ZONES WILL NOT BE GREATER IN SIZE THAT IS CURRENTLY REQUIRED BY THE CITY'S REGULATIONS. THE AMOUNT OF WOODY VEGETATION CLEARING SHALL NOT EXCEED 50 PERCENT OF THE VEGETATION EXISTING WHEN THE INITIAL CLEARING IS DONE. VEGETATION CLEARING SHALL BE DONE CONSISTENT WITH CITY STANDARDS AND SHALL AVOID/MINIMIZE IMPACTS TO COVERED SPECIES TO THE MAXIMUM EXTENT POSSIBLE. FOR ALL NEW DEVELOPMENT, REGARDLESS OF THE OWNERSHIP, THE BRUSH MANAGEMENT IN THE ZONE 2 AREA WILL BE THE RESPONSIBILITY OF A HOMEOWNERS ASSOCIATION OR OTHER PRIVATE PARTY. FOR EXISTING PROJECT AND APPROVED PROJECTS, THE BRUSH MANAGEMENT ZONES, STANDARDS AND LOCATIONS, AND CLEARING TECHNIQUES WILL NOT CHANGE FROM THOSE REQUIRED UNDER EXISTING REGULATIONS.

GRADING/LAND DEVELOPMENT

8. MANUFACTURED SLOPES ASSOCIATED WITH SITE DEVELOPMENT SHALL BE INCLUDED WITHIN THE DEVELOPMENT FOOTPRINT FOR PROJECTS WITHIN OR ADJACENT TO THE MHPA.

CUP to amend CUP 545-PC and SITE DEVELOPMENT PERMIT

True North

0 8'-0" 30'-0" 60'-0" 120'-0"

PHASE 2 SITE PLAN

SCALE: 1" = 30'-0"

REVISION 8	9-15-15
REVISION 7	8-1-14
REVISION 6	2-15-14
REVISION 5	6-10-13
REVISION 4	8-6-12
REVISION 3	7-8-10
REVISION 2	4-24-09
REVISION 1	3-3-08
ORIGINAL DATE:	9-12-07

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DATE:	9-6-16
JOB No:	03073
DRAWN BY:	PS
CHECKED BY:	RON

REVISIONS:

project: NEW BUILDINGS FOR: North City Presbyterian Church SAN DIEGO, CALIFORNIA

F:\DDWG\03073\073sitePhase1&2.dwg Dec 19, 2016 @ 10:52am Plotted by Conference
© Kenneth D. Smith

In Phase 1, Bldg. B will be a 7.309K one story, sprinklered, sanctuary building with up to 414 seats. This can be compared to the existing Building G Worship Hall containing only 200 seats. Way in the future when Phase 2 is complete with a new sanctuary, the Phase 1 sanctuary will be used as a fellowship Hall and multi-purpose gymnasium.

Phase 2, the last phase, consists of constructing Building A, removing Building C (the offices) and remodeling Building E (the fellowship building) from 1.666K sq. ft. to 0.779K sq. ft.–and , when Building A is complete, converting Building B as described above.

Building A will be a 16,038K sprinklered, two story building. At the present time it is expected that there will be room in the parking areas to park 173 vehicles when Bldg. A is constructed with 502 seats. At that time, if there is parking room for more than 173 vehicles, more seats can be installed inside the new Bldg. A, at the same ratio of 3 seats per 1 parking space.

As mentioned above, to make room for building A, the Office Building C will be removed with the offices temporarily expected to move to Building G or Building E while Building A is constructed. Upon completion of Building A, the offices will move to the second story of the new building where there will also be meeting rooms, etc. Over the long term it is expected that building G and the remodeled Building E will be used for Christian Education on Sundays.

Community Plan Roadway Classifications

As seen on Figures 2 and 3, the project fronts on Poway Road and Springhurst Drive. In the Sabre Springs Community Plan, both are classified streets.

Poway Road from Springhurst Drive, east, along the project, to the boundary with the City of Poway, is classified as a six lane major arterial, with a curb to curb width of 102' in 122' Right of Way and is constructed with a six lane major width up to the City Limits but the striping tapers to four lanes to meet four lanes inside the City of Poway. It is posted with 50 MPH signs west of Springhurst but 45 from Springhurst to the City limits. There are no turnouts at bus stops.

Springhurst Drive, from Sabre Springs Parkway, to Poway Road, is a 64/84, 4 lane collector street along the project, while south of Sabre Springs Parkway, it is only a 40/60, 2 lane, collector street. It has 30MPH signs between Poway Road and Sabre Springs Parkway, and south of that, 25 MPH School signs.

Both Poway Road and Springhurst Drive are fully constructed to their ultimate community plan classifications.

The Study and Existing Traffic

At a meeting with city staff, it was determined that the intersections of Springhurst Drive at Poway Road and the church driveway at Sabre Springs Parkway, must be analyzed at the present time using new 2015 weekday volumes and the existing network. Additionally, the total project volumes must be added to the new 2015 volumes, and using the existing network, meet the requirement of comparing the existing and existing plus total project volumes. Also, the intersection analyses must be made at the end of Phase 1 (2018) and finally, at Horizon year and project build out (2035), with the new 2015 volumes and network modifications made by the project during Phase 1 or later.

Further, the Poway Rd. and Springhurst Dr. segment comparison of volumes must be quantified using the new 2015 volumes, and finally the 2035 Horizon year volumes at project build-out.

Table 1 shows the City of San Diego, Roadway Classification Levels of Service (LOS) and Average Daily Traffic (ADT), for the various city streets. It is this Table that the segments must be compared to for the various segment analyses required in this study.

Existing peak hour turning movement counts, were made on September 9, 2015 at both intersections and the church right turn only driveway to/from Poway Road. On the same day 24 hour counts were made on Poway Road between Springhurst and the City Limits and on Springhurst Road between Sabre Springs Parkway and Poway Road. (See Appendix A-1 & A-2) The counts were made at the same locations on Sunday when the turning moves at the intersections were made at the church "busy time" from 10:15 to 11:15. (See A1 thru A9 for all the existing traffic counts).

At the same city staff meeting mentioned above, it was reiterated that the existing church driveway to/from Poway Road must be relocated because of a safety concern of allowing the existing driveway to remain within the Poway Road transition lane. Subsequent to that meeting, the Poway Road driveway was planned to be relocated so it is much further from Springhurst Drive, and thus Poway Road can be restriped to meet city staff approval.

After obtaining the existing traffic counts of Figures 4, 5, 8 and 9 the church generated traffic of Phases 1 and the total project (Phase 2), were separately estimated so

TABLE 3-4

Roadway Classifications

STREET CLASSIFICATION	LANES	LEVEL OF SERVICE A	B	C	D	E
Freeway	8 lanes	60,000	84,000	120,000	140,000	150,000
Freeway	6 lanes	45,000	63,000	90,000	110,000	120,000
Freeway	4 lanes	30,000	42,000	60,000	70,000	80,000
Expressway	6 lanes	30,000	42,000	60,000	70,000	80,000
Primary Arterial	6 lanes	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 lanes	15,000	21,000	30,000	35,000	40,000
Collector	4 lanes	10,000	14,000	20,000	25,000	30,000
Collector (no center lane) continuous left-turn lane)	4 lanes 2 lanes	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2 lanes	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	2,500	3,500	5,000	6,500	8,000
Collector (multifamily)	2 lanes	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 lanes	—	—	2,200	—	—

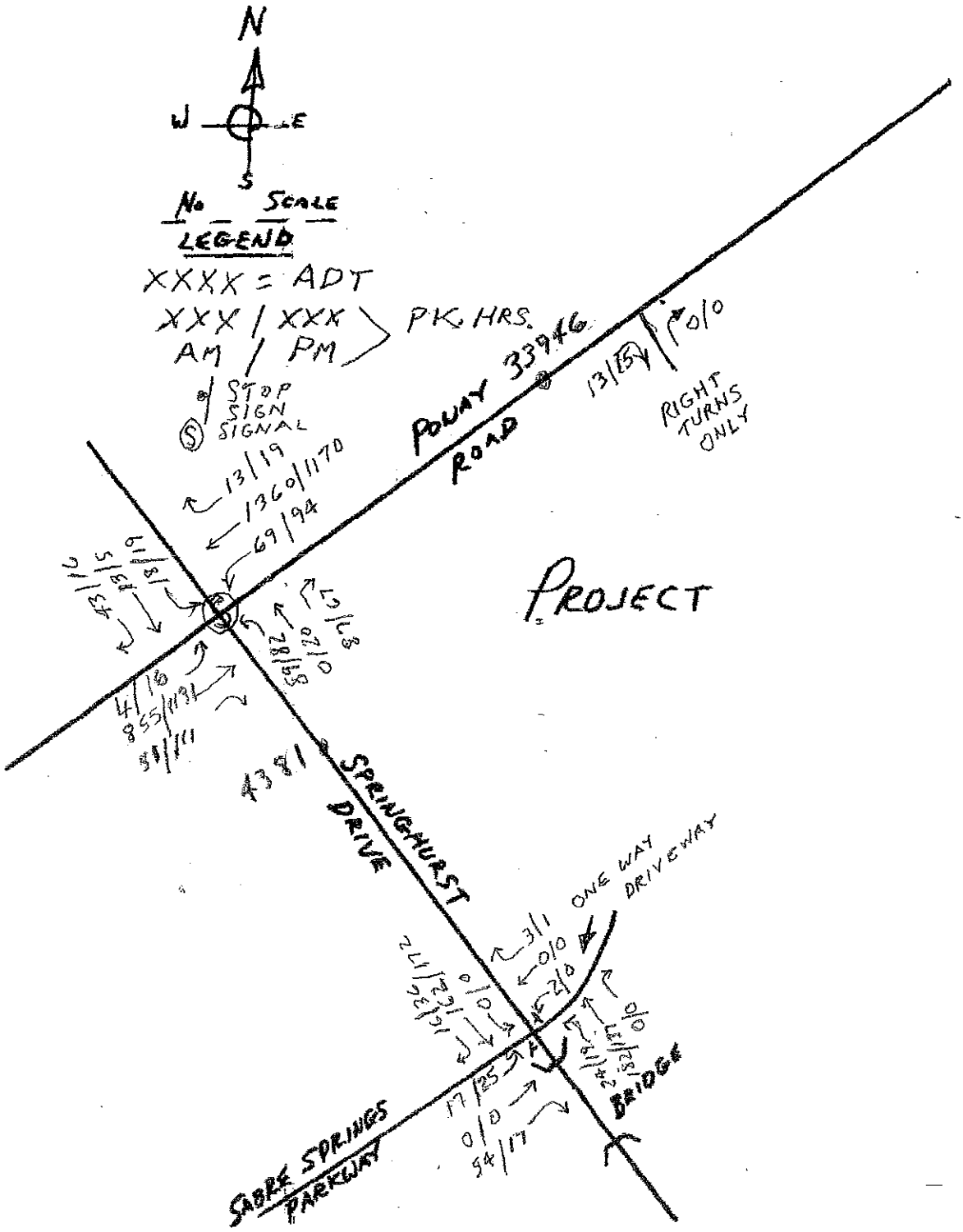
Legend

XX/XXX= Approximate recommended ADT based on the City of San Diego Street Design Manual.

NOTES:

1. The volumes and the average daily level of service listed above are only intended as a general planning guideline.

2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

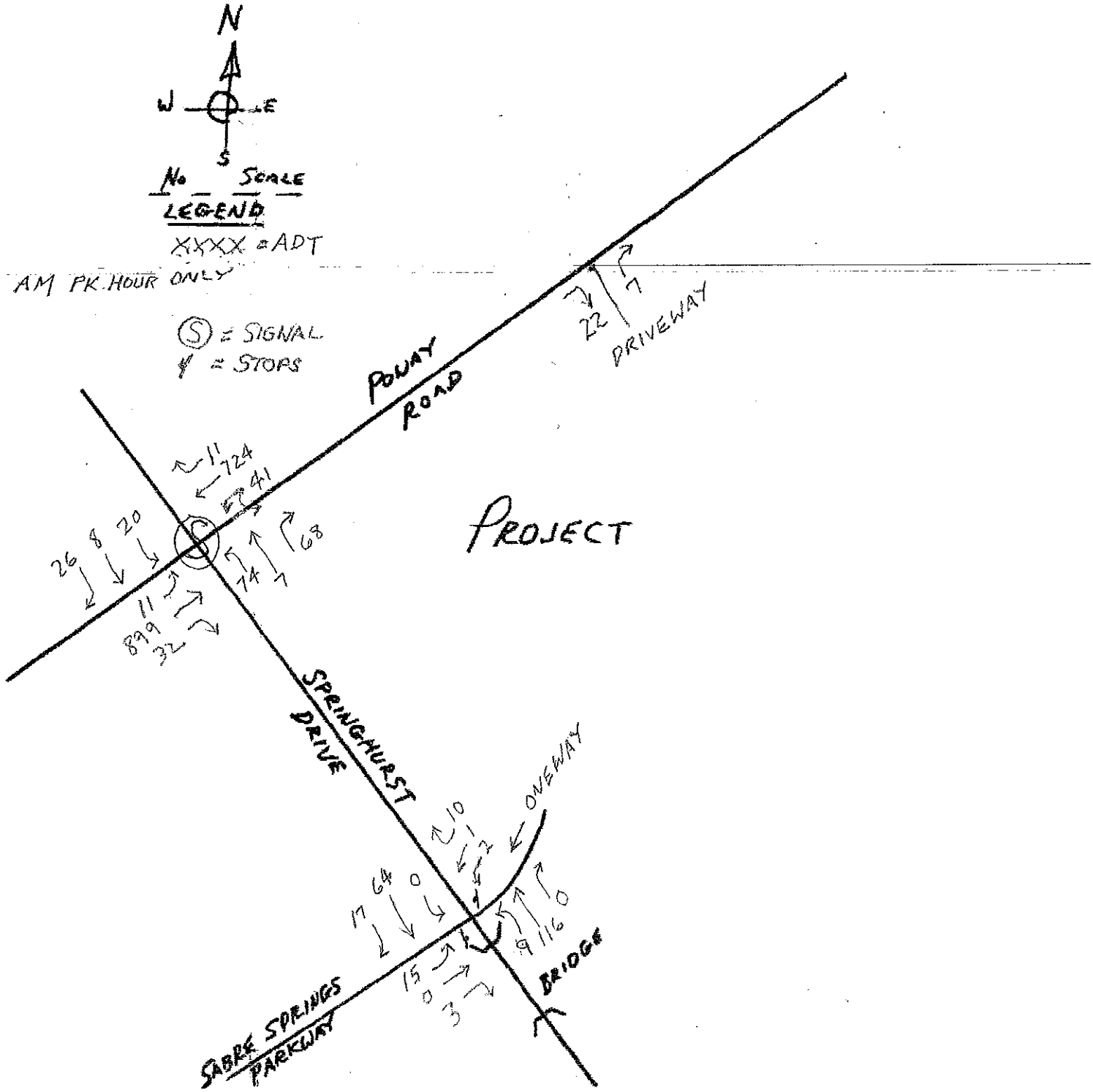


2015 EXISTING WEEKDAY TRAFFIC (33946) & (4381)

COUNTED – SEPT. 9 2015 – EXISTING NETWORK

FIGURE 4

NORTH CITY PRESBYTERIAN CHURCH



2015 - EXISTING SUNDAY PK. HOUR TRAFFIC

ON EXISTING NETWORK - 10:15 TO 11:15 AM

COUNTED 10/11/15

FIGURE 5

NORTH CITY PRESBYTERIAN CHURCH

they could be added to the new, existing and future street volumes for determining the after project traffic impacts.

Existing Intersection Lanes And Controls

Figure 6 shows the existing lanes and controls at the two intersections of concern to city staff. It should be noted that at Sabre Springs Parkway, the streets are wide enough for striping more lanes, but at the present time, only double yellow centerlines exist.

Existing Intersection Traffic Analysis

Using the existing intersection traffic of Figures 4 and 5, and the lanes of Figure 6, standard HCM, Traffix, computerized formulas were used to determine the delays at the intersections, and from them, the existing LOS's. The calculations are in the Appendix (A-A-10 thru A-15) but Table 2 below shows the existing intersection delays and LOS's for weekdays and Sunday, 2015.

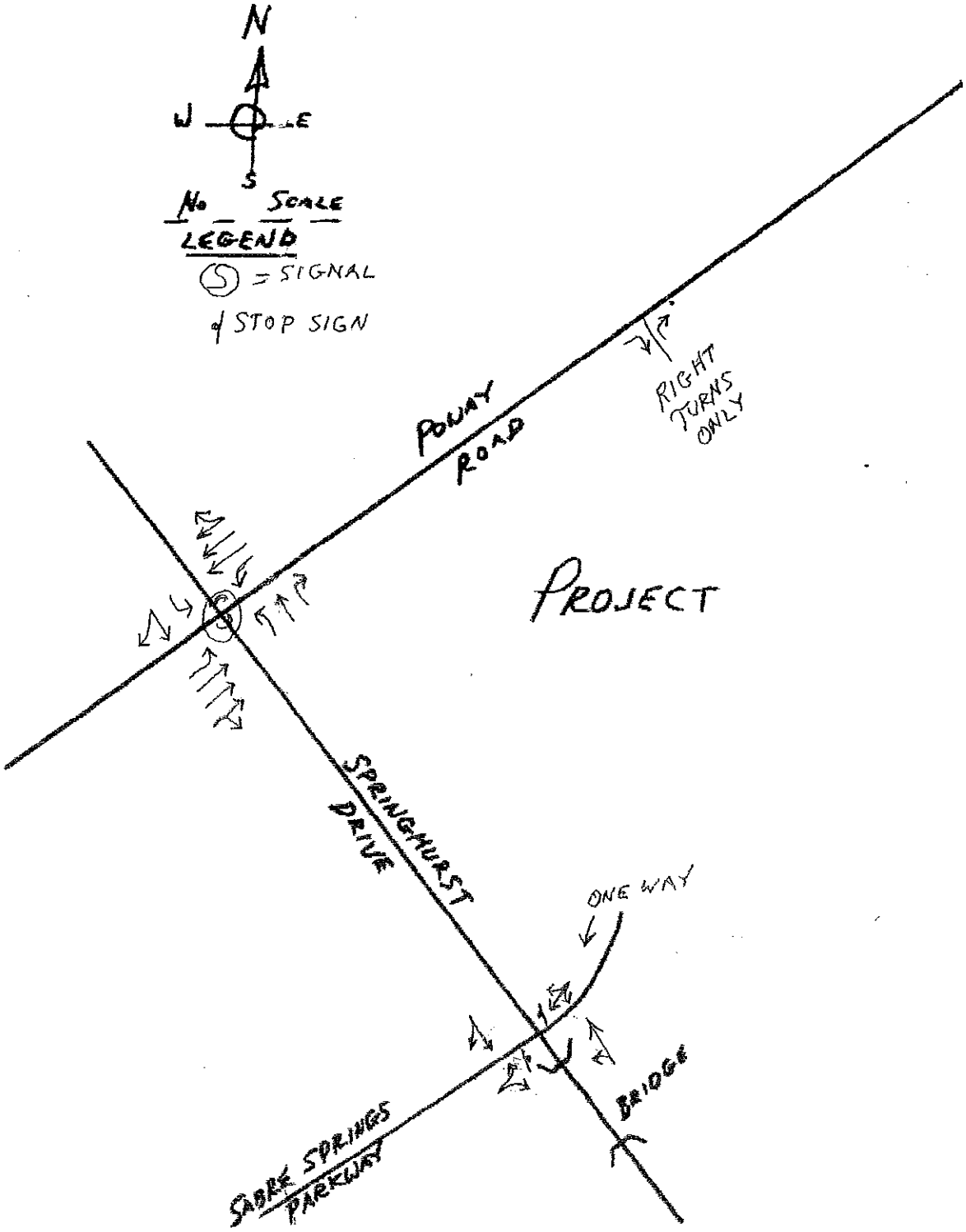
Table 2

Existing Intersection Delays and LOS's

		Weekdays		Sunday at Church Peak	
Intersection		Delay	LOS	Delay	LOS
1. Springhurst at Poway Rd					
	AM	11.8	B	8.7	A
	PM	14.0	B	N.A.	N.A.
2. Springhurst at Sabre Springs					
	PM	10.9*	B	N.A.	N.A.

*Critical Movement

Note that with existing traffic, both intersections have very good LOS's, and thus the existing church vicinity has no significant traffic impacts from the existing land uses.



2015 EXISTING

INTERSECTION LANES & CONTROLS

FIGURE 6

NORTH CITY PRESBYTERIAN CHURCH

Existing Segment Analysis

By using the existing segment volumes of Figures 4 and 5, they were compared to City of San Diego, LOS volumes for the capacity of the roadway. Table 3 below shows the existing segment volumes compared to the City standards of Table 1 for their classification, and the existing LOS of each segment for a weekday. As seen in Table 3 the segments at the present time are operating at acceptable levels of Service (LOS) with only the existing project and the surrounding developments.

Table 3

Existing Segment Analysis At The Project

Segment	Classification	LOS Capacity–ADT	Existing ADT	V / C	LOS
Poway Rd–West Of City Limits	Major Arterial	LOS E = 50000	33946	.678	C
Springhurst Poway Rd to Sabre Springs	Collector	LOS E = 15000	4381	. 292	A

As mentioned earlier, the City of San Diego also now requires an analysis of the intersections and segments with the existing traffic of Figures 4 & 5, plus the total project traffic on the existing network. To analyze the traffic impact of the Total Project as well as its impact at Phase 1 or Phase 2, requires the derivation of the project traffic to be added to the nonproject traffic at each time period to be studied. In this case Table 4, shows the estimated project traffic generation at the time periods of interest.

Project Traffic Generation

Using City of San Diego traffic generation rates for weekdays and the existing church Sunday AM experience at the busiest church peak, Table 4 below shows the estimated church traffic for each of the two future Phases e.g., Phase 1 and Phase 2. Note that Phase 2 traffic when added to Phase 1, makes up the total Project Traffic.

Table 4

Estimated Project Traffic Generation

				Peak Hours***			
				AM		PM	
	Size	Rate	ADT	In	Out	In	Out
1. Church Weekday Phase 1	7.309K	15/K*	110	4	1	5	5
Sunday Phase 1	7.309K	60/K*	440	94	9	NA	NA
2. Church Weekday Phase 2	13.137K	15/K*	197	6	2	8	8
Sunday Phase 2	13.137K	60/K*	788	169	16	NA	NA
3. Weekday Total Project Traffic			307	10	3	13	13
Sunday Total Project Traffic			1228	263	25	NA	NA

*15/K and 60/K include all uses including Daycare
**Weekdays - AM 4% of ADT split 8:2 and PM at 8% split 5:5

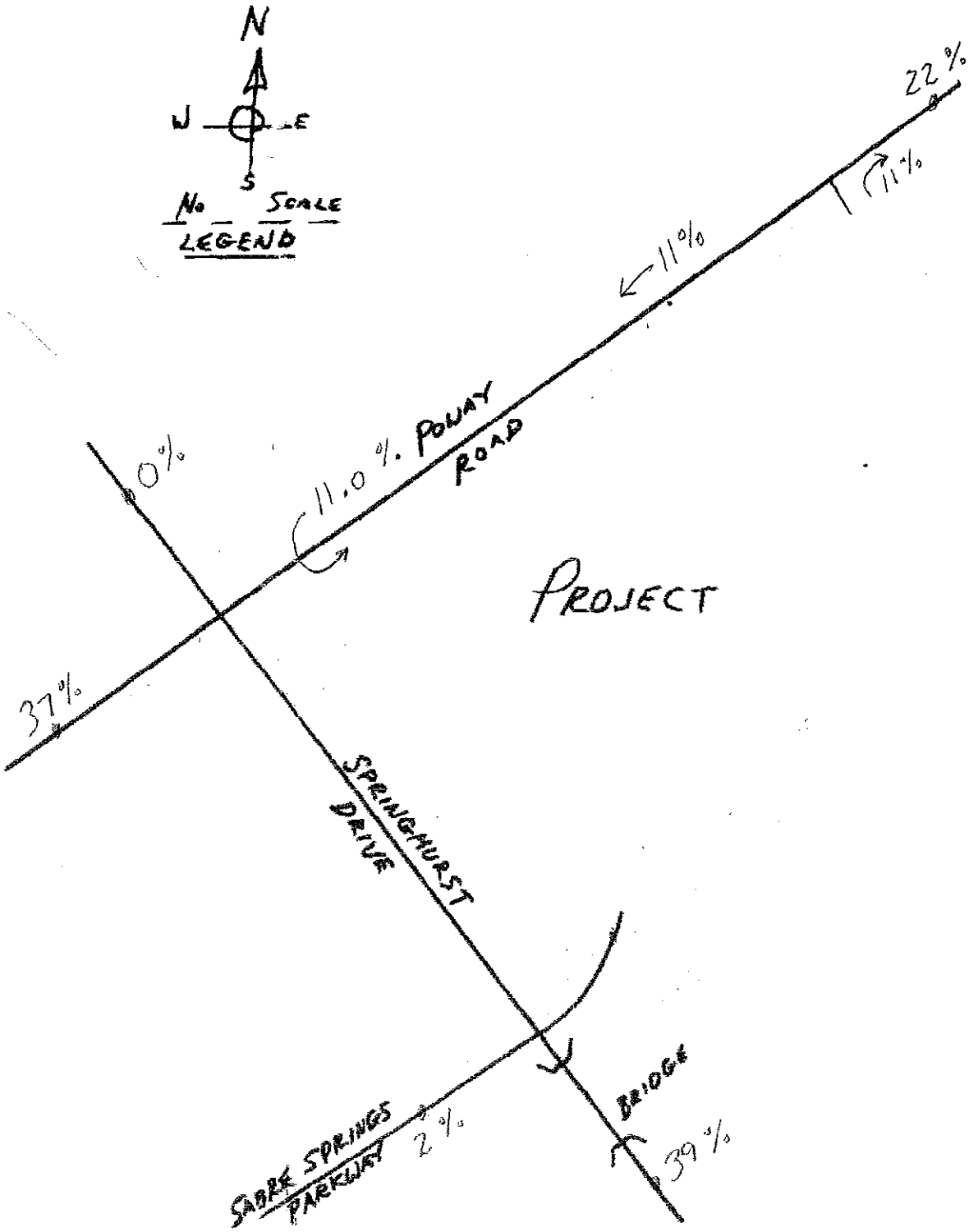
Note also that the Phase 2 Sanctuary size in Table 2 has been reduced by the 2946 sq. ft. of buildings that are removed to build the new Sanctuary (16083 sq. ft.–2946 sq. ft. = 13137 sq. ft.

Project Traffic Distribution

In order to distribute the project traffic of Table 4 in the various directions, a single zone traffic assignment was obtained from SANDAG for Series 11, year 2035, to help in estimating the projects distribution. After analyzing the SANDAG data, the project distribution of Figure 7 was produced.

Project Traffic Assignment

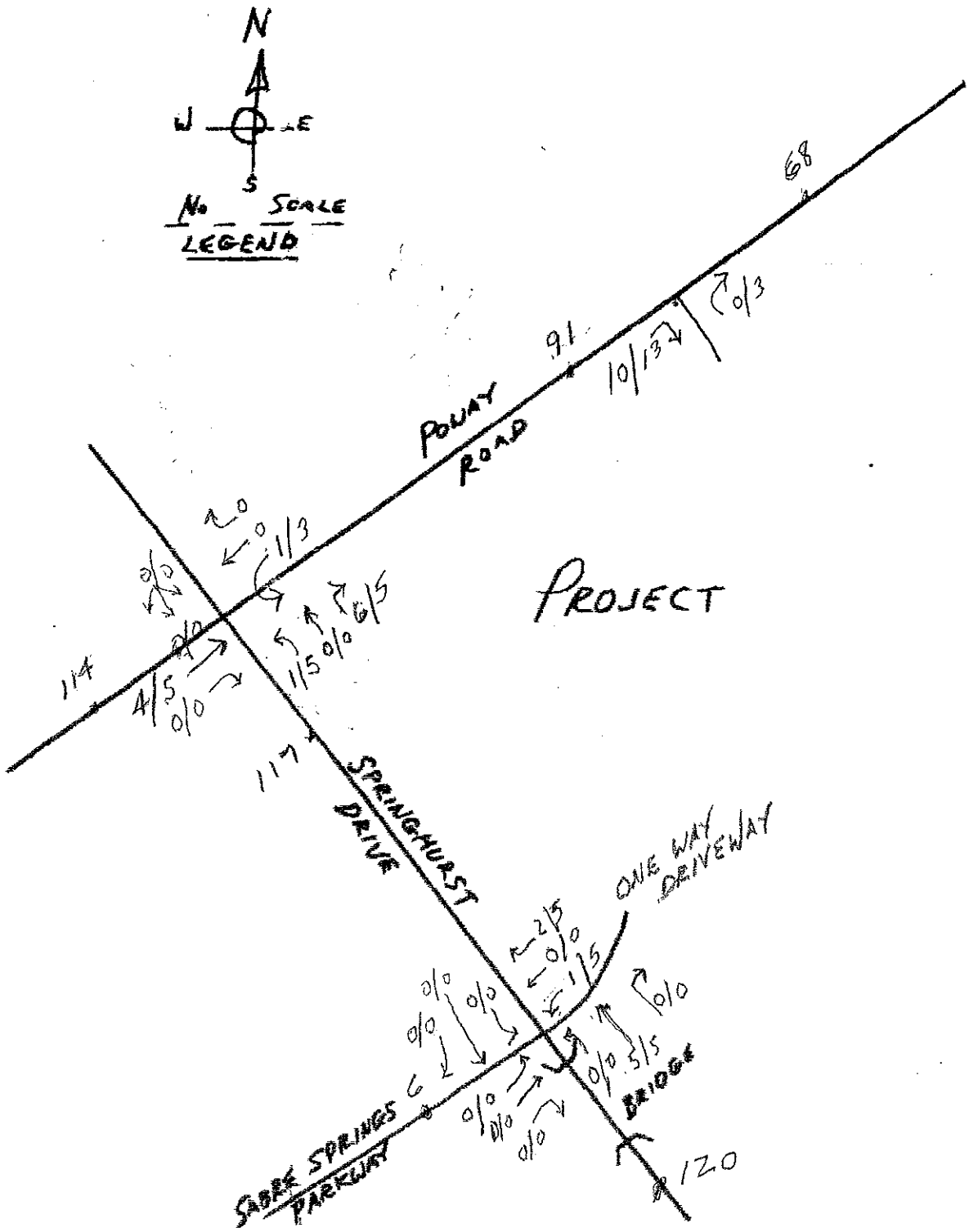
With the total project traffic of Table 4 developed, along with the project traffic distribution just shown on Figure 7, it was possible to start the various analyses required in the project traffic study. Figure 8, shows the total project traffic as it is distributed and assigned to the existing network.



ESTIMATED PROJECT TRAFFIC DISTRIBUTION
FROM SANDAG SERIES 11, YEAR 2035

FIGURE 7

NORTH CITY PRESBYTERIAN CHURCH



TOTAL PROJECT ONLY

2015 WEEK DAY EXISTING NETWORK

TOTAL PROJECT = 307 ADT & AM = 10 IN & 3 OUT; PM = 18 IN & 18 OUT

FIGURE 8

The first analysis is the development of existing traffic conditions without any new traffic added to 2015 traffic and geometrics. The "before" project analysis has been done and is summarized in Table 2, Page 12. The "after project" analysis starts on this page and requires that the total project traffic of Figure 8 be added to the existing weekday of Figure 4 resulting in the traffic volumes shown on Figure 9. The Appendix pages A-16 thru A-19 show the LOS calculations for weekday total project traffic scenarios.

Table 5 below combines the existing traffic data from Table 2 with the existing plus total project traffic just analyzed and shows the impact of the total project traffic on the existing network as if the project was completed today.

Table 5

Existing + Total Project, Intersection Delay and LOS Comparison

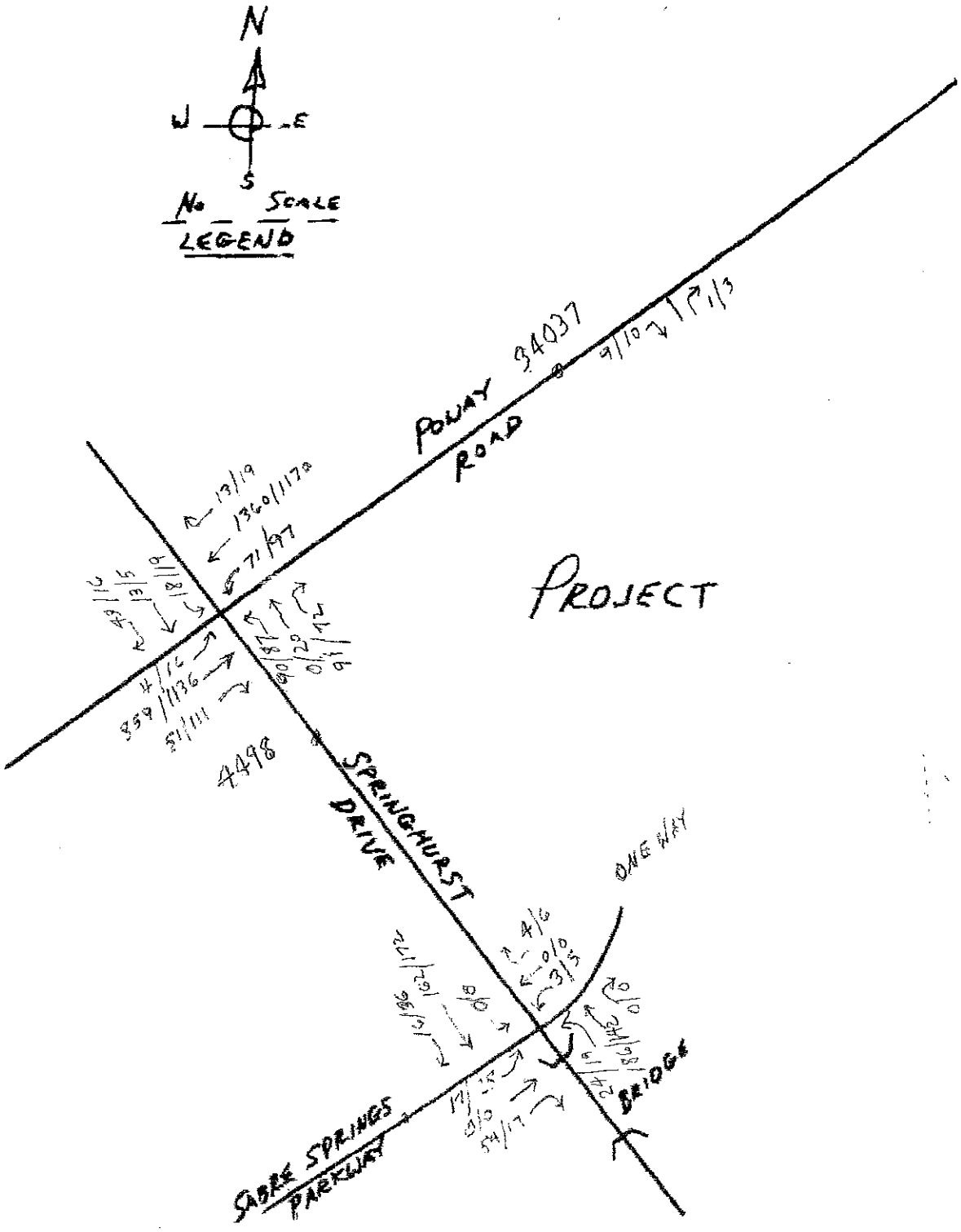
	Existing From Table 2		Existing With Total Project	
	Weekday		Weekday	
Intersection	Delay	LOS	Delay	LOS
1. Springhurst / Poway				
AM	11.8	B	12.1	B
PM	14.0	B	14.5	B
2. Springhurst / Sabre Springs				
AM	10.6*	B	10.7*	B
PM	10.9*	B	11.0*	B

*Critical Movement

Note: that with existing and existing plus total project traffic, with no improvements to the network, the LOS's are still at LOS B.

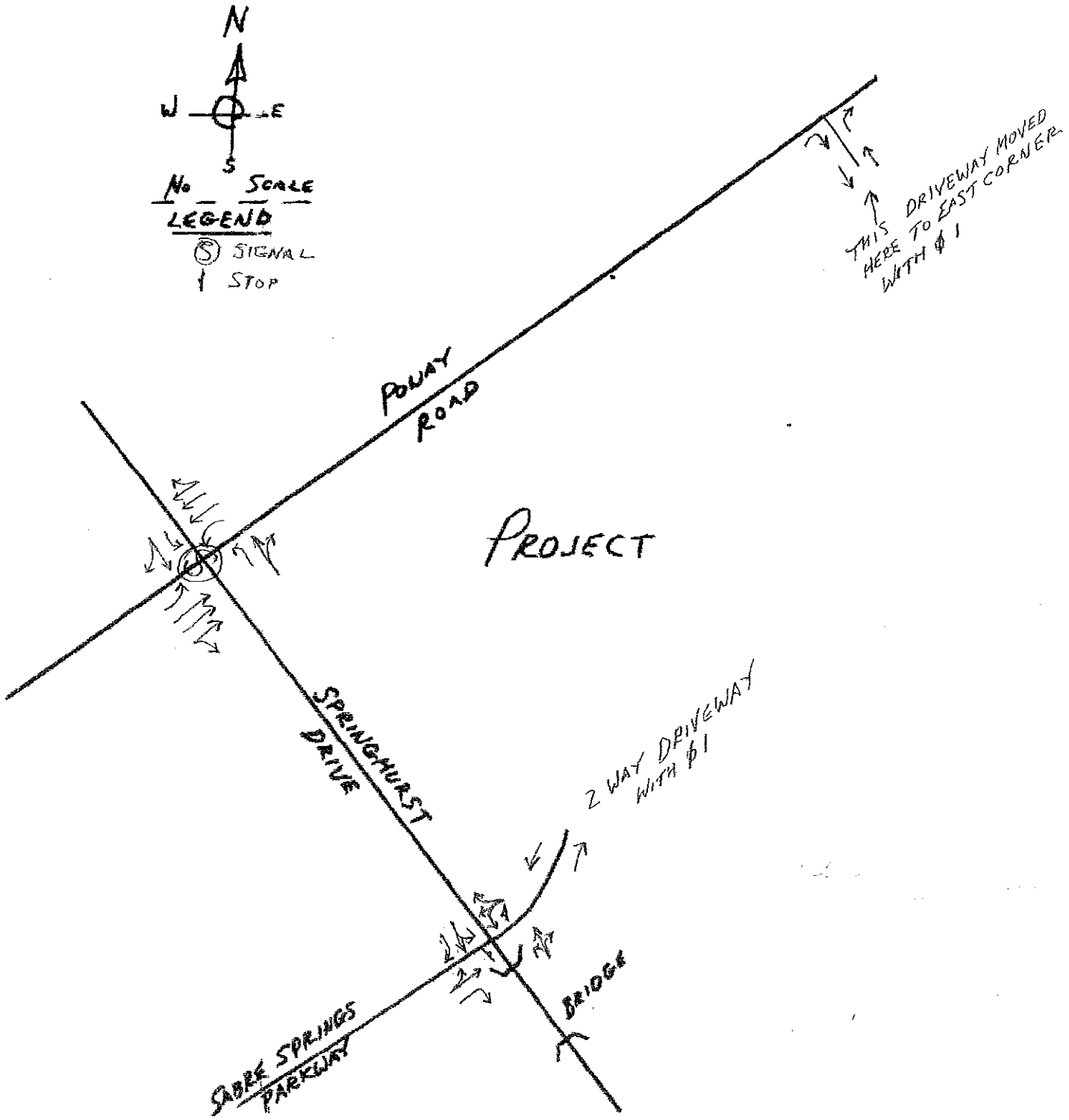
Project Phase 1 Traffic Analysis

Until now, this traffic report has analyzed only existing traffic or total project traffic added to existing traffic, with no changes to the network. Now will start the analysis of the project with the two Phases that are planned over the coming years including modifying the network to serve the site that is planned in Phase 1. These network modifications will be in use over the total project. Figure 10 shows these lanes as they will be modified during Phase 1.



COMBINED
2015 EXISTING WEEKDAY + TOTAL PROJECT TRAFFIC
ON EXISTING NETWORK

FIGURE 9



MODIFIED

INTERSECTION LANES & CONTROLS

FIGURE 10

NORTH CITY PRESBYTERIAN CHURCH

According to project staff, they plan on constructing the Phase 1 buildings and network improvements during 2018 – three years from the 2015 existing traffic counts. Therefore in order to analyze the traffic at the end of Phase 1 (in 2018) the 2015 traffic of Figure 4 must first be increased three years to 2018. Using an increase of 1% per year that has been used in past traffic studies for this project and checked in the study by comparing 2015 to 2035 ADT's, the Figure 4 traffic was multiplied by 1.03 and had the Phase 1 traffic added to it. See Figure 11 for the expanded 2015 traffic ready to have Phase 1 traffic added for 2018 volumes.

The Phase 1 project traffic generation of Table 4 shows that Phase 1 will add, on a weekday, 110ADT, 4 inbound and 1 outbound vehicle in the AM peak and 5 in and 5 out in the PM. Figure 12 shows the Phase 1 traffic assignment which will be added to Figure 11 leading to Figure 13 for the Phase 1 project analysis. The actual calculations are shown in the Appendix A-20 thru A-25 while Table 6 below shows the 2018 LOS's without and with Phase 1.

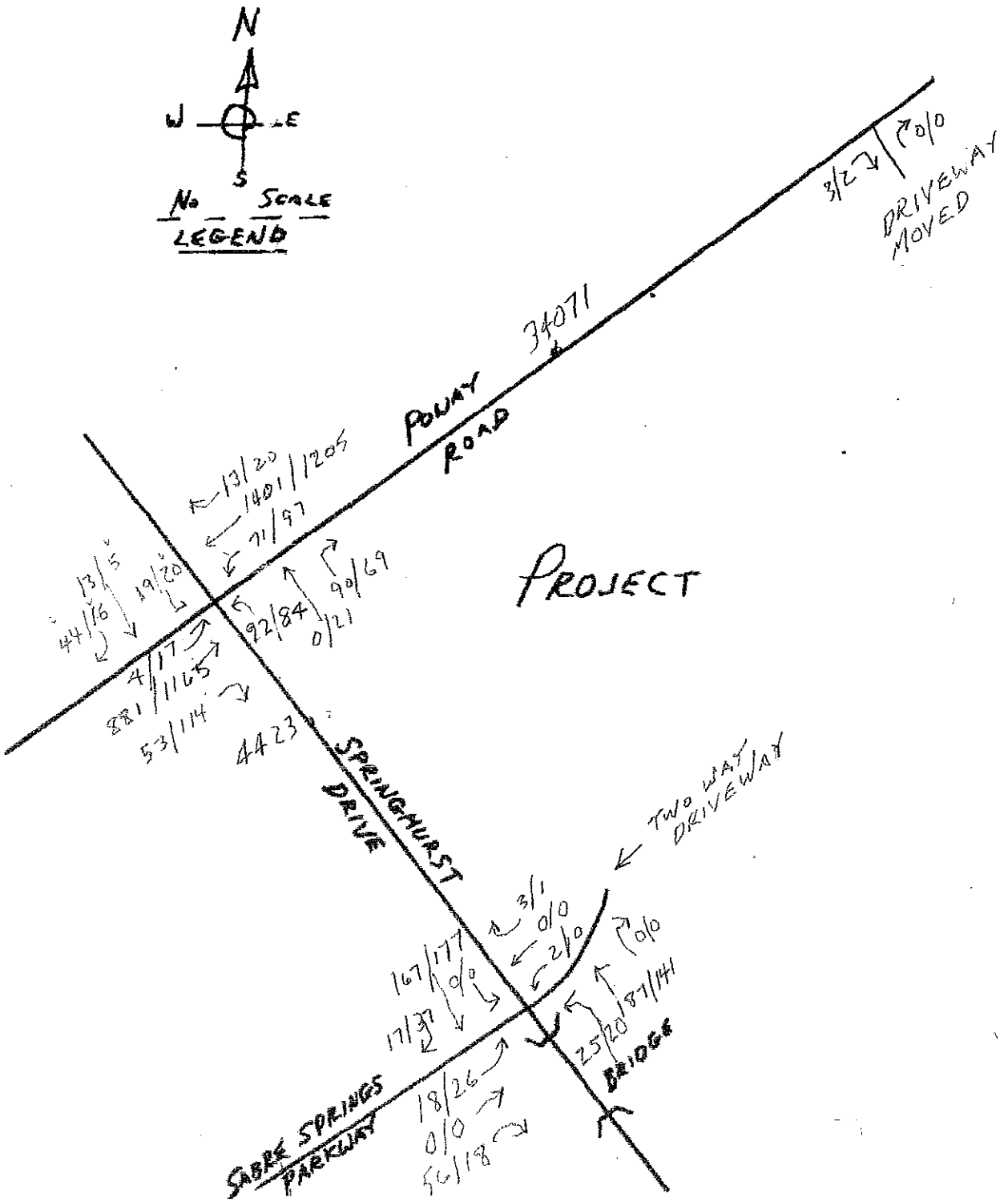
Table 6

2018 Weekday Traffic Intersection Delays and LOS's Before and After Phase 1 Traffic is Added

	2018Traffic Without Phase 1		2018 Traffic With Phase 1	
Intersections	Delay	LOS	Delay	LOS
1. Springhurst/Poway				
AM	11.8	B	13.0	B
PM	14.6	B	14.7	B
2. Springhurst/Saber Springs				
AM	10.7*	B	10.8*	B
PM	10.7*	B	10.7*	B

Critical Case Delays

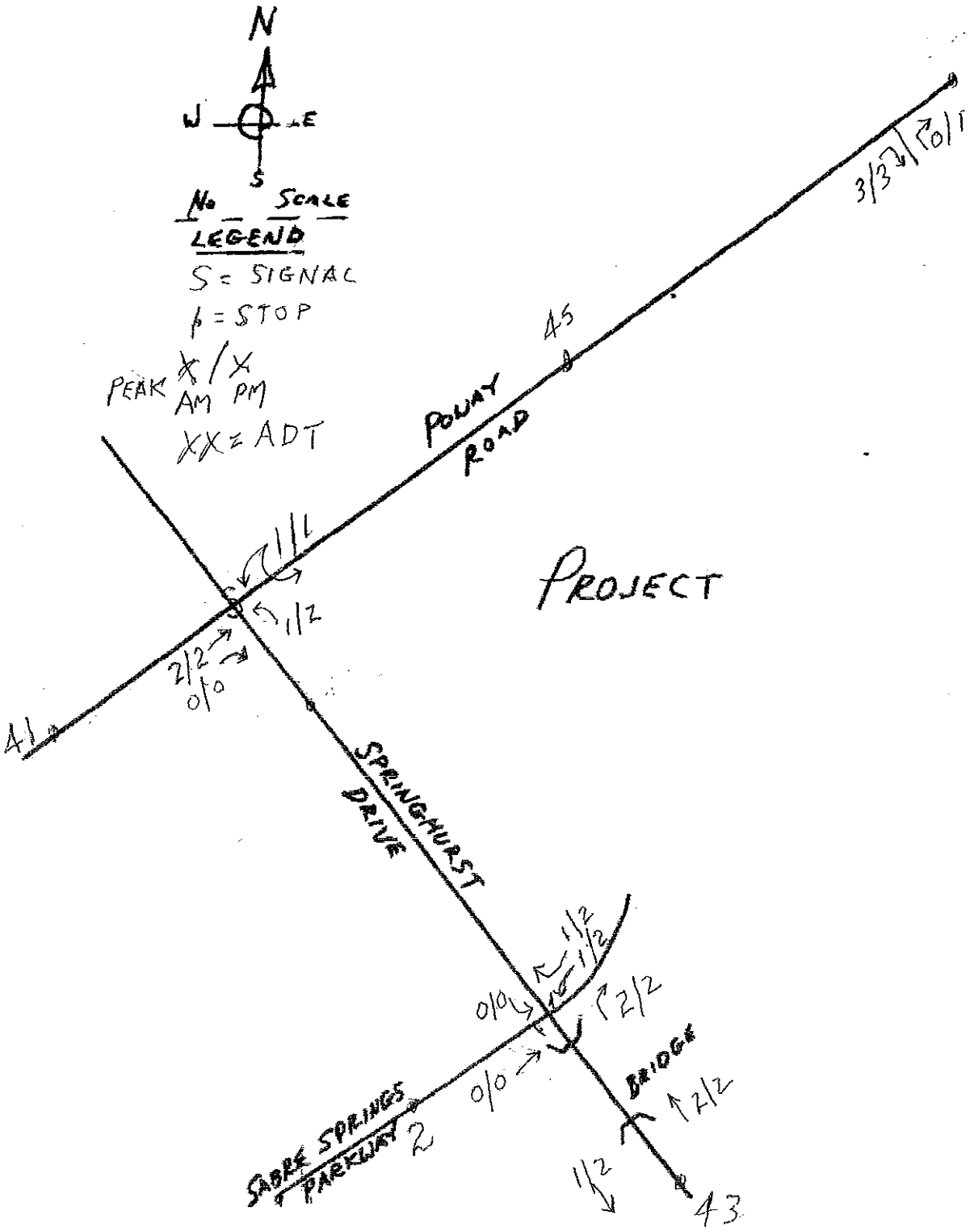
Note in Table 6, that the addition of Phase 1 Traffic to the expanded 2018 traffic, does not change the excellent LOS of B at either intersection since with the two way modified driveway at Sabre Springs, much of the south Springhurst traffic can use this driveway rather than be forced to use the Poway Rd. intersection. (see more text on Page 23)



2018 – EXISTING 2015 WEEKDAY TRAFFIC EXPANDED TO 2018 – WITH Ø1 MODIFIED NETWORK

NO PROJECT TRAFFIC

FIGURE 11



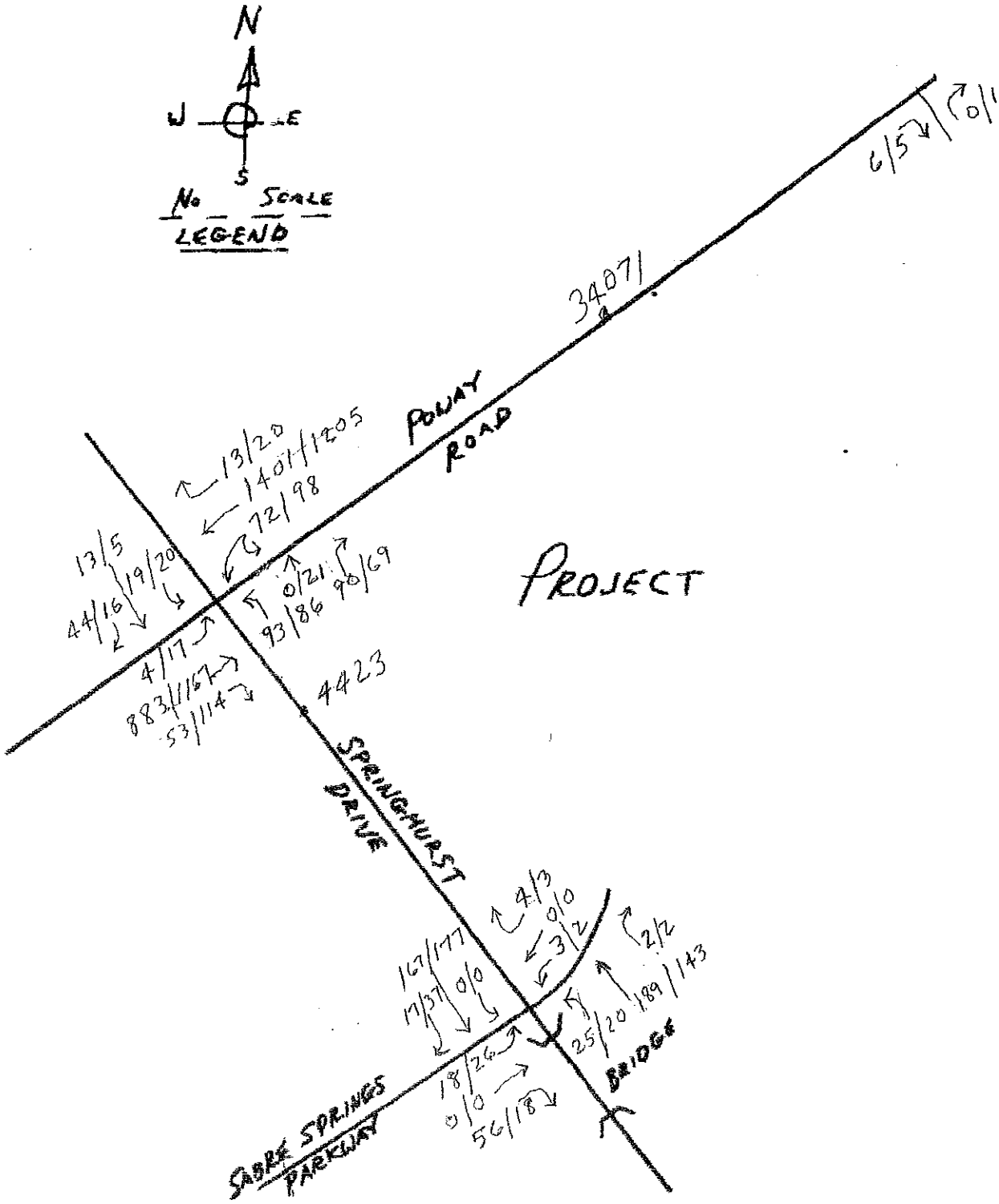
PHASE 1 ONLY

PHASE 1 WITH MODIFIED NETWORK

PHASE 1 PROJECT = 110 ADT — AM = 5 IN & 2 OUT — PM = 5 IN & 5 OUT

FIGURE 12

NORTH CITY PRESBYTERIAN CHURCH



WEEKDAY 2018 PLUS PHASE I TRAFFIC WITH MODIFIED NETWORK

2018 - PROJECT PHASE I = 110 ADT - AM = 5 IN & 2 OUT & PM = 5 IN & 5 OU

FIGURE 13

NORTH CITY PRESBYTERIAN CHURCH

Project Final Phase (End of Phase 2) / 2035 Horizon Year Traffic Analysis

Nobody knows when the final phase planned for the project will occur, except that it will be well into the future after Phase 1 in 2018. Therefore the City Staff suggested that the traffic study should analyze the total traffic of the project against the traffic of 2035 Horizon year volumes.

Final Segment Volumes

Throughout this Traffic Impact Study, the emphasis has been on the intersections and their forecasted LOS's. Note that at all periods from existing to Horizon Year, these intersection LOS's are all at the very good A or B level that promises that the planned Church project impact will not be the reason the roadway could ever become congested in the future. The project segment analysis promises the same, since only 307 weekday ADT's are expected to be added gradually to the local system, by the Horizon Year of 2035.

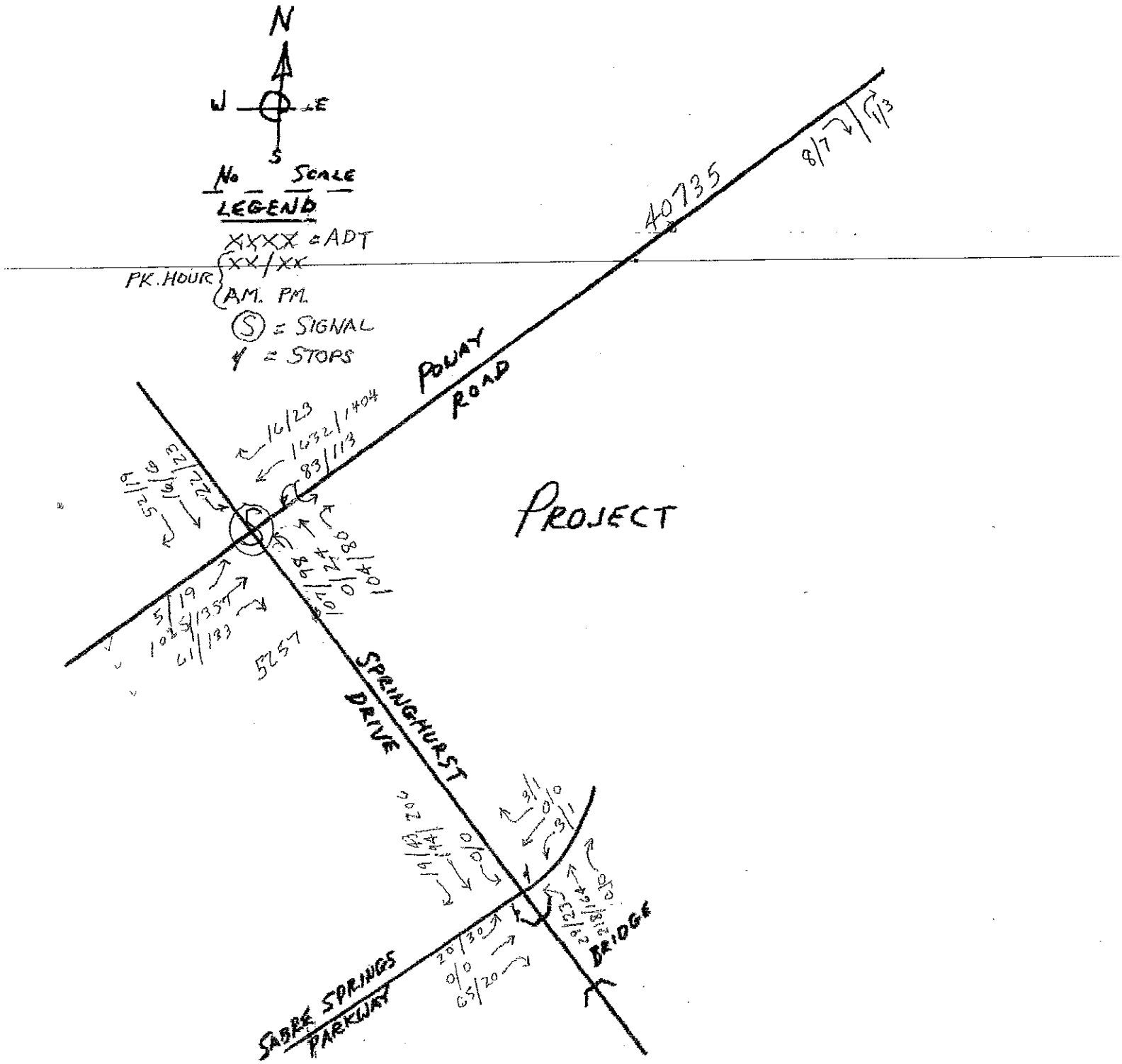
The 307 ADT's are only 0.68 of 1% of the SANDAG FORECASTED 2035 ADT's along Poway Road at the project. Our study, thought to be a conservative 1% of growth per year, varied from 33946 in 2015, to 40860 ADT in 2035. Our analysis shows that the Church project will have an insignificant traffic impact at all the time periods on all the segments, from 2015 through the 2035 Horizon Year.

Figure 14 is the base Horizon year traffic that the total project will be measured against. Note that it was derived by multiplying the existing 2015 traffic by 1.20 times, or, by adding the conservative, 1% per year (2015 to 2035).

Figure 15 shows the Horizon year traffic with the total project traffic added to it.

By using the traffic volumes shown on Figures 14 and 15, in the same computation formulas to obtain the Level Of Service reports by the 2000 HCM Operations Method as used in all LOS calculations, the Appendix pages A-28 thru A-35 show the 2035 weekday calculations of the LOS's.

A-36 and A-37 show the final estimated 2035 Sunday LOS calculations derived from Figure 16. Table 7 below shows the 2035 LOS's when the project is assumed complete– on weekdays and Sunday.



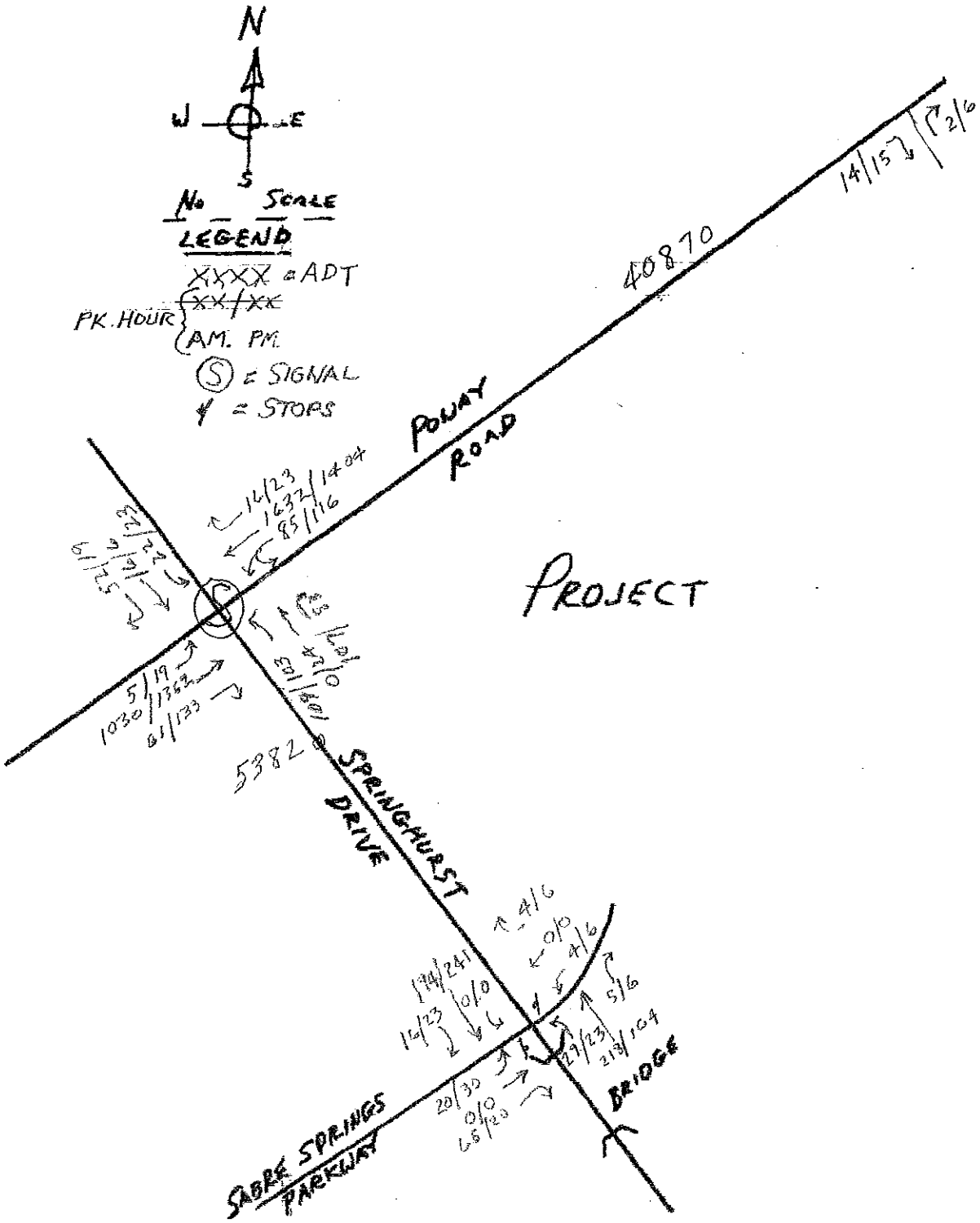
BASE HORIZON YEAR

2035 - HORIZON YEAR - WEEKDAY - EXPANDED 1.20 TIMES FROM NEW 2015 COUNTS - USING MODIFIED NETWORK

NO PROJECT TRAFFIC

FIGURE 14

NORTH CITY PRESBYTERIAN CHURCH



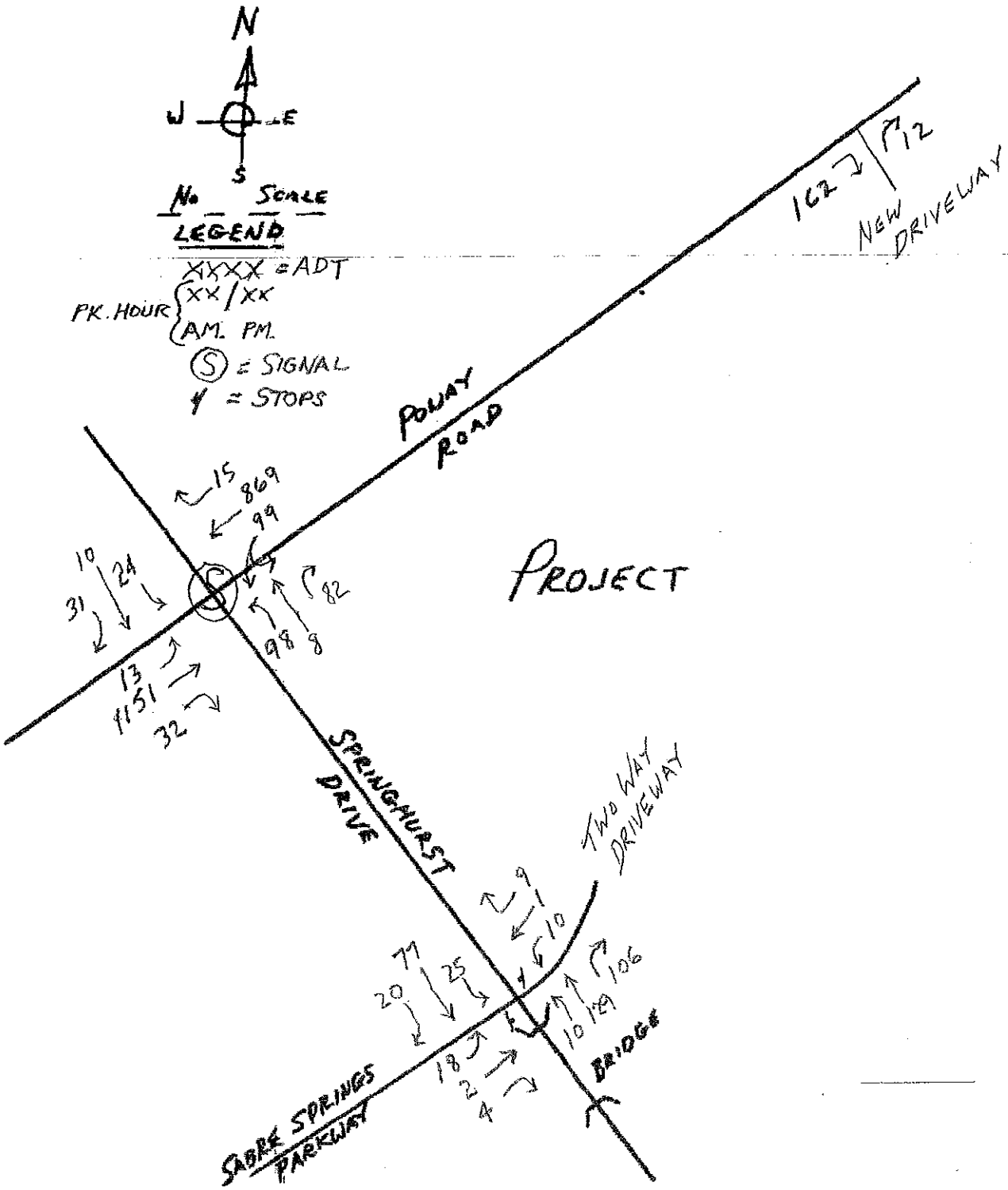
2035 - HORIZON YEAR - WEEKDAY - EXPANDED FROM 2015

COUNTS - MODIFIED NETWORK - WITH TOTAL PROJECT

TOTAL PROJECT TRAFFIC = 307 ADT - AM = 10/3, PM = 13/13

FIGURE 15

NORTH CITY PRESBYTERIAN CHURCH



THE 2035 SUNDAY CHURCH, AM PK. HOUR TRAFFIC, AS EXPANDED FROM THE 2015 SUNDAY COUNT, USING THE MODIFIED NETWORK AND TOTAL TRAFFIC OF 263 IN & 25 OUT

FIGURE 16

Table 7

2035 Traffic, Intersection Delays And LOS's Before And After The Total Project Traffic Is Added

	2035 Horizon Year Traffic Without Total Project Traffic		2035 Horizon Year Traffic With Project Traffic	
Intersection	Weekday		Weekday	
Springhurst / Poway	Delay	LOS	Delay	LOS
AM	12.3	B	12.4	B
PM	14.8	B	15.2	B
Springhurst / Sabre Springs				
AM	11.3*	B	11.7*	B
PM	11.2*	B	11.7*	

Sunday Existing (2015) AM Only			Sunday 2035 with Project AM Only		
	Delay	LOS		Delay	LOS
Springhurst / Poway	8.7	A	AM =	9.6	A
Springhurst / Saber Springs	9.9*	A	AM =	11.0*	B

*Critical Movement Delay

Existing Transit Service

The North City Presbyterian Church is served primarily by the Metropolitan Transit System (MTS) Route 944. This Route runs from the Sabre Springs / Penasquitos Transit Station on the west, then south to Poway Road, and along Poway Road east, passing the Church, crossing Pomerado Road, and extending east to Garden Road / Floral Avenue

where it loops back to Poway Road to go back west, passing the Church again, to the Sabre Springs / Penasquitos station where it begins all over again.

On Monday through Friday starting at 5AM, thru 7:30PM, Route 944 has ½ hour headways in each direction and therefore the Church has excellent weekday transit service since Route 944 also interconnects with Rancho Bernardo via Routes 945 and 945A which travel to / from Poway via Pomerado Road and Midland, and Espola Roads, north of Poway.

On Saturday all the above routes provide one hour headway service, but none provide any Sunday service.

Parking Access and Parking Tabulations

As shown on the Figure 2 and 3 site plans, with the new driveway at the far eastern end of the site, all off street parking spaces will have adequate access to / from the two driveways – few spaces will be located "outside" the access driveways since the in and out driveways are located at the west and east extremities of the total site and both drives are 2 way traffic.

City of San Diego Municipal Code Table 142-05F30 requires 1 parking space per 3 fixed seats. With Phase 1 and the 414 seat sanctuary, 138 spaces are required while 147 are being provided.

With Phase 2 (Build-out) when 167 parking spaces are required by the City, 173 are provided on site, thus, in both phases, the required spaces are being provided along with excellent access.

RelocatingThe Poway Road Driveway

As Mentioned early in this report, the existing, main, driveway on Poway Road must be relocated further east to allow for a longer lane transition. This will be done prior to the end of the project Phase 1, as shown on both Figures 2 and 3 herein. The plan for the original relocated driveway was changed during early site design in November and December of 2012, after extensive contact with City of San Diego, Traffic Engineers. Figure 17 shows the 2012 Striping Plan drawing, approved then by the City Traffic Engineers, and now incorporated in the driveway plans shown on Phase 1 and 2, site plans shown herein.

In the past there also have been questions raised about the sight distance from the new driveway for outbound users of the new driveway. It should be noted that because of the raised median in Poway Road, this driveway will have in / out only right turns allowed on

POWAY ROAD

CONCEPTUAL STRIPING PLAN

SPRINGHURST DRIVE

EX. PAVED MEDIAN

EX. STRIPING

BEGIN TRANSITION 83' EAST OF CROSSWALK

END OF TRANSITION

120'

80'

EX. CURB, GUTTER & SIDEWALK

R/W

BEGIN 4, TYPE F BLINKERS @ 73' CENTERS

EXISTING CROSSWALK

EX. 24' BROW

CHURCH SIGNS

LEGEND

SIGN LOCATION	
SIGN DETAIL NO.	W44
TYPE III ARROW	
TYPE VI ARROW	
STREET CENTERLINE	℄
RIGHT-OF-WAY	R/W
TRANSITION AREA	

SIGN LEGEND

STRIPING MODIFIED
11/7/13
James W. Frederick
TRAFFIC ENG. #136

ONE WAY
R6-1 (R1)

RIGHT LANE MUST TURN RIGHT
R3-7 (R1)

BEGIN R.T. LANE
YIELD TO BIKES
R4-4

RIGHT LANE ENDS
W9-1

W4-2
36"x36"

N

40 20 0 40 80 120

SCALE: 1" = 40'

CONCEPTUAL STRIPING PLANS FOR:
NORTH CITY PRESBYTERIAN CHURCH

BIDDING INFORMATION

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 4 OF 4 SHEETS

VIA NO.
P.T.S. NO.
V.T.N.

REVISION	BY	APPD. DATE	AS-BUILT
ORIGINAL			
REVISION 1			
REVISION 2			

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

FIG. 17

Road. Thus the outbound users must only look to the left for eastbound Poway Road vehicles. The new driveway is over 300 feet east of the existing driveway which will be closed with the full height curb and gutter with the new construction, and therefore has much more adequate sight distance than the existing driveway.

Scattered through this report are various Tables or Figures that show the intersection and segment LOS impacts of the project. The following Tables 8 and 9 and Figure 18 bring them together for easy comparisons.

Table 8

Summary Of Intersection Delays And LOS's Found In This Study

	Existing 2015 & Project				2018 & Project				2035 & Total Project			
	Existing Network				Modified Network				Modified Network			
	W.O. Proj.		With Proj.		W.O. Proj.		With Proj.		W.O. Proj.		With Proj.	
	Springhurst		Poway		Springhurst		Poway		Springhurst		Poway	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
AM	11.8	B	12.1	B	11.8	B	13.0	B	12.3	B	12.4*	B
PM	14.0	B	14.5	B	14.6	B	14.7	B	14.8	B	15.2*	B

*Footnote: In 2035, large volumes of traffic from South Springhurst can enter the project at Sabre Springs and avoid, traveling through the Poway intersection.

AM Sunday		AM Sunday	
8.7	A	9.6	A

	Existing 2015 & Project			Existing & Project 1			2035 & Total Project		
	Springhurst		Sabre Springs	Springhurst		Sabre Springs	Springhurst		Sabre Springs
	Delay	LOS	Delay LOS	Delay	LOS	Delay LOS	Delay	LOS	Delay LOS
AM	10.6	B	10.7* B	10.7*	B	10.8* B	12.3*	B	12.4* B
PM	10.9*	B	11.0* B	10.7*	B	10.7* B	14.8*	B	15.2* B
AM Sunday	9.9*	B					AM Sunday 11.0*		

*Critical Case

Project Intersection Comparisons

Note in Table 8, that all weekday intersections are at LOS B with all except one (2018 + Phase 1) having delay changes of less than 1.0 seconds.

Sunday, all calculations show only LOS A.

Therefore, Table 8 shows that the project has no significant traffic impacts on either of the major study intersections.

With regard to the segments of the study, Figure 18 and Table 9 show that the project adds such small volumes that by any measure, the project has an insignificant traffic impact on the segments.

Table 9

Segment Comparisons

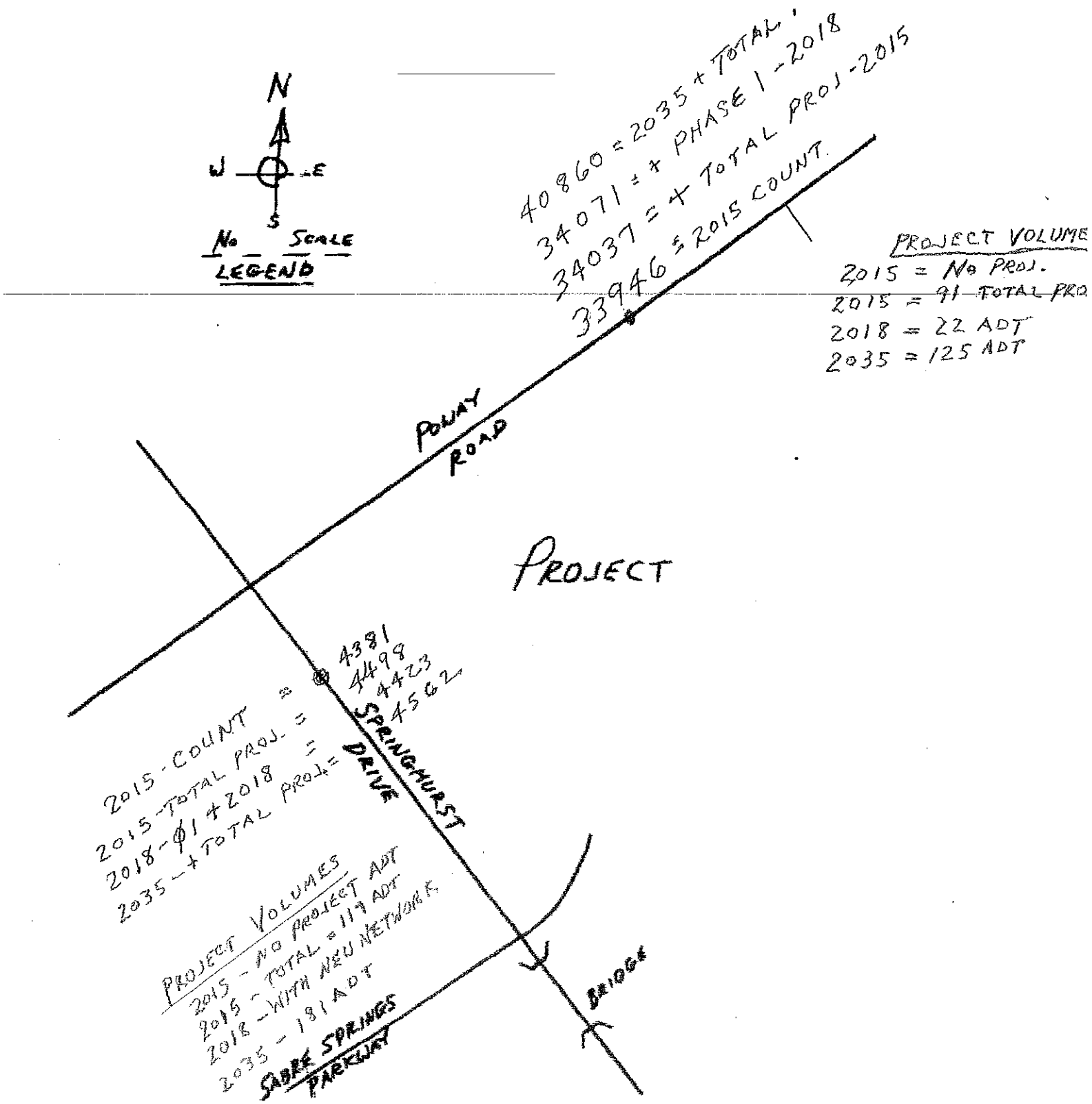
Segment

Poway Road East of Springhurst
Classification --- Major Arterial
Capacity ---------- LOS E = 50000

Study Volumes		V / C	LOS
Counted 2015	-- 33946	.679	C
2015 + Total	-- 34037	.682	C
2018 + Phase 1	-- 34071	.682	C
2035 + Total	-- 40860	.817	D

Springhurst North of Sabre Springs
Classification --- Collector
Capacity -------- LOS E = 15000

Study Volumes		V / C	LOS
Counted 2015	- 4381	.292	A
2015 + Total	- 4498	.300	A
2018 + Phase 1	- 4423	.295	A
2035 + Total	- 4562	.304	A



SUMMARY OF SEGMENT VOLUMES

FIGURE 18

Conclusions and Recommendations

As shown in all the Tables / Figures, the project will not have a significant traffic impact on either the critical intersections or segments, and thus has no mitigation requirements except to relocate its existing Poway Road driveway to its far eastern corner as shown on Figures 2 and 3, allowing right turns in and out at the new driveway.

By moving the driveway, the Poway Road eastbound lanes between Springhurst Drive and the new driveway can be restriped to provide more transition length where the existing three eastbound lanes merge down to two lanes. Figure 17 shows this preliminary restriping plan as approved by City of San Diego and City of Poway staffs in December 2012. Additionally, as part of the overall improvement of traffic access to the North City Presbyterian campus, with Phase 1, the driveway to Springhurst Drive will be striped for two way traffic.

From all the above, with implementation of the Poway Road driveway and the two way Springhurst Drive driveway, it is the professional opinion of this consultant that the plans for the existing North City Presbyterian Church can be approved by the local community, and the City of San Diego, with the full knowledge that it is will not seriously worsen the existing, traffic conditions, in the neighborhood.

James W. Federhart

Federhart & Associates

REGISTERED PROFESSIONAL ENGINEER
JAMES W. FEDERHART
No. 136
Exp. 3/31/18
TRAFFIC
STATE OF CALIFORNIA

November 7, 2013

Memo

Modification Of Figure 17 Of The December 28, 2012
Focused Traffic Study For The North City
Presbyterian Church On Poway Road

As shown on the above Figure 17, Page 29, due to riparian Environmental requirements, the proposed December 28, 2012 Poway Road Striping plan and new Poway Road driveway location, have been slightly modified as shown on the new Figure 17.

The new plan, can be implemented as shown, with the full knowledge that the traffic safety and traffic movements have not been compromised for either the travelers along Poway Road, or the users of the new driveway, with the modified Figure 17 plan.

There also have been questions raised about the sight distance from the new driveway for outbound users of the new driveway. It should be noted that because of the raised median in Poway Road, this driveway will have only right turns to and from Poway Road. Thus the driveway users must only look for good sight distance to the left at eastbound Poway Road as they exit the driveway. This sight distance is clear and excellent and extends well west of the signalized intersection at Springhurst Drive. The new driveway is also over 300 feet east of the existing drive way which will be closed with the new construction, and therefore has more clear sight distance than the existing.

James W. Federhart

Federhart & Associates

F

APPENDIX

A

Martin A. Parish
2117 Willow Drive El Centro, CA 92243
VEHICLE VOLUME SUMMARY

STREET : Poway Road
LIMIT 1 : Springhurst Drive
LIMIT 2 : Poway City Limit

Site: 0001
Date: 09/09/2015

Interval Begin		AM EB	AM WB	AM Total	PM EB	PM WB	PM Total
12:00		19	19	38	223	275	498
12:15		36	16	52	219	277	496
12:30		17	21	38	267	318	585
12:45		18	13	31	249	264	513
01:00		16	18	34	202	242	444
01:15		12	9	21	216	246	462
01:30		8	7	15	209	251	460
01:45		5	1	6	265	267	532
02:00		13	3	16	240	270	510
02:15		18	12	30	252	264	516
02:30		4	8	12	276	277	553
02:45		6	14	20	235	271	506
03:00		7	7	14	302	266	568
03:15		3	10	13	299	262	561
03:30		8	11	19	332	288	620
03:45		10	17	27	321	287	608
04:00		16	23	39	345	277	622
04:15		9	31	40	324	316	640
04:30		11	31	42	303	341	644
04:45		29	67	96	395	313	708
05:00		50	61	111	319	346	665
05:15		54	120	174	324	299	623
05:30		66	151	217	360	298	658
05:45		124	158	282	328	312	640
06:00		99	234	333	319	328	647
06:15		96	231	327	259	307	566
06:30		119	327	446	275	302	577
06:45		211	365	576	231	249	480
07:00		216	400	616	199	219	418
07:15		240	379	619	209	210	419
07:30		240	356	596	185	267	452
07:45		268	330	598	160	196	356
08:00		183	322	505	165	190	355
08:15		212	298	510	148	175	323
08:30		229	299	528	118	142	260
08:45		251	272	523	121	178	299
09:00		258	245	503	123	145	268
09:15		254	268	522	112	161	273
09:30		213	276	489	128	137	265
09:45		225	242	467	99	79	178
10:00		202	243	445	146	106	252
10:15		198	243	441	54	75	129
10:30		226	262	488	50	101	151
10:45		237	223	460	51	47	98
11:00		200	274	474	40	40	80
11:15		242	246	488	13	28	41
11:30		203	270	473	53	27	80
11:45		260	210	470	46	17	63
12Hr Total	0	5,641	7,643	13,284	10,109	10,553	20,662
Peak Hour		08:30	06:45	07:00	04:45	04:15	04:15
Volume	#	992	1,500	2,429	1,398	1,316	2,657
Factor		0.93	0.94	0.98	0.88	0.95	0.94
Day Total		15,750	18,196	Grand Total		33,946	

POWAY RD.
EXISTING 2015 ADT

Printed : 09/18/2015

A1

Martin A. Parish.
2117 Willow Drive El Centro, CA 92243
VEHICLE VOLUME SUMMARY

STREET : Springhurst Drive
LIMIT 1 : Poway Road
LIMIT 2 : Saber Springs Parkway

Site: 0002
Date: 09/09/2015

Interval Begin		AM NB	AM SB	AM Total	PM NB	PM SB	PM Total
12:00		2	1	3	21	35	56
12:15		0	2	2	25	43	68
12:30		2	3	5	57	20	77
12:45		1	2	3	24	29	53
01:00		0	3	3	10	32	42
01:15		0	0	0	17	55	72
01:30		0	1	1	22	65	87
01:45		0	0	0	106	47	153
02:00		0	2	2	43	25	68
02:15		0	0	0	35	29	64
02:30		0	1	1	48	32	80
02:45		0	0	0	33	47	80
03:00		0	0	0	43	37	80
03:15		0	0	0	55	36	91
03:30		1	1	2	36	35	71
03:45		2	0	2	24	37	61
04:00		2	0	2	40	53	93
04:15		0	1	1	41	44	85
04:30		3	0	3	38	37	75
04:45		4	1	5	52	42	94
05:00		4	2	6	32	58	90
05:15		6	1	7	50	51	101
05:30		11	0	11	35	59	94
05:45		15	6	21	32	59	91
06:00		13	6	19	35	52	87
06:15		15	9	24	34	46	80
06:30		19	64	83	39	41	80
06:45		56	13	69	43	32	75
07:00		73	17	90	28	35	63
07:15		45	35	80	17	28	45
07:30		22	57	79	19	41	60
07:45		36	24	60	19	21	40
08:00		32	16	48	15	30	45
08:15		39	38	77	23	30	53
08:30		40	52	92	10	31	41
08:45		76	75	151	14	14	28
09:00		78	21	99	11	25	36
09:15		56	15	71	8	18	26
09:30		29	27	56	11	20	31
09:45		44	16	60	8	12	20
10:00		26	18	44	4	12	16
10:15		31	11	42	0	13	13
10:30		23	16	39	1	5	6
10:45		22	20	42	3	4	7
11:00		21	17	38	3	4	7
11:15		34	25	59	1	2	3
11:30		17	17	34	1	6	7
11:45		23	21	44	2	4	6
12Hr Total	0	923	657	1,580	1,268	1,533	2,801
Peak Hour		08:30	08:15	08:15	01:45	05:00	01:15
Volume	#	250	186	419	232	227	380
Factor		0.80	0.62	0.69	0.55	0.87	0.62
Day Total		2,191	2,190	Grand Total		4,381	

SPRINGHURST DR.
EXISTING 2015 ADT

Printed : 09/21/2015

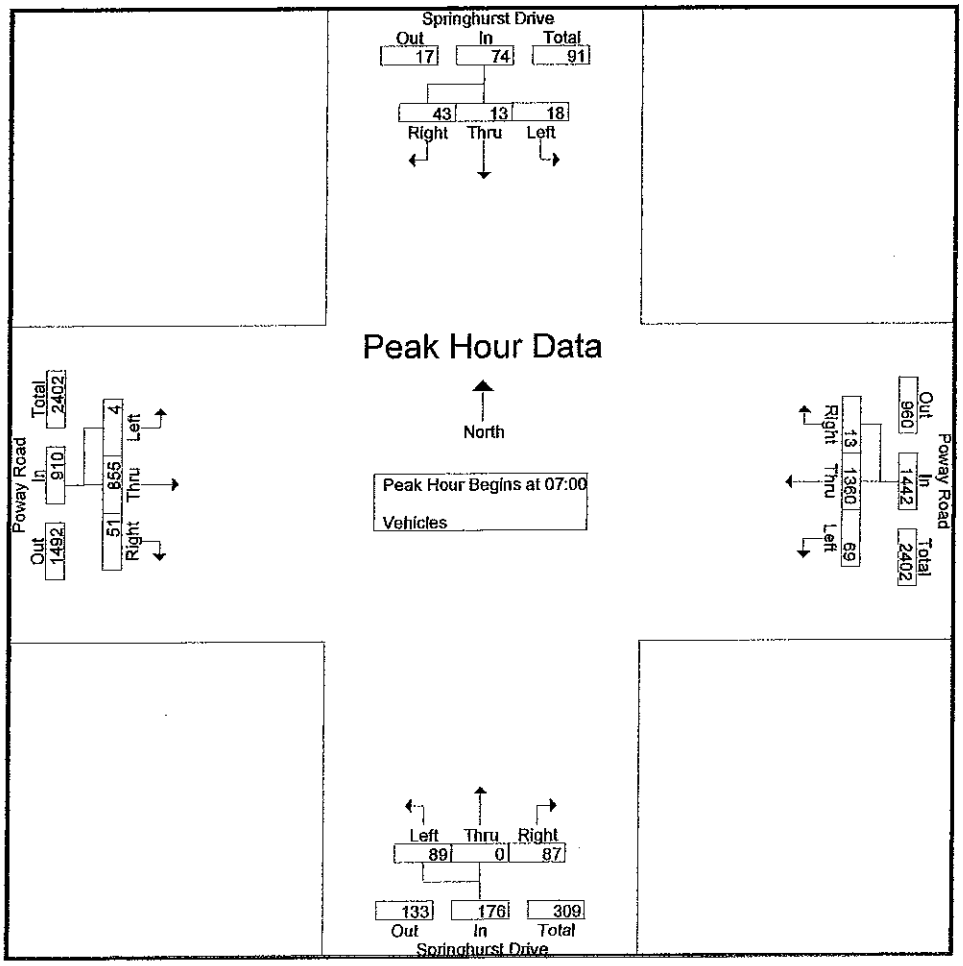
A2

Martin A. Parish
2117 Willow Drive
El Centro, CA 92243
619-988-1949

Weather: Clear & Dry
Counted by: M. Parish
Board No.: Video
Loc: Springhurst & Poway Road

File Name : springhurst & poway road.01
Site Code : 0001
Start Date : 9/9/2015
Page No : 2

	Springhurst Drive Southbound				Poway Road Westbound				Springhurst Drive Northbound				Poway Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00																	
07:00	4	3	13	20	7	361	2	370	38	0	35	73	0	174	7	181	644
07:15	5	3	12	20	21	353	3	377	24	0	21	45	1	214	11	226	668
07:30	5	1	7	13	35	341	6	382	12	0	10	22	1	225	21	247	664
07:45	4	6	11	21	6	305	2	313	15	0	21	36	2	242	12	256	626
Total Volume	18	13	43	74	69	1360	13	1442	89	0	87	176	4	855	51	910	2602
% App. Total	24.3	17.6	58.1		4.8	94.3	0.9		50.6	0	49.4		0.4	94	5.6		
PHF	.900	.542	.827	.881	.493	.942	.542	.944	.586	.000	.621	.603	.500	.883	.607	.889	.974



POWAY — SPRINGHURST

EXISTING AM

A3

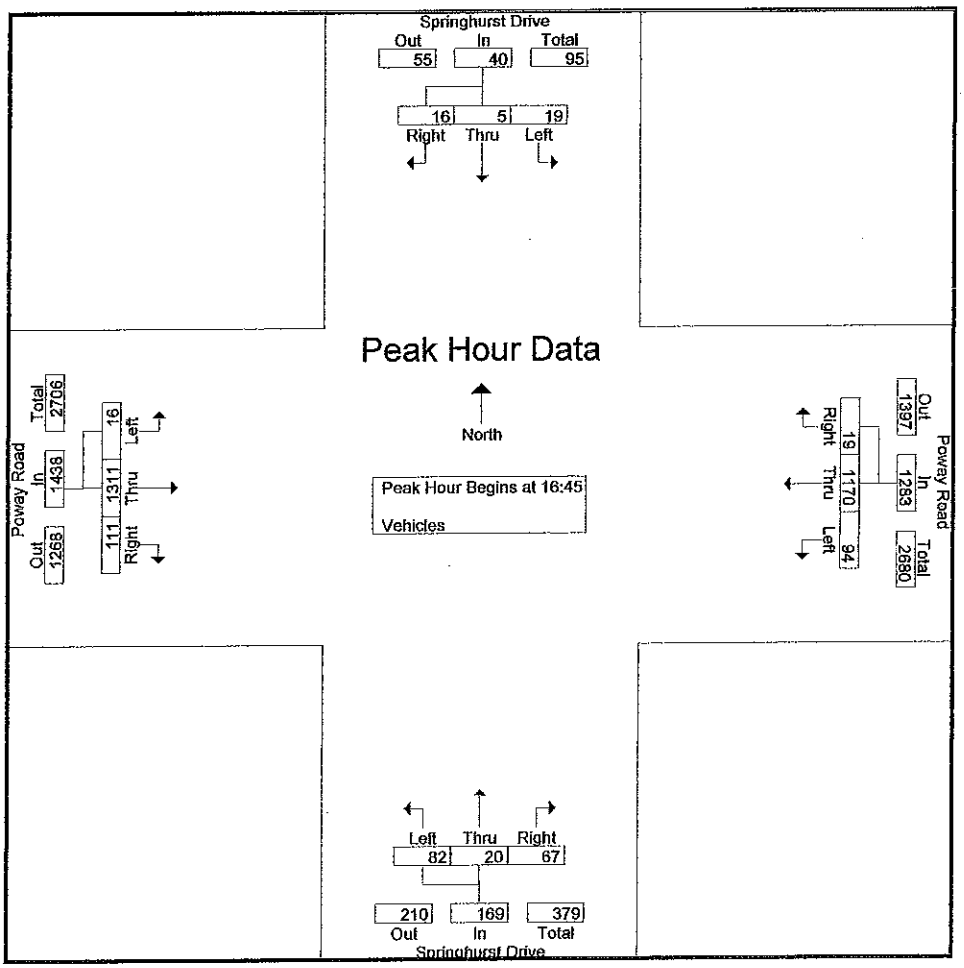
Martin A. Parish

2117 Willow Drive
El Centro, CA 92243
619-988-1949

Weather: Clear & Dry
Counted by: M. Parish
Board No.: Video
Loc: Springhurst & Poway Road

File Name : springhurst & poway road.01
Site Code : 0001
Start Date : 9/9/2015
Page No : 3

	Springhurst Drive Southbound				Poway Road Westbound				Springhurst Drive Northbound				Poway Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	5	1	6	12	21	283	3	307	18	9	25	52	6	364	20	390	761
17:00	5	0	1	6	31	329	5	365	19	1	12	32	1	302	27	330	733
17:15	4	2	4	10	17	278	8	303	25	8	17	50	5	303	32	340	703
17:30	5	2	5	12	25	280	3	308	20	2	13	35	4	342	32	378	733
Total Volume	19	5	16	40	94	1170	19	1283	82	20	67	169	16	1311	111	1438	2930
% App. Total	47.5	12.5	40		7.3	91.2	1.5		48.5	11.8	39.6		1.1	91.2	7.7		
PHF	.950	.625	.667	.833	.758	.889	.594	.879	.820	.556	.670	.813	.667	.900	.867	.922	.963



POWAY - SPRINGHURST

EXISTING PM

A4

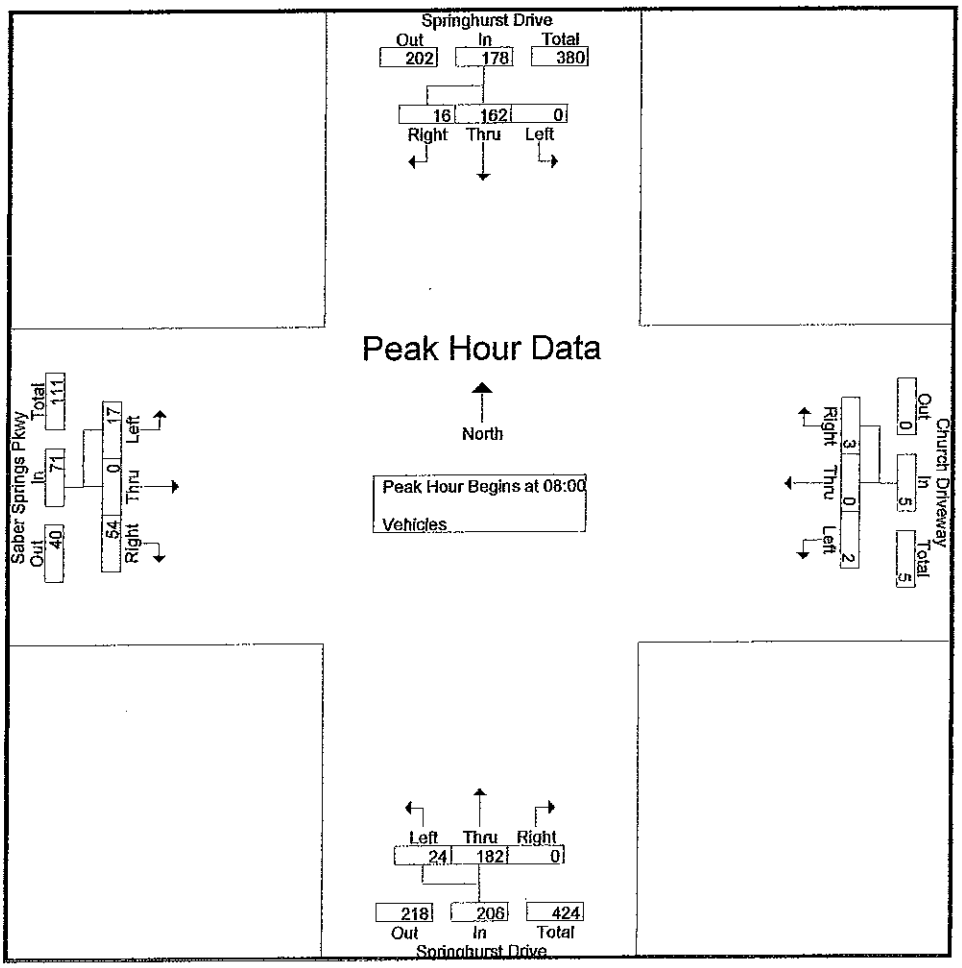
Martin A. Parish

2117 Willow Drive
El Centro, CA 92243
619-988-1949

Weather: Clear & Dry
Counted by: M. Parish
Board No.: Video
Loc: Springhurst Dr & Saber Springs Pkwy

File Name : springhurst & saber springs pkwy
Site Code : 0002
Start Date : 9/9/2015
Page No : 2

	Springhurst Drive Southbound				Church Driveway Westbound				Springhurst Drive Northbound				Saber Springs Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	0	21	3	24	0	0	0	0	3	35	0	38	3	0	7	10	72
08:15	0	33	2	35	0	0	0	0	2	28	0	30	8	0	1	9	74
08:30	0	36	6	42	0	0	1	1	9	39	0	48	3	0	20	23	114
08:45	0	72	5	77	2	0	2	4	10	80	0	90	3	0	26	29	200
Total Volume	0	162	16	178	2	0	3	5	24	182	0	206	17	0	54	71	460
% App. Total	0	91	9		40	0	60		11.7	88.3	0		23.9	0	76.1		
PHF	.000	.563	.667	.578	.250	.000	.375	.313	.600	.569	.000	.572	.531	.000	.519	.612	.575



SPRINGHURST — SABER SPRINGS

EXISTING AM

A5

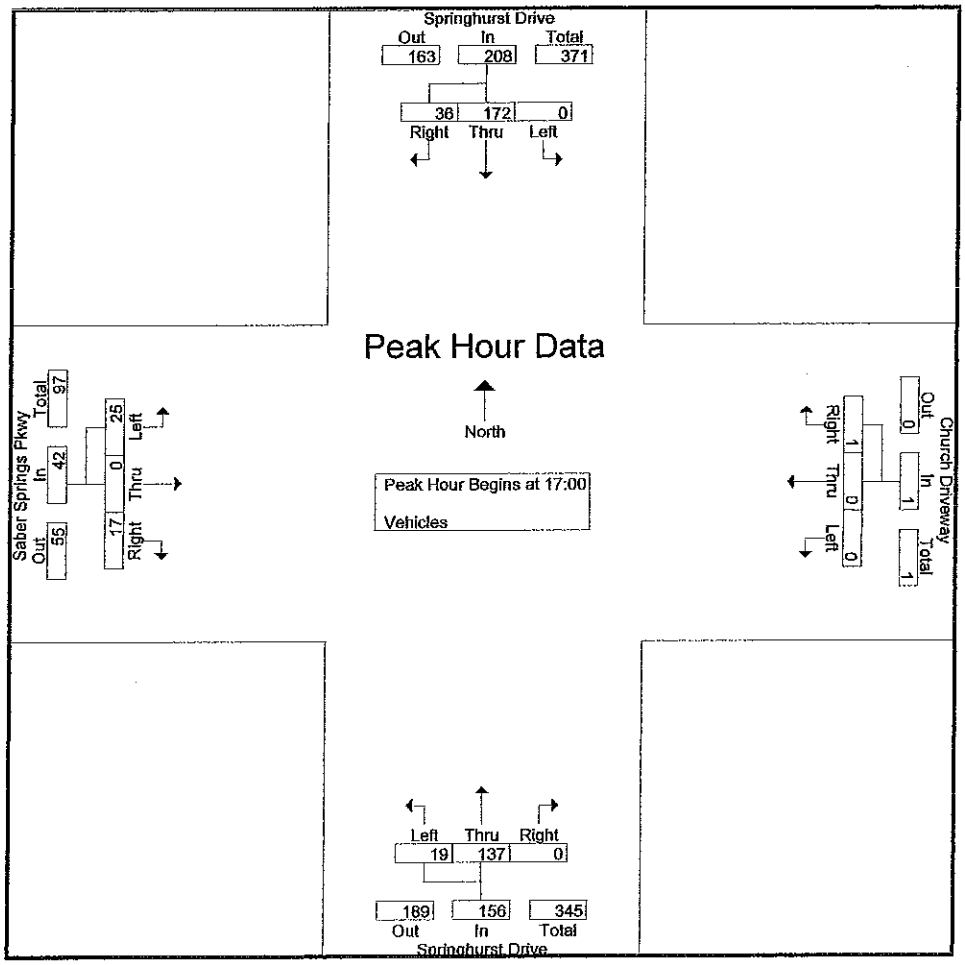
Martin A. Parish

2117 Willow Drive
El Centro, CA 92243
619-988-1949

Weather: Clear & Dry
Counted by: M. Parish
Board No.: Video
Loc: Springhurst Dr & Saber Springs Pkwy

File Name : springhurst & saber springs pkwy
Site Code : 0002
Start Date : 9/9/2015
Page No : 3

	Springhurst Drive Southbound				Church Driveway Westbound				Springhurst Drive Northbound				Saber Springs Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	0	34	4	38	0	0	0	0	3	39	0	42	7	0	7	14	94
17:15	0	47	8	55	0	0	0	0	5	34	0	39	6	0	4	10	104
17:30	0	43	9	52	0	0	1	1	7	36	0	43	6	0	4	10	106
17:45	0	48	15	63	0	0	0	0	4	28	0	32	6	0	2	8	103
Total Volume	0	172	36	208	0	0	1	1	19	137	0	156	25	0	17	42	407
% App. Total	0	82.7	17.3		0	0	100		12.2	87.8	0		59.5	0	40.5		
PHF	.000	.896	.600	.825	.000	.000	.250	.250	.679	.878	.000	.907	.893	.000	.607	.750	.960



SPRINGHURST - SABER SPRINGS

EXISTING PM

A6

Martin A. Parish
2117 Willow Drive
El Centro, CA 92243
619-988-1949

Weather: Clear & Dry
Counted by: M. Parish
Board No.: Video
Loc: Springhurst Dr & Saber Springs Pkwy

File Name : springhurst & saber springs pkwy
Site Code : 0002
Start Date : 9/9/2015
Page No : 1

Groups Printed- Vehicles

	Springhurst Drive Southbound				Church Driveway Westbound				Springhurst Drive Northbound				Saber Springs Pkwy Eastbound						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00	2	25	5	1	0	0	0	0	13	58	0	0	13	0	6	1	2	122	124
07:15	0	22	5	0	0	0	0	0	2	33	0	0	12	0	6	2	2	80	82
07:30	0	46	9	0	0	0	0	0	2	17	0	0	5	1	7	1	1	87	88
07:45	0	20	0	0	0	0	0	0	7	24	0	0	4	0	8	0	0	63	63
Total	2	113	19	1	0	0	0	0	24	132	0	0	34	1	27	4	5	352	357
08:00	0	21	3	0	0	0	0	0	3	35	0	0	3	0	7	1	1	72	73
08:15	0	33	2	0	0	0	0	0	2	28	0	0	8	0	1	0	0	74	74
08:30	0	36	6	0	0	0	1	0	9	39	0	0	3	0	20	20	20	114	134
08:45	0	72	5	0	2	0	2	0	10	80	0	0	3	0	26	61	61	200	261
Total	0	162	16	0	2	0	3	0	24	182	0	0	17	0	54	82	82	460	542
*** BREAK ***																			
16:00	0	38	9	1	0	0	0	0	4	30	0	0	4	0	3	0	1	88	89
16:15	2	39	11	0	0	0	0	0	1	34	0	0	5	0	7	0	0	99	99
16:30	0	39	6	0	0	0	0	0	7	32	0	0	7	0	13	0	0	104	104
16:45	0	40	7	0	0	0	0	0	6	31	0	0	7	0	7	0	0	98	98
Total	2	156	33	1	0	0	0	0	18	127	0	0	23	0	30	0	1	389	390
17:00	0	34	4	0	0	0	0	0	3	39	0	0	7	0	7	4	4	94	98
17:15	0	47	8	0	0	0	0	0	5	34	0	0	6	0	4	0	0	104	104
17:30	0	43	9	0	0	0	1	0	7	36	0	0	6	0	4	0	0	106	106
17:45	0	48	15	0	0	0	0	0	4	28	0	0	6	0	2	1	1	103	104
Total	0	172	36	0	0	0	1	0	19	137	0	0	25	0	17	5	5	407	412
Grand Total	4	603	104	2	2	0	4	0	85	578	0	0	99	1	128	91	93	1608	1701
Apprch %	0.6	84.8	14.6		33.3	0	66.7		12.8	87.2	0		43.4	0.4	56.1				
Total %	0.2	37.5	6.5		0.1	0	0.2		5.3	35.9	0		6.2	0.1	8		5.5	94.5	

SPRINGHURST - SABER SPRINGS

EXISTING PEAK HOURS

A7

Martin A. Parish

2117 Willow Drive
El Centro, CA 92243
619-988-1949

Weather: Clear & Dry
Counted by: M. Parish
Board No.: Video
Loc: Springhurst & Poway Road

SUNDAY AM ONLY
BUSIEST HOUR
10:15 TO 11:15 AM

File Name : springhurst & poway road
Site Code : 0003
Start Date : 10/11/2015
Page No : 1

Groups Printed- Vehicles

	Springhurst Southbound					Poway Road Westbound						Springhurst Northbound					Poway Road Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	U Turn	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
10:15	4	0	4	0	8	9	177	0	1	0	186	14	3	13	0	30	1	190	9	1	200	2	424	426
10:30	6	3	9	0	18	12	209	2	0	1	223	17	1	15	1	33	2	158	6	0	166	2	440	442
10:45	6	2	8	0	16	9	150	7	0	1	166	21	0	21	0	42	1	219	5	0	225	1	449	450
Total	16	5	21	0	42	30	536	9	1	2	575	52	4	49	1	105	4	567	20	1	591	5	1313	1318
11:00	4	3	5	1	12	11	188	2	1	1	201	22	3	19	0	44	7	332	12	1	351	4	608	612
Grand Total	20	8	26	1	54	41	724	11	2	3	776	74	7	68	1	149	11	899	32	2	942	9	1921	1930
Apprch %	37	14.8	48.1			5.3	93.3	1.4				49.7	4.7	45.6			1.2	95.4	3.4					
Total %	1	0.4	1.4		2.8	2.1	37.7	0.6			40.4	3.9	0.4	3.5		7.8	0.6	46.8	1.7		49	0.5	99.5	

10:15-11:15

A8

Martin A. Parish
2117 Willow Drive
El Centro, CA 92243
619-988-1949

Weather: Clear & Dry
Counted by: M. Parish
Board No.: Manual
Loc: Springhurst & Saber Springs

File Name : Springhurst & Saber Springs
Site Code : 0001
Start Date : 10/11/2015
Page No : 1

Groups Printed- Vehicles

	Springhurst Southbound					Church Drwy Westbound					Springhurst Northbound					Saber Springs Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
10:15	0	15	4	0	19	0	0	0	0	0	2	32	0	0	34	3	0	0	0	3	56
10:30	0	13	6	0	19	0	0	3	0	3	0	29	0	0	29	3	0	1	0	4	55
10:45	0	18	4	0	22	1	0	3	0	4	3	30	0	0	33	4	0	1	0	5	64
Total	0	46	14	0	60	1	0	6	0	7	5	91	0	0	96	10	0	2	0	12	175
11:00	0	18	3	0	21	1	1	4	0	6	4	25	0	0	29	5	0	1	0	6	62
Grand Total	0	64	17	0	81	2	1	10	0	13	9	116	0	0	125	15	0	3	0	18	237
Apprch %	0	79	21	0		15.4	7.7	76.9	0		7.2	92.8	0	0		83.3	0	16.7	0		
Total %	0	27	7.2	0	34.2	0.8	0.4	4.2	0	5.5	3.8	48.9	0	0	52.7	6.3	0	1.3	0	7.6	

SUNDAY

SPRINGHURST – POWAY

Scenario Report

Scenario:	Weekday EX AM
Command:	Default Command
Volume:	EX AM
Geometry:	EX AM
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	120	Critical Vol./Cap.(X):	0.356
Loss Time (sec):	0	Average Delay (sec/veh):	11.8
Optimal Cycle:	35	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	89	0	87	18	13	43	4	855	51	69	1360	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	89	0	87	18	13	43	4	855	51	69	1360	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	94	0	92	19	14	45	4	900	54	73	1432	14
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	94	0	92	19	14	45	4	900	54	73	1432	14
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	94	0	92	19	14	45	4	900	54	73	1432	14
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	1.00	1.00	1.00	0.23	0.77	1.00	2.83	0.17	1.00	2.97	0.03
Final Sat.:	1769	1900	1583	1769	383	1265	1769	4759	284	1769	5030	48
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.06	0.01	0.04	0.04	0.00	0.19	0.19	0.04	0.28	0.28
Crit Moves:			****	****			****				****	
Green/Cycle:	0.11	0.00	0.15	0.04	0.09	0.09	0.04	0.66	0.66	0.15	0.76	0.76
Volume/Cap:	0.48	0.00	0.37	0.26	0.41	0.41	0.06	0.29	0.29	0.28	0.37	0.37
Uniform Del:	50.2	0.0	45.5	55.7	51.9	51.9	55.2	8.6	8.6	45.7	4.8	4.8
IncremntDel:	1.9	0.0	1.0	1.8	1.9	1.9	0.3	0.0	0.0	0.6	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	52.1	0.0	46.4	57.5	53.9	53.9	55.6	8.7	8.7	46.3	4.8	4.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	52.1	0.0	46.4	57.5	53.9	53.9	55.6	8.7	8.7	46.3	4.8	4.8
LOS by Move:	D	A	D	E	D	D	E	A	A	D	A	A
HCM2k95thQ:	189	0	166	49	128	128	10	258	258	129	310	310

Note: Queue reported is the distance per lane in feet.

SPRINGHURST — POWAY

Scenario Report

Scenario:	Weekday EX PM
Command:	Default Command
Volume:	EX PM
Geometry:	EX PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	140	Critical Vol./Cap.(X):	0.379
Loss Time (sec):	0	Average Delay (sec/veh):	14.0
Optimal Cycle:	37	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	82	20	67	19	5	16	16	1131	111	94	1170	19
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	82	20	67	19	5	16	16	1131	111	94	1170	19
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	86	21	71	20	5	17	17	1191	117	99	1232	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	86	21	71	20	5	17	17	1191	117	99	1232	20
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	86	21	71	20	5	17	17	1191	117	99	1232	20
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.98	0.83	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	1.00	1.00	1.00	0.24	0.76	1.00	2.73	0.27	1.00	2.95	0.05
Final Sat.:	1769	1862	1583	1769	393	1257	1769	4569	448	1769	4992	81
Capacity Analysis Module:												
Vol/Sat:	0.05	0.01	0.04	0.01	0.01	0.01	0.01	0.26	0.26	0.06	0.25	0.25
Crit Moves:	****				****			****		****		
Green/Cycle:	0.13	0.09	0.09	0.07	0.04	0.04	0.11	0.69	0.69	0.15	0.73	0.73
Volume/Cap:	0.38	0.12	0.49	0.15	0.38	0.38	0.09	0.38	0.38	0.38	0.34	0.34
Uniform Del:	55.9	58.5	60.5	60.8	66.0	66.0	56.5	9.2	9.2	53.9	6.8	6.8
IncremntDel:	1.1	0.3	2.6	0.6	4.0	4.0	0.2	0.1	0.1	0.9	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	56.9	58.8	63.1	61.4	70.0	70.0	56.7	9.3	9.3	54.8	6.8	6.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	56.9	58.8	63.1	61.4	70.0	70.0	56.7	9.3	9.3	54.8	6.8	6.8
LOS by Move:	E	E	E	E	E	E	E	A	A	D	A	A
HCM2k95thQ:	182	46	173	47	71	71	36	397	397	201	329	329

Note: Queue reported is the distance per lane in feet.

SPRINGHURST – SABRE SPRINGS

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 2.1 Worst Case Level Of Service: B[10.6]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1 0	0 0		0 0 0	1 0		0 0 1!	0 0		0 0 1!	0 0	
Volume Module:												
Base Vol:	24	182	0	0	162	16	17	0	54	2	0	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	24	182	0	0	162	16	17	0	54	2	0	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	25	192	0	0	171	17	18	0	57	2	0	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	25	192	0	0	171	17	18	0	57	2	0	3
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	187	xxxx	xxxxx	xxxx	xxxx	xxxxx	423	421	179	449	429	192
Potent Cap.:	1387	xxxx	xxxxx	xxxx	xxxx	xxxxx	541	524	864	520	518	850
Move Cap.:	1387	xxxx	xxxxx	xxxx	xxxx	xxxxx	532	514	864	479	509	850
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.03	0.00	0.07	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	1.4	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	752	xxxxx	xxxx	649	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.3	xxxxx	xxxxx	10.6	xxxxx
Shared LOS:	A	*	*	*	*	*	*	B	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			10.3			10.6		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A12

SPRINGHURST — SABER SPRINGS

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 1.5 Worst Case Level Of Service: B[10.9]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1 0 0 0			0 0 0 1 0			0 0 1! 0 0			0 0 0 0 1		
Volume Module:												
Base Vol:	19	137	0	0	172	36	25	0	17	0	0	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	137	0	0	172	36	25	0	17	0	0	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	20	144	0	0	181	38	26	0	18	0	0	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	20	144	0	0	181	38	26	0	18	0	0	1
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	xxxxx	xxxx	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	3.3
Capacity Module:												
Cnflict Vol:	219	xxxx	xxxxx	xxxx	xxxx	xxxxx	385	384	200	xxxx	xxxx	144
Potent Cap.:	1350	xxxx	xxxxx	xxxx	xxxx	xxxxx	574	549	841	xxxx	xxxx	903
Move Cap.:	1350	xxxx	xxxxx	xxxx	xxxx	xxxxx	566	541	841	xxxx	xxxx	903
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	0.05	0.00	0.02	xxxx	xxxx	0.00
Level Of Service Module:												
2Way95thQ:	1.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0.1
Control Del:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.0
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	A
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	653	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.9	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	B	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			10.9			9.0		
ApproachLOS:	*			*			B			A		

Note: Queue reported is the distance per lane in feet.

A13

SPRINGHURST — POWAY

Scenario Report

Scenario:	EX SUNDAY AM
Command:	Default Command
Volume:	EX SUNDAY AM
Geometry:	EX AM
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A/4

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	60	Critical Vol./Cap.(X):	0.284
Loss Time (sec):	0	Average Delay (sec/veh):	8.7
Optimal Cycle:		Level Of Service:	A

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	74	7	68	20	8	26	11	899	32	41	724	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	74	7	68	20	8	26	11	899	32	41	724	11
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	78	7	72	21	8	27	12	946	34	43	762	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	78	7	72	21	8	27	12	946	34	43	762	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	78	7	72	21	8	27	12	946	34	43	762	12
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.98	0.83	0.93	0.87	0.87	0.93	0.89	0.89	0.93	0.89	0.89
Lanes:	1.00	1.00	1.00	1.00	0.24	0.76	1.00	2.90	0.10	1.00	2.96	0.04
Final Sat.:	1769	1862	1583	1769	388	1260	1769	4884	174	1769	4997	76
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.05	0.01	0.02	0.02	0.01	0.19	0.19	0.02	0.15	0.15
Crit Moves:	****				****			****		****		
Green/Cycle:	0.15	0.12	0.12	0.12	0.08	0.08	0.27	0.68	0.68	0.09	0.49	0.49
Volume/Cap:	0.29	0.03	0.38	0.10	0.26	0.26	0.02	0.29	0.29	0.29	0.31	0.31
Uniform Del:	22.5	23.4	24.4	23.6	25.8	25.8	16.1	3.9	3.9	25.7	9.1	9.1
IncremntDel:	0.6	0.1	1.3	0.2	1.0	1.0	0.0	0.0	0.0	1.0	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	23.0	23.5	25.7	23.8	26.8	26.8	16.1	3.9	3.9	26.8	9.2	9.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	23.0	23.5	25.7	23.8	26.8	26.8	16.1	3.9	3.9	26.8	9.2	9.2
LOS by Move:	C	C	C	C	C	C	B	A	A	C	A	A
HCM2k95thQ:	79	7	87	22	47	47	9	141	141	55	164	164

Note: Queue reported is the distance per lane in feet.

SPRINGHURST – SABER SPRINGS

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 1.5 Worst Case Level Of Service: A[9.9]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	- T	- R	L	- T	- R	L	- T	- R	L	- T	- R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0 0	0	0 0	0 1	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	9	116	0	0	64	17	15	0	3	2	1	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	9	116	0	0	64	17	15	0	3	2	1	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	9	122	0	0	67	18	16	0	3	2	1	11
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	9	122	0	0	67	18	16	0	3	2	1	11
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	85	xxxx	xxxxx	xxxx	xxxx	xxxxx	223	217	76	219	226	122
Potent Cap.:	1511	xxxx	xxxxx	xxxx	xxxx	xxxxx	733	681	985	737	673	929
Move Cap.:	1511	xxxx	xxxxx	xxxx	xxxx	xxxxx	720	676	985	731	669*	929
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	0.00	0.00	0.00	0.00	0.01
Level Of Service Module:												
2Way95thQ:	0.5	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	754	xxxxx	xxxx	867	xxxxx
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.9	xxxxx	xxxxx	9.2	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	A	*
ApproachDel:	xxxxxx			xxxxxx				9.9			9.2	
ApproachLOS:		*			*			A			A	

Note: Queue reported is the distance per lane in feet.

A15

SPRINGHURST - POWAY

2015

Scenario Report

Scenario:	EX AM + P Existing Network
Command:	Default Command
Volume:	EX AM + P
Geometry:	EX AM
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	120	Critical Vol./Cap.(X):	0.358
Loss Time (sec):	0	Average Delay (sec/veh):	12.1
Optimal Cycle:	36	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	90	0	91	18	13	43	4	859	51	71	1360	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	90	0	91	18	13	43	4	859	51	71	1360	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	95	0	96	19	14	45	4	904	54	75	1432	14
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	95	0	96	19	14	45	4	904	54	75	1432	14
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	95	0	96	19	14	45	4	904	54	75	1432	14
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	1.00	1.00	1.00	0.23	0.77	1.00	2.83	0.17	1.00	2.97	0.03
Final Sat.:	1769	1900	1583	1769	383	1265	1769	4760	283	1769	5030	48
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.06	0.01	0.04	0.04	0.00	0.19	0.19	0.04	0.28	0.28
Crit Moves:			****	****			****				****	
Green/Cycle:	0.11	0.00	0.16	0.04	0.09	0.09	0.04	0.65	0.65	0.15	0.76	0.76
Volume/Cap:	0.47	0.00	0.38	0.26	0.40	0.40	0.06	0.29	0.29	0.29	0.38	0.38
Uniform Del:	49.8	0.0	45.0	55.7	51.7	51.7	55.2	8.9	8.9	45.8	5.0	5.0
IncremntDel:	1.7	0.0	0.9	1.8	1.8	1.8	0.3	0.0	0.0	0.6	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	51.5	0.0	45.9	57.5	53.5	53.5	55.6	9.0	9.0	46.4	5.1	5.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	51.5	0.0	45.9	57.5	53.5	53.5	55.6	9.0	9.0	46.4	5.1	5.1
LOS by Move:	D	A	D	E	D	D	E	A	A	D	A	A
HCM2k95thQ:	188	0	172	49	126	126	10	264	264	133	317	317

Note: Queue reported is the distance per lane in feet.

SPRINGHURST - SABER

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 2.1 Worst Case Level Of Service: B[10.7]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	- T	- R	L	- T	- R	L	- T	- R	L	- T	- R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0 0	0	0 0	0 1	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	24	186	0	0	162	16	17	0	54	3	0	4
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	24	186	0	0	162	16	17	0	54	3	0	4
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	25	196	0	0	171	17	18	0	57	3	0	4
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	25	196	0	0	171	17	18	0	57	3	0	4
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	187	xxxx	xxxxx	xxxx	xxxx	xxxxx	427	425	179	454	434	196
Potent Cap.:	1387	xxxx	xxxxx	xxxx	xxxx	xxxxx	538	521	864	516	515	845
Move Cap.:	1387	xxxx	xxxxx	xxxx	xxxx	xxxxx	527	511	864	476	506	845
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.03	0.00	0.07	0.01	0.00	0.00
Level Of Service Module:												
2Way95thQ:	1.4	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	749	xxxxx	xxxx	634	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.3	xxxxx	xxxxx	10.7	xxxxx
Shared LOS:	A	*	*	*	*	*	*	B	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			10.3			10.7		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A-17

2015

Poway

Scenario Report

Scenario:	EX PM + P Existing Network
Command:	Default Command
Volume:	EX PM + P
Geometry:	EX PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A18

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	140	Critical Vol./Cap.(X):	0.385
Loss Time (sec):	0	Average Delay (sec/veh):	14.5
Optimal Cycle:	37	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	87	20	72	19	5	16	16	1136	111	97	1170	19
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	87	20	72	19	5	16	16	1136	111	97	1170	19
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	92	21	76	20	5	17	17	1196	117	102	1232	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	92	21	76	20	5	17	17	1196	117	102	1232	20
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	92	21	76	20	5	17	17	1196	117	102	1232	20
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.98	0.83	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	1.00	1.00	1.00	0.24	0.76	1.00	2.73	0.27	1.00	2.95	0.05
Final Sat.:	1769	1862	1583	1769	393	1257	1769	4571	447	1769	4992	81
Capacity Analysis Module:												
Vol/Sat:	0.05	0.01	0.05	0.01	0.01	0.01	0.01	0.26	0.26	0.06	0.25	0.25
Crit Moves:	****				****			****		****		
Green/Cycle:	0.13	0.10	0.10	0.07	0.04	0.04	0.10	0.68	0.68	0.15	0.72	0.72
Volume/Cap:	0.38	0.12	0.49	0.16	0.38	0.38	0.09	0.38	0.38	0.38	0.34	0.34
Uniform Del:	55.3	57.7	59.9	60.9	66.0	66.0	56.6	9.7	9.7	53.7	7.0	7.0
IncremntDel:	1.0	0.3	2.4	0.6	4.0	4.0	0.2	0.1	0.1	0.9	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	56.3	58.0	62.3	61.4	70.0	70.0	56.8	9.8	9.8	54.6	7.1	7.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	56.3	58.0	62.3	61.4	70.0	70.0	56.8	9.8	9.8	54.6	7.1	7.1
LOS by Move:	E	E	E	E	E	E	E	A	A	D	A	A
HCM2k95thQ:	191	45	183	47	71	71	36	408	408	207	335	335

Note: Queue reported is the distance per lane in feet.

Saber

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 1.7 Worst Case Level Of Service: B[11.0]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1 0 0 0			0 0 0 1 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module:												
Base Vol:	19	142	0	0	172	36	25	0	17	5	0	6
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	142	0	0	172	36	25	0	17	5	0	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	20	149	0	0	181	38	26	0	18	5	0	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	20	149	0	0	181	38	26	0	18	5	0	6
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	219	xxxx	xxxxx	xxxx	xxxx	xxxxx	393	389	200	398	408	149
Potent Cap.:	1350	xxxx	xxxxx	xxxx	xxxx	xxxxx	567	546	841	562	532	897
Move Cap.:	1350	xxxx	xxxxx	xxxx	xxxx	xxxxx	556	537	841	544	524	897
Volume/Cap:	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	0.05	0.00	0.02	0.01	0.00	0.01
Level Of Service Module:												
2Way95thQ:	1.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	645	xxxxx	xxxx	692	xxxxx
SharedQueue:	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	0.1	xxxxx
Shrd ConDel:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	11.0	xxxxx	xxxxx	10.3	xxxxx
Shared LOS:	A	*	*	*	*	*	*	B	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			11.0			10.3		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A/4

Springhurst / Poway
No Project

Scenario Report

Scenario:	Weekday NT 2018 AM
Command:	Default Command
Volume:	NT AM
Geometry:	NT AM
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A20

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	120	Critical Vol./Cap.(X):	0.367
Loss Time (sec):	0	Average Delay (sec/veh):	11.8
Optimal Cycle:	36	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	92	0	90	19	13	44	4	881	53	71	1401	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	92	0	90	19	13	44	4	881	53	71	1401	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	97	0	95	20	14	46	4	927	56	75	1475	14
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	97	0	95	20	14	46	4	927	56	75	1475	14
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	97	0	95	20	14	46	4	927	56	75	1475	14
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	0.00	1.00	1.00	0.23	0.77	1.00	2.83	0.17	1.00	2.97	0.03
Final Sat.:	1769	0	1583	1769	375	1271	1769	4752	286	1769	5031	47
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.06	0.01	0.04	0.04	0.00	0.20	0.20	0.04	0.29	0.29
Crit Moves:			****	****			****				****	
Green/Cycle:	0.11	0.00	0.16	0.04	0.09	0.09	0.04	0.66	0.66	0.14	0.76	0.76
Volume/Cap:	0.49	0.00	0.39	0.27	0.43	0.43	0.06	0.30	0.30	0.30	0.39	0.39
Uniform Del:	50.1	0.0	45.5	55.7	52.1	52.1	55.2	8.6	8.6	46.0	4.8	4.8
IncremntDel:	1.9	0.0	1.0	2.0	2.1	2.1	0.3	0.1	0.1	0.7	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	52.0	0.0	46.5	57.7	54.2	54.2	55.6	8.7	8.7	46.7	4.9	4.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	52.0	0.0	46.5	57.7	54.2	54.2	55.6	8.7	8.7	46.7	4.9	4.9
LOS by Move:	D	A	D	E	D	D	E	A	A	D	A	A
HCM2k95thQ:	195	0	172	52	131	131	10	267	267	133	323	323

Note: Queue reported is the distance per lane in feet.

SABER SPRINGS
NO PROJ.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 2.1 Worst Case Level Of Service: B[10.7]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0 0	0	0 1	0 0	1	0 1	0 0	1	0 0	1! 0	0
Volume Module:												
Base Vol:	25	187	0	0	167	17	18	0	56	2	0	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	187	0	0	167	17	18	0	56	2	0	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	26	197	0	0	176	18	19	0	59	2	0	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	26	197	0	0	176	18	19	0	59	2	0	3
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	194	xxxx	xxxxx	xxxx	xxxx	xxxxx	427	425	176	464	443	197
Potent Cap.:	1380	xxxx	xxxxx	xxxx	xxxx	xxxxx	538	521	867	509	509	844
Move Cap.:	1380	xxxx	xxxxx	xxxx	xxxx	xxxxx	528	511	867	467	499	844
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.04	0.00	0.07	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	1.5	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	5.5	xxxx	xxxx	xxxxx
Control Del:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.5	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	A	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	528	xxxx	xxxxx	xxxx	638	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	7.7	xxxx	xxxxx	7.2	xxxx	xxxxx	12.1	xxxx	xxxxx	xxxxx	10.7	xxxxx
Shared LOS:	A	*	*	A	*	*	B	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			10.1			10.7		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A-7

SPRINGHURST / POWAY
No. PROJECT

Scenario Report

Scenario:	Weekday NT 2018 PM
Command:	Default Command
Volume:	NT PM
Geometry:	NT PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A 22

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	140	Critical Vol./Cap.(X):	0.395
Loss Time (sec):	0	Average Delay (sec/veh):	14.6
Optimal Cycle:	38	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	84	21	69	20	5	16	17	1165	114	97	1205	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	84	21	69	20	5	16	17	1165	114	97	1205	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	88	22	73	21	5	17	18	1226	120	102	1268	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	88	22	73	21	5	17	18	1226	120	102	1268	21
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	88	22	73	21	5	17	18	1226	120	102	1268	21
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.87	0.87	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	0.23	0.77	1.00	0.24	0.76	1.00	2.73	0.27	1.00	2.95	0.05
Final Sat.:	1769	385	1263	1769	393	1257	1769	4570	447	1769	4990	83
Capacity Analysis Module:												
Vol/Sat:	0.05	0.06	0.06	0.01	0.01	0.01	0.01	0.27	0.27	0.06	0.25	0.25
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.14	0.14	0.04	0.08	0.08	0.10	0.67	0.67	0.15	0.72	0.72
Volume/Cap:	0.48	0.40	0.40	0.33	0.18	0.18	0.10	0.40	0.40	0.40	0.35	0.35
Uniform Del:	59.0	54.4	54.4	65.9	60.7	60.7	57.2	10.1	10.1	54.3	7.4	7.4
IncremntDel:	1.9	1.1	1.1	3.1	0.7	0.7	0.2	0.1	0.1	1.0	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	60.9	55.4	55.4	69.0	61.4	61.4	57.4	10.2	10.2	55.3	7.5	7.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	60.9	55.4	55.4	69.0	61.4	61.4	57.4	10.2	10.2	55.3	7.5	7.5
LOS by Move:	E	E	E	E	E	E	E	B	B	E	A	A
HCM2k95thQ:	202	197	197	65	53	53	39	427	427	209	354	354

Note: Queue reported is the distance per lane in feet.

SABER
2018 No PROJECT

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 1.5 Worst Case Level Of Service: B[10.7]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1 0 0 0			0 1 0 0 1			0 1 0 0 1			0 0 0 0 1		
Volume Module:												
Base Vol:	20	141	0	0	177	37	26	0	18	0	0	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	141	0	0	177	37	26	0	18	0	0	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	21	148	0	0	186	39	27	0	19	0	0	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	21	148	0	0	186	39	27	0	19	0	0	1
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	xxxxx	xxxx	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	3.3
Capacity Module:												
Cnflict Vol:	225	xxxx	xxxxx	xxxx	xxxx	xxxxx	377	377	186	xxxx	xxxx	148
Potent Cap.:	1343	xxxx	xxxxx	xxxx	xxxx	xxxxx	580	555	856	xxxx	xxxx	898
Move Cap.:	1343	xxxx	xxxxx	xxxx	xxxx	xxxxx	572	546	856	xxxx	xxxx	898
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.05	0.00	0.02	xxxx	xxxx	0.00
Level Of Service Module:												
2Way95thQ:	1.2	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	1.7	xxxx	xxxx	0.1
Control Del:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.3	xxxxx	xxxx	9.0
LOS by Move:	A	*	*	*	*	*	*	*	A	*	*	A
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	572	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.0	xxxx	xxxxx	0.0	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.7	xxxx	xxxxx	7.2	xxxx	xxxxx	11.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	A	*	*	B	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			10.7			9.0		
ApproachLOS:	*			*			B			A		

Note: Queue reported is the distance per lane in feet.

A23

AM - 2015 + PHASE 1

Scenario Report

Scenario:	Weekday NT 2018 AM + P
Command:	Default Command
Volume:	NT AM + P
Geometry:	NT AM
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A24

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	120	Critical Vol./Cap.(X):	0.387
Loss Time (sec):	0	Average Delay (sec/veh):	13.0
Optimal Cycle:	37	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	93	0	90	19	13	44	4	883	53	72	1401	13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	93	0	90	19	13	44	4	883	53	72	1401	13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	98	0	95	20	14	46	4	929	56	76	1475	14
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	98	0	95	20	14	46	4	929	56	76	1475	14
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	98	0	95	20	14	46	4	929	56	76	1475	14
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	0.00	1.00	1.00	0.23	0.77	1.00	2.83	0.17	1.00	2.97	0.03
Final Sat.:	1769	0	1583	1769	375	1271	1769	4752	285	1769	5031	47
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.06	0.01	0.04	0.04	0.00	0.20	0.20	0.04	0.29	0.29
Crit Moves:	****				****		****				****	
Green/Cycle:	0.14	0.00	0.13	0.09	0.09	0.09	0.04	0.63	0.63	0.14	0.73	0.73
Volume/Cap:	0.40	0.00	0.44	0.12	0.40	0.40	0.06	0.31	0.31	0.31	0.40	0.40
Uniform Del:	47.2	0.0	47.8	49.8	51.5	51.5	55.2	10.1	10.1	46.5	6.2	6.2
IncremntDel:	1.1	0.0	1.5	0.3	1.8	1.8	0.3	0.1	0.1	0.7	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	48.3	0.0	49.3	50.2	53.2	53.2	55.6	10.1	10.1	47.2	6.3	6.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	48.3	0.0	49.3	50.2	53.2	53.2	55.6	10.1	10.1	47.2	6.3	6.3
LOS by Move:	D	A	D	D	D	D	E	B	B	D	A	A
HCM2k95thQ:	180	0	182	39	127	127	10	287	287	137	360	360

Note: Queue reported is the distance per lane in feet.

SABER
AM-2018 + PHASE 1

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 2.1 Worst Case Level Of Service: B[10.8]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 1 0 0 1			0 1 0 0 1			0 0 1! 0 0		
Volume Module:												
Base Vol:	25	189	2	0	167	17	18	0	56	3	0	4
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	189	2	0	167	17	18	0	56	3	0	4
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	26	199	2	0	176	18	19	0	59	3	0	4
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	26	199	2	0	176	18	19	0	59	3	0	4
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	194	xxxx	xxxxx	xxxx	xxxx	xxxxx	431	429	176	467	446	200
Potent Cap.:	1380	xxxx	xxxxx	xxxx	xxxx	xxxxx	535	518	867	506	507	841
Move Cap.:	1380	xxxx	xxxxx	xxxx	xxxx	xxxxx	524	508	867	465	497	841
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.04	0.00	0.07	0.01	0.00	0.01
Level Of Service Module:												
2Way95thQ:	1.5	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	5.5	xxxx	xxxx	xxxxx
Control Del:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.5	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	A	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	524	xxxx	xxxxx	xxxx	624	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.2	xxxx	xxxxx	12.1	xxxx	xxxxx	xxxxx	10.8	xxxxx
Shared LOS:	*	*	*	A	*	*	B	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			10.1			10.8		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A25

SPRINGHURST / POWAY
PM - 2018 + PHASE I

Scenario Report

Scenario:	Weekday NT 2018 PM + P
Command:	Default Command
Volume:	NT PM + P
Geometry:	NT PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A26

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	140	Critical Vol./Cap.(X):	0.396
Loss Time (sec):	0	Average Delay (sec/veh):	14.7
Optimal Cycle:	38	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	86	21	69	20	5	16	17	1167	114	98	1205	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	86	21	69	20	5	16	17	1167	114	98	1205	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	91	22	73	21	5	17	18	1228	120	103	1268	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	91	22	73	21	5	17	18	1228	120	103	1268	21
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	91	22	73	21	5	17	18	1228	120	103	1268	21
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.87	0.87	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	0.23	0.77	1.00	0.24	0.76	1.00	2.73	0.27	1.00	2.95	0.05
Final Sat.:	1769	385	1263	1769	393	1257	1769	4571	446	1769	4990	83
Capacity Analysis Module:												
Vol/Sat:	0.05	0.06	0.06	0.01	0.01	0.01	0.01	0.27	0.27	0.06	0.25	0.25
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.14	0.14	0.04	0.07	0.07	0.10	0.67	0.67	0.15	0.72	0.72
Volume/Cap:	0.48	0.40	0.40	0.33	0.18	0.18	0.10	0.40	0.40	0.40	0.35	0.35
Uniform Del:	59.0	54.4	54.4	65.9	60.8	60.8	57.1	10.2	10.2	54.2	7.4	7.4
IncremntDel:	2.0	1.1	1.1	3.1	0.7	0.7	0.2	0.1	0.1	1.0	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	60.9	55.5	55.5	69.0	61.6	61.6	57.4	10.3	10.3	55.2	7.5	7.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	60.9	55.5	55.5	69.0	61.6	61.6	57.4	10.3	10.3	55.2	7.5	7.5
LOS by Move:	E	E	E	E	E	E	E	B	B	E	A	A
HCM2k95thQ:	207	197	197	65	53	53	39	429	429	211	354	354

Note: Queue reported is the distance per lane in feet.

PM
2018 + PHASE 1

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 1.6 Worst Case Level Of Service: B[10.7]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 1	0 0	1	0 1	0 0	1	0 0	1! 0	0
Volume Module:												
Base Vol:	20	143	2	0	177	37	26	0	18	2	0	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	143	2	0	177	37	26	0	18	2	0	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	21	151	2	0	186	39	27	0	19	2	0	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	21	151	2	0	186	39	27	0	19	2	0	3
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	225	xxxx	xxxxx	xxxx	xxxx	xxxxx	382	381	186	409	419	152
Potent Cap.:	1343	xxxx	xxxxx	xxxx	xxxx	xxxxx	576	552	856	553	525	895
Move Cap.:	1343	xxxx	xxxxx	xxxx	xxxx	xxxxx	567	543	856	534	517	895
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.05	0.00	0.02	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	1.2	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	1.7	xxxx	xxxx	xxxxx
Control Del:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.3	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	A	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	567	xxxx	xxxxx	xxxx	704	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.2	xxxx	xxxxx	11.7	xxxx	xxxxx	xxxxx	10.1	xxxxx
Shared LOS:	*	*	*	A	*	*	B	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			10.7			10.1		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A27

Scenario Report

Scenario:	Weekday LT 2035 AM
Command:	Default Command
Volume:	LT AM
Geometry:	LT AM
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A 7.8

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

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Intersection #1

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Cycle (sec):	120	Critical Vol./Cap.(X):	0.427
Loss Time (sec):	0	Average Delay (sec/veh):	12.3
Optimal Cycle:	40	Level Of Service:	B

****

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	107	0	104	22	16	52	5	1025	61	83	1632	16
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	107	0	104	22	16	52	5	1025	61	83	1632	16
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	113	0	109	23	17	55	5	1079	64	87	1718	17
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	113	0	109	23	17	55	5	1079	64	87	1718	17
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	113	0	109	23	17	55	5	1079	64	87	1718	17
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	0.00	1.00	1.00	0.24	0.76	1.00	2.83	0.17	1.00	2.97	0.03
Final Sat.:	1769	0	1583	1769	388	1260	1769	4759	283	1769	5029	49
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.07	0.01	0.04	0.04	0.00	0.23	0.23	0.05	0.34	0.34
Crit Moves:			****	****			****				****	
Green/Cycle:	0.12	0.00	0.15	0.04	0.08	0.08	0.04	0.66	0.66	0.14	0.76	0.76
Volume/Cap:	0.55	0.00	0.45	0.31	0.55	0.55	0.07	0.34	0.34	0.34	0.45	0.45
Uniform Del:	50.0	0.0	46.1	55.8	53.1	53.1	55.3	9.0	9.0	46.3	5.1	5.1
IncremntDel:	3.1	0.0	1.3	2.4	4.8	4.8	0.4	0.1	0.1	0.8	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	53.1	0.0	47.4	58.3	57.9	57.9	55.7	9.0	9.0	47.1	5.2	5.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	53.1	0.0	47.4	58.3	57.9	57.9	55.7	9.0	9.0	47.1	5.2	5.2
LOS by Move:	D	A	D	E	E	E	E	A	A	D	A	A
HCM2k95thQ:	228	0	202	61	167	167	13	319	319	157	396	396

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Note: Queue reported is the distance per lane in feet.

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Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 2.3 Worst Case Level Of Service: B[11.3]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0 0	0	0 1	0 0	1	0 1	0 0	1	0 0	1! 0	0
Volume Module:												
Base Vol:	29	218	0	0	144	19	20	0	65	3	0	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	29	218	0	0	144	19	20	0	65	3	0	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	31	229	0	0	152	20	21	0	68	3	0	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	31	229	0	0	152	20	21	0	68	3	0	3
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	172	xxxx	xxxxx	xxxx	xxxx	xxxxx	444	442	152	486	462	229
Potent Cap.:	1405	xxxx	xxxxx	xxxx	xxxx	xxxxx	524	510	895	491	497	810
Move Cap.:	1405	xxxx	xxxxx	xxxx	xxxx	xxxxx	514	498	895	446	486	810
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.04	0.00	0.08	0.01	0.00	0.00
Level Of Service Module:												
2Way95thQ:	1.7	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	6.2	xxxx	xxxx	xxxxx
Control Del:	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.4	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	A	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	514	xxxx	xxxxx	xxxx	575	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	7.6	xxxx	xxxxx	7.2	xxxx	xxxxx	12.3	xxxx	xxxxx	xxxxx	11.3	xxxxx
Shared LOS:	A	*	*	A	*	*	B	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			10.1			11.3		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

Scenario Report

Scenario:	Weekday LT 2035 PM
Command:	Default Command
Volume:	LT PM
Geometry:	LT PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	140	Critical Vol./Cap.(X):	0.460
Loss Time (sec):	0	Average Delay (sec/veh):	14.8
Optimal Cycle:	42	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	98	24	80	23	6	19	19	1357	133	113	1404	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	98	24	80	23	6	19	19	1357	133	113	1404	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	103	25	84	24	6	20	20	1428	140	119	1478	24
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	103	25	84	24	6	20	20	1428	140	119	1478	24
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	103	25	84	24	6	20	20	1428	140	119	1478	24
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.87	0.87	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	0.23	0.77	1.00	0.24	0.76	1.00	2.73	0.27	1.00	2.95	0.05
Final Sat.:	1769	380	1268	1769	396	1254	1769	4569	448	1769	4991	82
Capacity Analysis Module:												
Vol/Sat:	0.06	0.07	0.07	0.01	0.02	0.02	0.01	0.31	0.31	0.07	0.30	0.30
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.14	0.14	0.04	0.07	0.07	0.09	0.68	0.68	0.15	0.73	0.73
Volume/Cap:	0.52	0.46	0.46	0.38	0.23	0.23	0.13	0.46	0.46	0.46	0.40	0.40
Uniform Del:	58.7	55.0	55.0	66.0	61.8	61.8	58.8	10.7	10.7	54.8	7.1	7.1
IncremntDel:	2.6	1.4	1.4	3.8	1.1	1.1	0.4	0.1	0.1	1.3	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	61.3	56.4	56.4	69.8	62.9	62.9	59.2	10.8	10.8	56.1	7.2	7.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	61.3	56.4	56.4	69.8	62.9	62.9	59.2	10.8	10.8	56.1	7.2	7.2
LOS by Move:	E	E	E	E	E	E	E	B	B	E	A	A
HCM2k95thQ:	235	232	232	76	65	65	45	518	518	247	411	411

Note: Queue reported is the distance per lane in feet.

A30

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 1.6 Worst Case Level Of Service: B[11.2]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1 0 0 0			0 1 0 0 1			0 1 0 0 1			0 0 1! 0 0		
Volume Module:												
Base Vol:	23	164	0	0	206	43	30	0	20	1	0	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	23	164	0	0	206	43	30	0	20	1	0	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	24	173	0	0	217	45	32	0	21	1	0	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	24	173	0	0	217	45	32	0	21	1	0	1
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	262	xxxx	xxxxx	xxxx	xxxx	xxxxx	438	438	217	471	483	173
Potent Cap.:	1302	xxxx	xxxxx	xxxx	xxxx	xxxxx	529	512	823	503	483	871
Move Cap.:	1302	xxxx	xxxxx	xxxx	xxxx	xxxxx	520	503	823	483	474	871
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.06	0.00	0.03	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	1.4	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	2.0	xxxx	xxxx	xxxxx
Control Del:	7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.5	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	A	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	520	xxxx	xxxxx	xxxx	621	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	7.8	xxxx	xxxxx	7.2	xxxx	xxxxx	12.4	xxxx	xxxxx	xxxxx	10.8	xxxxx
Shared LOS:	A	*	*	A	*	*	B	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			11.2			10.8		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A31

Scenario Report

Scenario:	Weekday LT 2035 AM + P
Command:	Default Command
Volume:	LT AM + P
Geometry:	LT AM
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A32

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	120	Critical Vol./Cap.(X):	0.427
Loss Time (sec):	0	Average Delay (sec/veh):	12.4
Optimal Cycle:	40	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	108	0	104	22	16	52	5	1030	61	85	1632	16
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	108	0	104	22	16	52	5	1030	61	85	1632	16
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	114	0	109	23	17	55	5	1084	64	89	1718	17
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	114	0	109	23	17	55	5	1084	64	89	1718	17
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	114	0	109	23	17	55	5	1084	64	89	1718	17
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	0.00	1.00	1.00	0.24	0.76	1.00	2.83	0.17	1.00	2.97	0.03
Final Sat.:	1769	0	1583	1769	388	1260	1769	4761	282	1769	5029	49
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.07	0.01	0.04	0.04	0.00	0.23	0.23	0.05	0.34	0.34
Crit Moves:			****	****			****				****	
Green/Cycle:	0.12	0.00	0.15	0.04	0.08	0.08	0.04	0.66	0.66	0.15	0.76	0.76
Volume/Cap:	0.55	0.00	0.45	0.31	0.55	0.55	0.07	0.35	0.35	0.35	0.45	0.45
Uniform Del:	50.0	0.0	46.1	55.8	53.2	53.2	55.3	9.1	9.1	46.1	5.1	5.1
IncremntDel:	3.1	0.0	1.3	2.4	4.9	4.9	0.4	0.1	0.1	0.8	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	53.1	0.0	47.4	58.3	58.1	58.1	55.7	9.2	9.2	46.9	5.2	5.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	53.1	0.0	47.4	58.3	58.1	58.1	55.7	9.2	9.2	46.9	5.2	5.2
LOS by Move:	D	A	D	E	E	E	E	A	A	D	A	A
HCM2k95thQ:	230	0	202	61	168	168	13	322	322	160	396	396

Note: Queue reported is the distance per lane in feet.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 2.2 Worst Case Level Of Service: B[11.7]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 1	0 0	1	0 1	0 0	1	0 0	1! 0	0
Volume Module:												
Base Vol:	29	218	5	0	194	16	20	0	65	4	0	4
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	29	218	5	0	194	16	20	0	65	4	0	4
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	31	229	5	0	204	17	21	0	68	4	0	4
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	31	229	5	0	204	17	21	0	68	4	0	4
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	221	xxxx	xxxxx	xxxx	xxxx	xxxxx	499	500	204	540	514	232
Potent Cap.:	1348	xxxx	xxxxx	xxxx	xxxx	xxxxx	482	473	836	453	464	807
Move Cap.:	1348	xxxx	xxxxx	xxxx	xxxx	xxxxx	471	462	836	408	453	807
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.04	0.00	0.08	0.01	0.00	0.01
Level Of Service Module:												
2Way95thQ:	1.7	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	6.7	xxxx	xxxx	xxxxx
Control Del:	7.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.7	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	A	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	471	xxxx	xxxxx	xxxx	542	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxxx	0.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.2	xxxx	xxxxx	13.0	xxxx	xxxxx	xxxxx	11.7	xxxxx
Shared LOS:	*	*	*	A	*	*	B	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			10.5			11.7		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A33

Scenario Report

Scenario:	Weekday LT 2035 PM + P
Command:	Default Command
Volume:	LT PM + P
Geometry:	LT PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A34

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	140	Critical Vol./Cap.(X):	0.465
Loss Time (sec):	0	Average Delay (sec/veh):	15.2
Optimal Cycle:	43	Level Of Service:	B

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	103	24	83	23	6	19	19	1362	133	116	1404	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	103	24	83	23	6	19	19	1362	133	116	1404	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	108	25	87	24	6	20	20	1434	140	122	1478	24
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	108	25	87	24	6	20	20	1434	140	122	1478	24
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	108	25	87	24	6	20	20	1434	140	122	1478	24
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.87	0.87	0.93	0.87	0.87	0.93	0.88	0.88	0.93	0.89	0.89
Lanes:	1.00	0.22	0.78	1.00	0.24	0.76	1.00	2.73	0.27	1.00	2.95	0.05
Final Sat.:	1769	369	1277	1769	396	1254	1769	4571	446	1769	4991	82
Capacity Analysis Module:												
Vol/Sat:	0.06	0.07	0.07	0.01	0.02	0.02	0.01	0.31	0.31	0.07	0.30	0.30
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.15	0.15	0.04	0.07	0.07	0.09	0.67	0.67	0.15	0.73	0.73
Volume/Cap:	0.53	0.47	0.47	0.38	0.24	0.24	0.13	0.47	0.47	0.47	0.41	0.41
Uniform Del:	58.4	54.8	54.8	66.0	61.9	61.9	58.9	11.1	11.1	54.6	7.3	7.3
IncremntDel:	2.7	1.4	1.4	3.8	1.1	1.1	0.4	0.1	0.1	1.3	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	61.1	56.2	56.2	69.8	63.0	63.0	59.3	11.2	11.2	56.0	7.3	7.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	61.1	56.2	56.2	69.8	63.0	63.0	59.3	11.2	11.2	56.0	7.3	7.3
LOS by Move:	E	E	E	E	E	E	E	B	B	E	A	A
HCM2k95thQ:	245	237	237	76	66	66	45	528	528	253	415	415

Note: Queue reported is the distance per lane in feet.

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 1.7 Worst Case Level Of Service: B[11.7]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	- T	- R	L	- T	- R	L	- T	- R	L	- T	- R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 1	0 0	1	0 1	0 0	1	0 0	1! 0	0
Volume Module:												
Base Vol:	23	164	6	0	241	23	30	0	20	6	0	6
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	23	164	6	0	241	23	30	0	20	6	0	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	24	173	6	0	254	24	32	0	21	6	0	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	24	173	6	0	254	24	32	0	21	6	0	6
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	278	xxxx	xxxxx	xxxx	xxxx	xxxxx	481	481	254	501	502	176
Potent Cap.:	1285	xxxx	xxxxx	xxxx	xxxx	xxxxx	495	485	785	481	471	867
Move Cap.:	1285	xxxx	xxxxx	xxxx	xxxx	xxxxx	485	475	785	461	462	867
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.07	0.00	0.03	0.01	0.00	0.01
Level Of Service Module:												
2Way95thQ:	1.4	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	2.1	xxxx	xxxx	xxxxx
Control Del:	7.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.7	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	A	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	485	xxxx	xxxxx	xxxx	602	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxxx	0.1	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.2	xxxx	xxxxx	12.9	xxxx	xxxxx	xxxxx	11.1	xxxxx
Shared LOS:	*	*	*	A	*	*	B	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			11.7			11.1		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A35

SPRINGHURST - POWAY

Scenario Report

Scenario:	LT(2035) SUNDAY AM + P
Command:	Default Command
Volume:	LT(2035) SUNDAY AM + P
Geometry:	LT AM
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	ALL
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

A36

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1

Cycle (sec):	60	Critical Vol./Cap.(X):	0.389
Loss Time (sec):	0	Average Delay (sec/veh):	9.6
Optimal Cycle:		Level Of Service:	A

Street Name:	Springhurst Drive						Poway Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	98	8	82	24	10	31	13	1151	32	99	869	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	98	8	82	24	10	31	13	1151	32	99	869	15
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	103	8	86	25	11	33	14	1212	34	104	915	16
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	103	8	86	25	11	33	14	1212	34	104	915	16
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	103	8	86	25	11	33	14	1212	34	104	915	16
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.85	0.85	0.93	0.87	0.87	0.93	0.89	0.89	0.93	0.89	0.89
Lanes:	1.00	0.09	0.91	1.00	0.24	0.76	1.00	2.92	0.08	1.00	2.95	0.05
Final Sat.:	1769	143	1464	1769	403	1249	1769	4926	137	1769	4982	86
Capacity Analysis Module:												
Vol/Sat:	0.06	0.06	0.06	0.01	0.03	0.03	0.01	0.25	0.25	0.06	0.18	0.18
Crit Moves:	****				****			****		****		
Green/Cycle:	0.15	0.12	0.12	0.12	0.08	0.08	0.24	0.62	0.62	0.15	0.53	0.53
Volume/Cap:	0.40	0.51	0.51	0.12	0.31	0.31	0.03	0.40	0.40	0.40	0.35	0.35
Uniform Del:	23.2	25.0	25.0	23.8	25.9	25.9	17.5	5.7	5.7	23.1	8.1	8.1
IncremntDel:	1.0	2.4	2.4	0.3	1.3	1.3	0.0	0.1	0.1	1.0	0.1	0.1
InitQueuDel:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Delay/Veh:	24.2	27.4	27.4	24.1	27.2	27.2	17.5	5.8	5.8	24.1	8.2	8.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	24.2	27.4	27.4	24.1	27.2	27.2	17.5	5.8	5.8	24.1	8.2	8.2
LOS by Move:	C	C	C	C	C	C	B	A	A	C	A	A
HCM2k95thQ:	111	124	124	27	58	58	11	220	220	112	189	189

Note: Queue reported is the distance per lane in feet.

SPRINGHURST – SABER

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #2

Average Delay (sec/veh): 1.8 Worst Case Level Of Service: B[11.0]

Street Name:	Springhurst Drive						Sabre Springs Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 1 0 0 1			0 1 0 0 1			0 0 1! 0 0		
Volume Module:												
Base Vol:	10	129	106	25	77	20	18	2	4	10	1	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	129	106	25	77	20	18	2	4	10	1	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	11	136	112	26	81	21	19	2	4	11	1	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	11	136	112	26	81	21	19	2	4	11	1	9
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	102	xxxx	xxxxx	247	xxxx	xxxxx	352	402	81	360	367	192
Potent Cap.:	1490	xxxx	xxxxx	1318	xxxx	xxxxx	603	537	979	596	561	850
Move Cap.:	1490	xxxx	xxxxx	1318	xxxx	xxxxx	583	522	979	579	546	850
Volume/Cap:	0.01	xxxx	xxxx	0.02	xxxx	xxxx	0.03	0.00	0.00	0.02	0.00	0.01
Level Of Service Module:												
2Way95thQ:	0.5	xxxx	xxxxx	1.5	xxxx	xxxxx	xxxx	xxxx	0.3	xxxx	xxxx	xxxxx
Control Del:	7.4	xxxx	xxxxx	7.8	xxxx	xxxxx	xxxxx	xxxx	8.7	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	A	*	*	*	*	A	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	577	xxxx	xxxxx	xxxx	674	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxxx	0.1	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	7.8	xxxx	xxxxx	11.5	xxxx	xxxxx	xxxxx	10.5	xxxxx
Shared LOS:	*	*	*	A	*	*	B	*	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			11.0			10.5		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the distance per lane in feet.

A37

HYDROLOGY & HYDRAULICS REPORT

Dated: 7/6/07, Revised: 7/8/08, 2/2/09, 6/30/09, 4/15/15, 9/4/15, 6/7/16

For

North City Presbyterian Church Project

Project Number: 150585

LOCATION: 11717 Poway Road, San Diego, CA 92064
APN 316-040-36

PREPARED BY:

SPEAR & ASS0CIATES, INC.
CIVIL ENGINEERS AND LAND SURVEYORS
475 Production Street
SAN MARCOS, CA 92078

PHONE: (760) 736-2040
FAX: (760) 736-4866

Date: 6/7/16

Danny Abada, PE

REGISTERED PROFESSIONAL ENGINEER
DANNY ABADA
No. 45381
CIVIL
STATE OF CALIFORNIA

DECLARATION OF RESPONSIBLE CHARGE

I, HEREBY DECLARE THAT I AM THE CIVIL ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THIS PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONAL CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT DESIGN STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

6/7/16

Danny Abada
REGISTERED CIVIL ENGINEER
Spear & Associates Inc.

DATE

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ATTACHMENTS

A. LOCATION MAPS	2
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I. INTRODUCTION

This hydrology report is prepared for the North City Presbyterian Church, located at 11717 Poway Road, San Diego, CA 92064. APN: 316-040-36.

The site encompasses 7.37 acres, but the development portion consists of 2.85 acres. The project also will add 0.47 acres of offsite parking areas draining to the site. The rest of the site will remain as is, undisturbed. The existing area (2.85 acres portion) was previously developed and currently includes several buildings, driveways and parking lots. The northern portion of the site has a 48" RCP crossing in an easterly direction and discharging its flow into Penasquitos River. The adjacent river area downstream from the project is an environmentally sensitive area. The southwest portion of the site drains to an existing 18" RCP that also discharges its flow into the river.

The topography slopes in a southwesterly direction with elevations ranging from approximately 433 to 420 and the site's runoff drains towards Penasquitos River. The adjacent 100-year floodplain was established by FEMA with flow elevations ranging from 400.0 to 407.0. The entire project is situated outside the 100-year floodplain.

The project consists of constructing two new buildings, the removal of one existing building and the removal and replacement of parking areas and driveways. All other existing buildings will remain. The northeastern portion of the development will drain into a new biofiltration basin (Flow Through Planter) and its flow will be tied into the existing 48" RCP. The southwestern portion will drain into another new biofiltration basin and its flow will be directed into the existing 18" RCP. The proposed drainage will maintain the existing flow characteristics of the site draining towards Penasquitos River and the Pacific Ocean approximately 10 miles west.

We have used the City of San Diego Hydrology Manual for this report. The report includes attachments for precipitation intensities, intensity duration calculations, soil type, runoff coefficients and times of concentration calculations. This report calculates the 2yr, 10yr, and 50yr flows generated from the site. The project soil is type C across all sub areas.

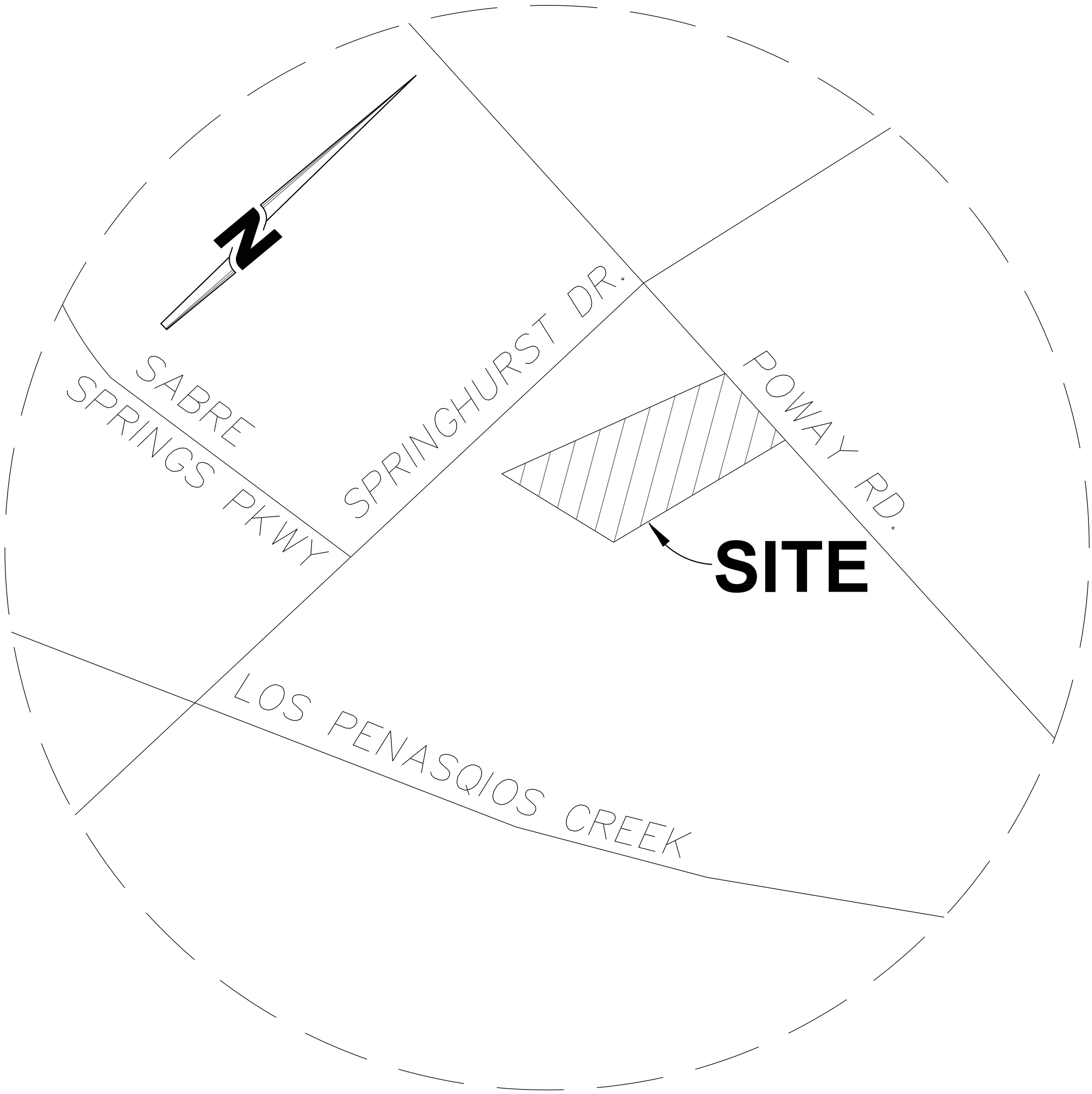
II. DISCUSSION/CONCLUSION

The project will not encroach into the 100-year flood plain established by FEMA. Post development peak flows, flow volumes and velocities for the 2yr, 10yr, and 50yr events will not exceed pre-development rates. This was achieved by maximizing existing pervious surfaces, onsite times of concentration and with the use of low impact and hydromodification strategies as shown on the project's Stormwater Management Plan.

Summary flow rates (see areas delineated in the Drainage Map)

	Storm Event 2-year (cfs)	***Storm Event 10-year (cfs)***	***Storm Event 50-year (cfs)***
Pre-Development Total	5.0	7.7	10.6
Post-Dev. Total	5.0	7.7	10.6
Pre-Development A	2.6	4.0	5.6
Post-Dev. A	1.9	2.9	4.0
Pre-Development B1	2.4	3.7	5.1
Post-Dev. B1	2.6	4.0	5.5

ATTACHMENT A



VICINITY MAP

NO SCALE

PER S.D. CO. THOMAS GUIDE
PAGE 1190, A-6

Aerial Picture Of The Site

FIGURE III

Project Name: *North City Presbyterian Church*
Address: 11717 Poway Road
San Diego, CA 92128

ATTACHMENT B

Post-Development Conditions **50-yr Event**

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	10.8	0.69	1.33	0.92	0.92	2.70	4.33	**4.0**
B1	8	0.69	1.52	1.05	1.05	2.70	5.25	**5.5**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	2.70	5.34	**1.4**
Offsite B3	9.1	0.48	0.47	0.23	0.23	2.70	4.83	**1.1**
Total Basin B	9.1				1.53	2.70	4.83	**7.4**
A1 & B1 & B2 & Offsite B3 Total Flow	10.8				2.45	2.70	4.33	**10.6**

Pre-Development Conditions

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	5.1	0.6	1.33	0.80	0.80	2.70	7.02	**5.6**
B1	7.3	0.6	1.52	0.91	0.91	2.70	5.57	**5.1**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	2.70	5.34	**1.4**
Offsite B3	9.1	0.48	0.47	0.23	0.23	2.70	4.83	**1.1**
Total B	9.1				1.40	2.70	4.83	**6.7**
A1 & B1 & B2 & Offsite B3 Total Flow	9.1				2.19	2.70	4.83	**10.6**

***Rational Method**

Post-Development Conditions **10-yr Event**

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	10.8	0.69	1.33	0.92	0.92	1.95	3.13	**2.9**
B1	8	0.69	1.52	1.05	1.05	1.95	3.79	**4.0**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	1.95	3.86	**1.0**
Offsite B3	9.1	0.48	0.47	0.23	0.23	1.95	3.49	**0.8**
Total Basin B	9.1				1.53	1.95	3.49	**5.4**
A1 & B1 & B2 & Offsite B3 Total Flow	10.8				2.45	1.95	3.13	**7.7**

Pre-Development Conditions

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	5.1	0.6	1.33	0.80	0.80	1.95	5.07	**4.0**
B1	7.3	0.6	1.52	0.91	0.91	1.95	4.02	**3.7**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	1.95	3.86	**1.0**
Offsite B3	9.1	0.48	0.47	0.23	0.23	1.95	3.49	**0.8**
Total B	9.1				1.40	1.95	3.49	**4.9**
A1 & B1 & B2 & Offsite B3 Total Flow	9.1				2.19	1.95	3.49	**7.7**

***Rational Method**

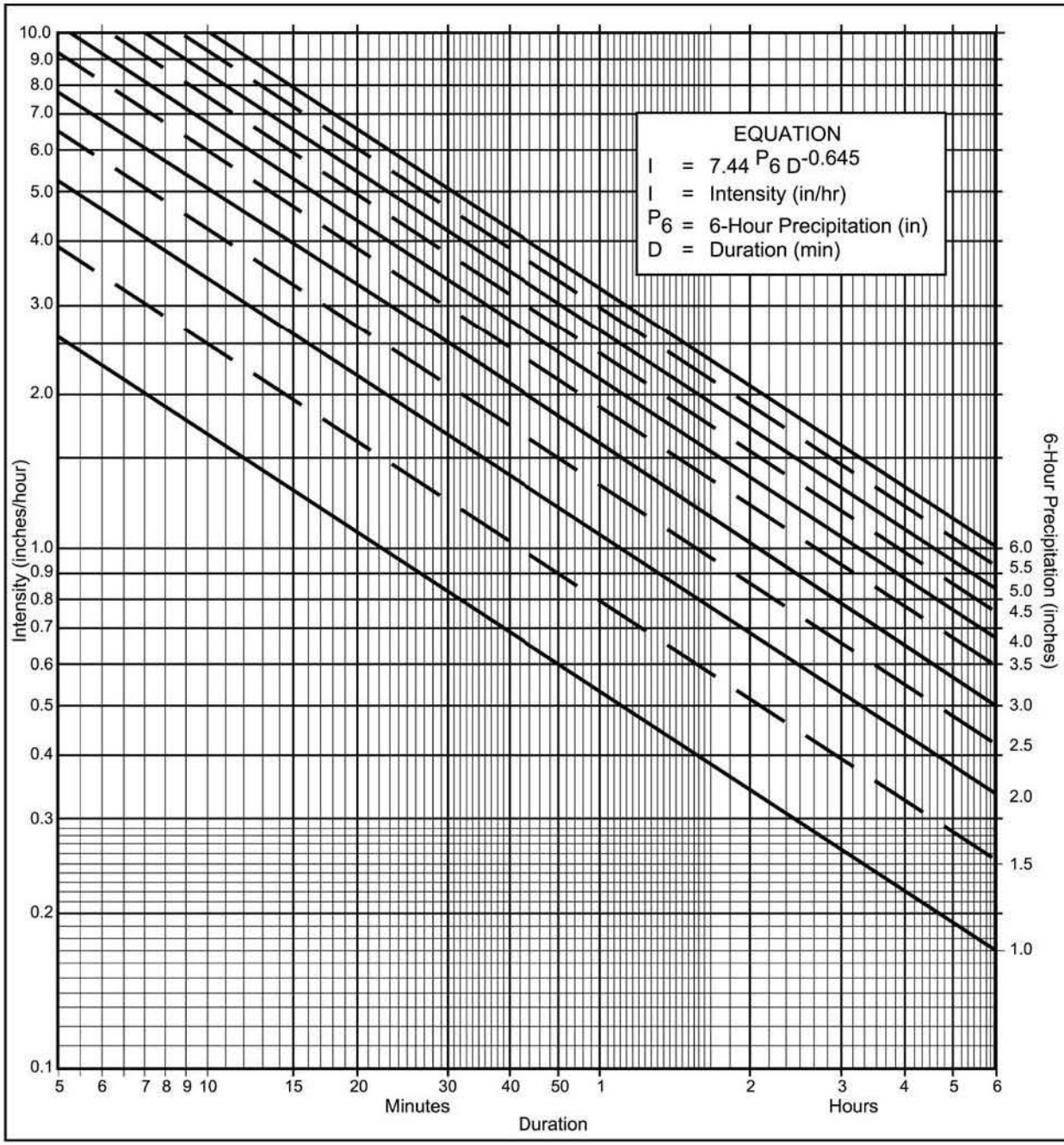
Post-Development Conditions **2-yr Event**

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	10.8	0.69	1.33	0.92	0.92	1.27	2.04	**1.9**
B1	8	0.69	1.52	1.05	1.05	1.27	2.47	**2.6**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	1.27	2.51	**0.6**
Offsite B3	9.1	0.48	0.47	0.23	0.23	1.27	2.27	**0.5**
Total Basin B	9.1				1.53	1.27	2.27	**3.5**
A1 & B1 & B2 & Offsite B3 Total Flow	10.8				2.45	1.27	2.04	**5.0**

Pre-Development Conditions

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	5.1	0.6	1.33	0.80	0.80	1.27	3.30	**2.6**
B1	7.3	0.6	1.52	0.91	0.91	1.27	2.62	**2.4**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	1.27	2.51	**0.6**
Offsite B3	9.1	0.48	0.47	0.23	0.23	1.27	2.27	**0.5**
Total B	9.1				1.40	1.27	2.27	**3.2**
A1 & B1 & B2 & Offsite B3 Total Flow	9.1				2.19	1.27	2.27	**5.0**

***Rational Method**



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 50 year

(b) P_6 = 2.7 in., P_{24} = 4.45, $\frac{P_6}{P_{24}}$ = 61 %(2)

(c) Adjusted P_6(2) = 2.7 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

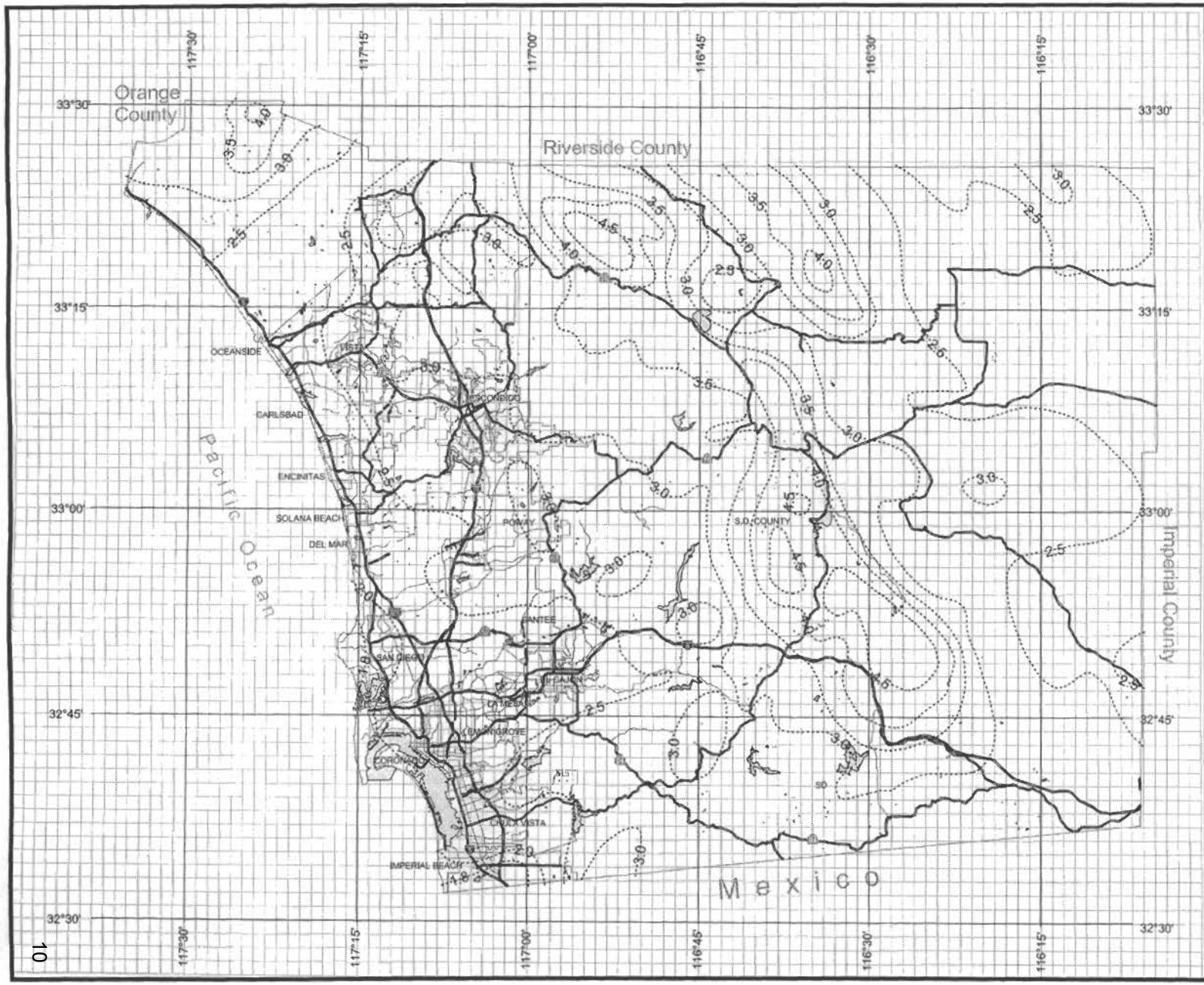
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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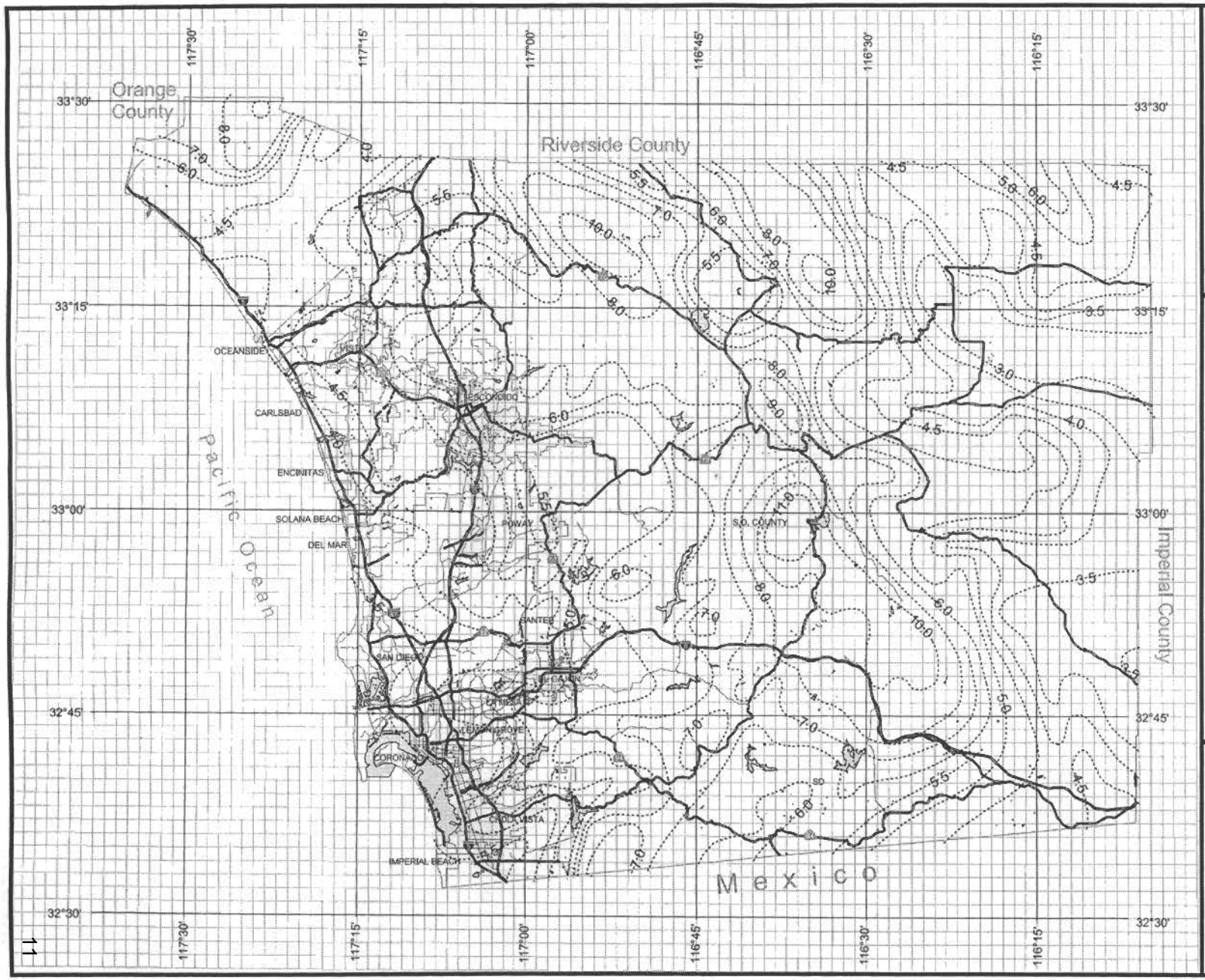
3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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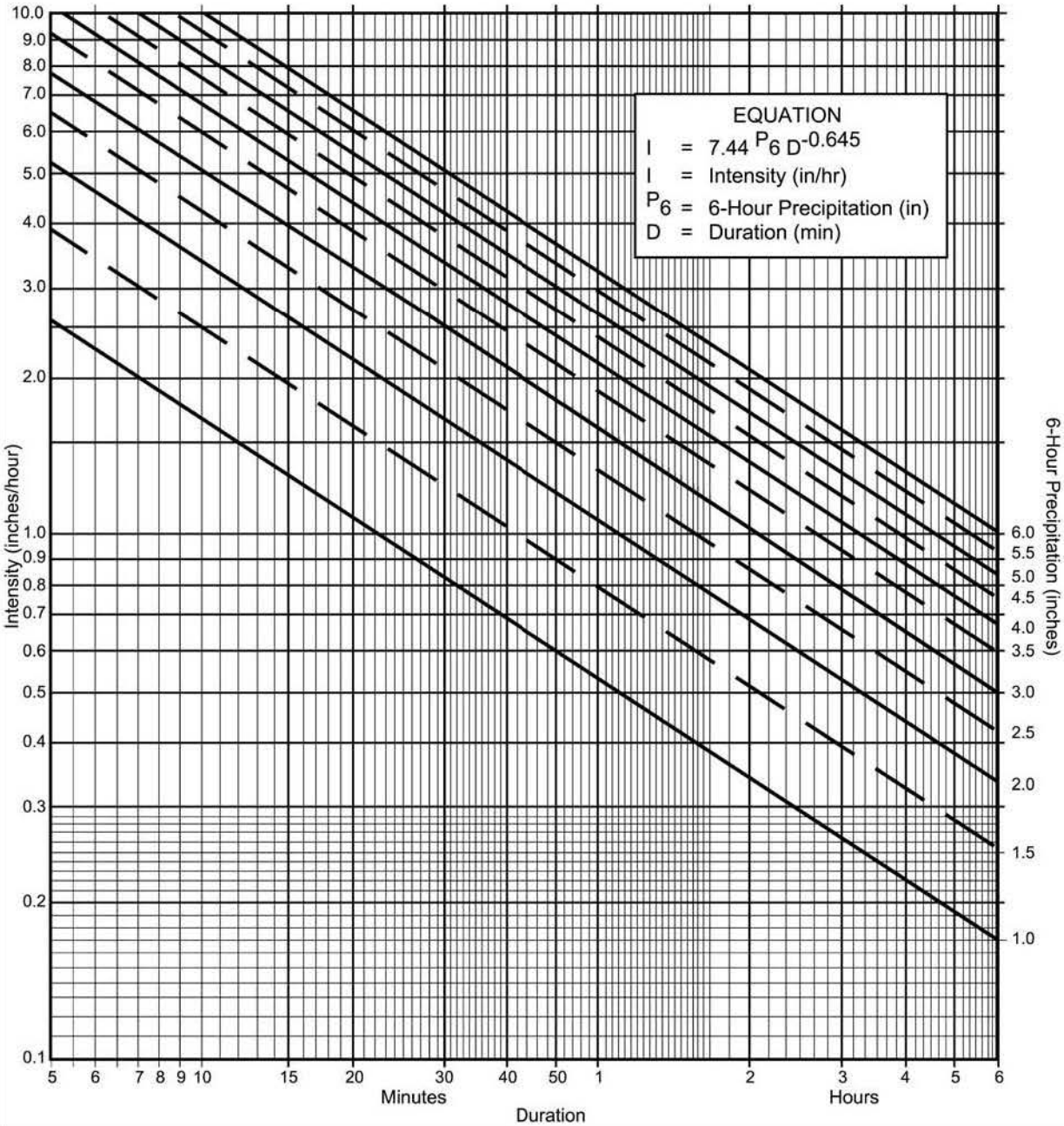
3 0 3 Miles



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 10 year

(b) P_6 = 1.95 in., P_{24} = 3.4, $\frac{P_6}{P_{24}}$ = 57 %(2)

(c) Adjusted P_6(2) = 1.95 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

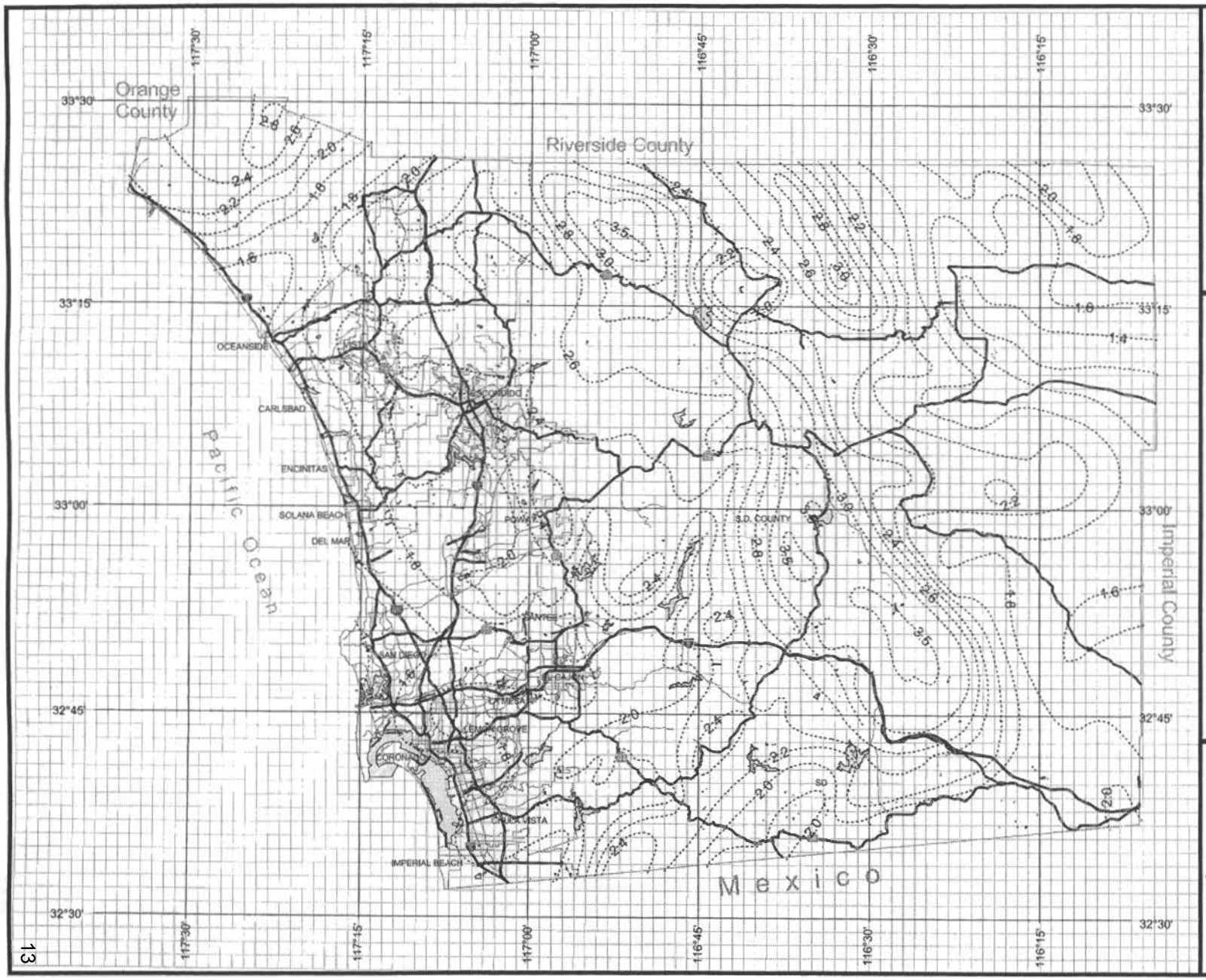
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
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3 0 3 Miles

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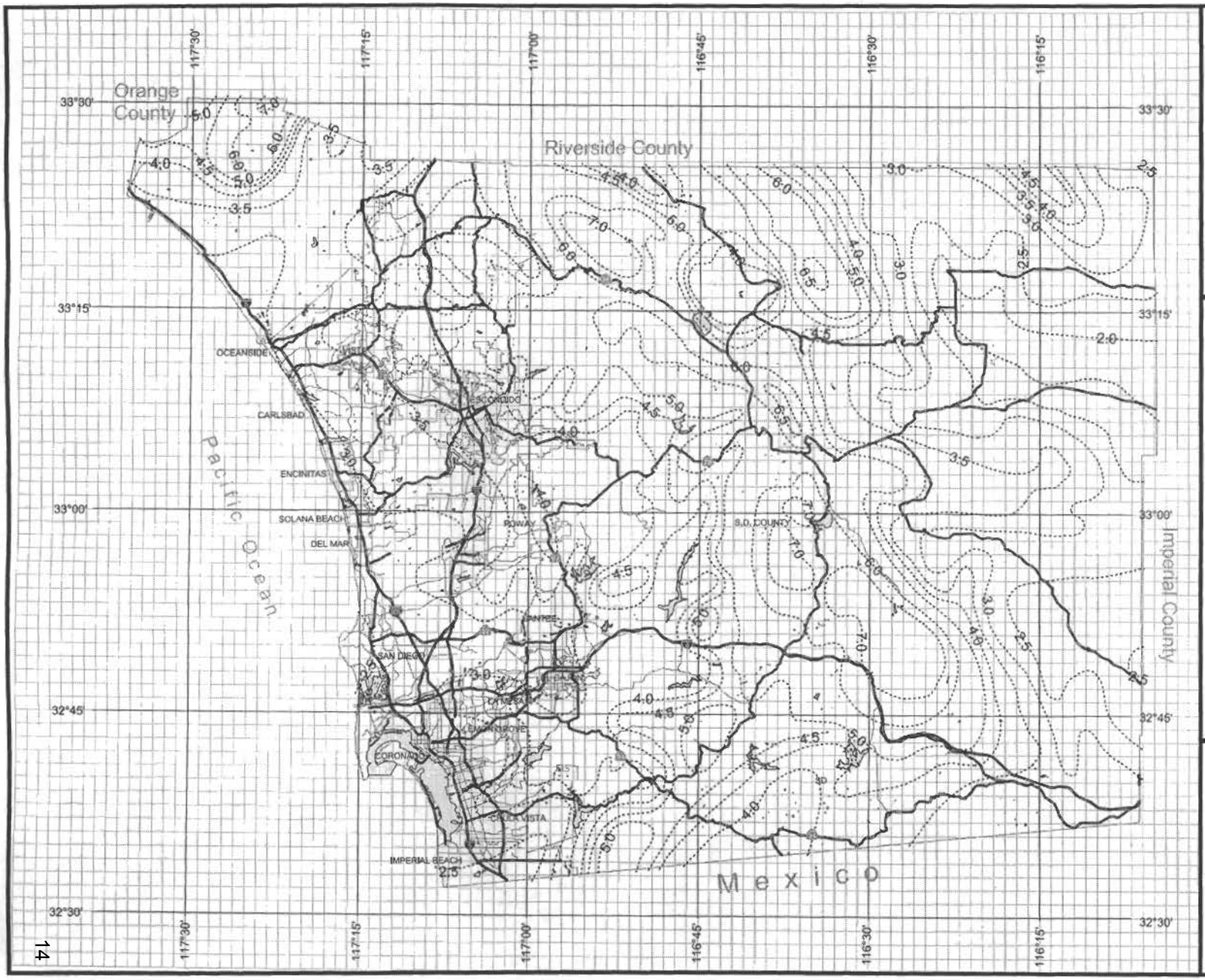

County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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N W E S

-3 0 3 Miles

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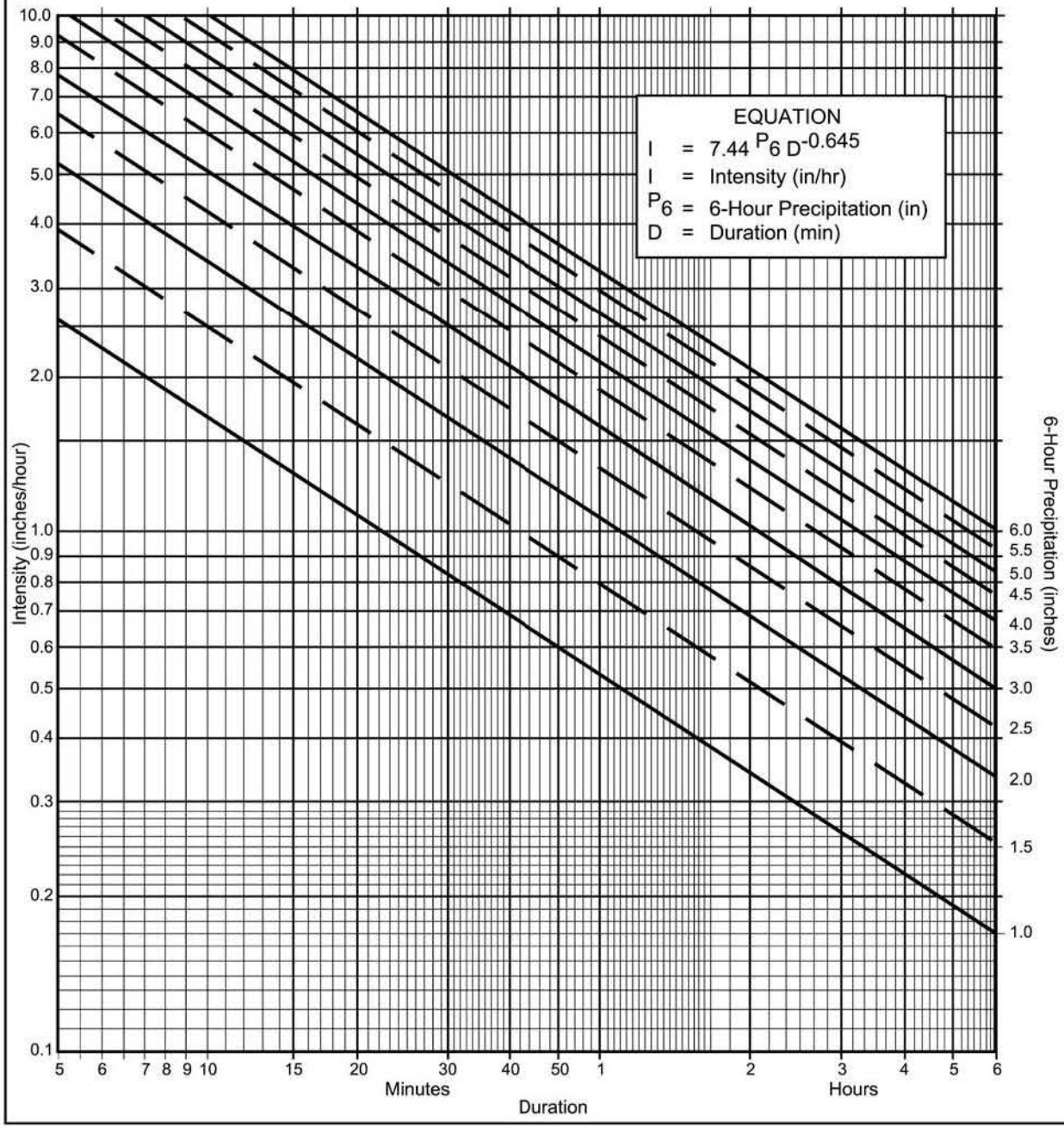


Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 2 year

(b) P_6 = 1.35 in., P_{24} = 1.95, $\frac{P_6}{P_{24}}$ = 69 %(2)

(c) Adjusted P_6(2) = 1.27 in.

(d) t_x = _____ min.

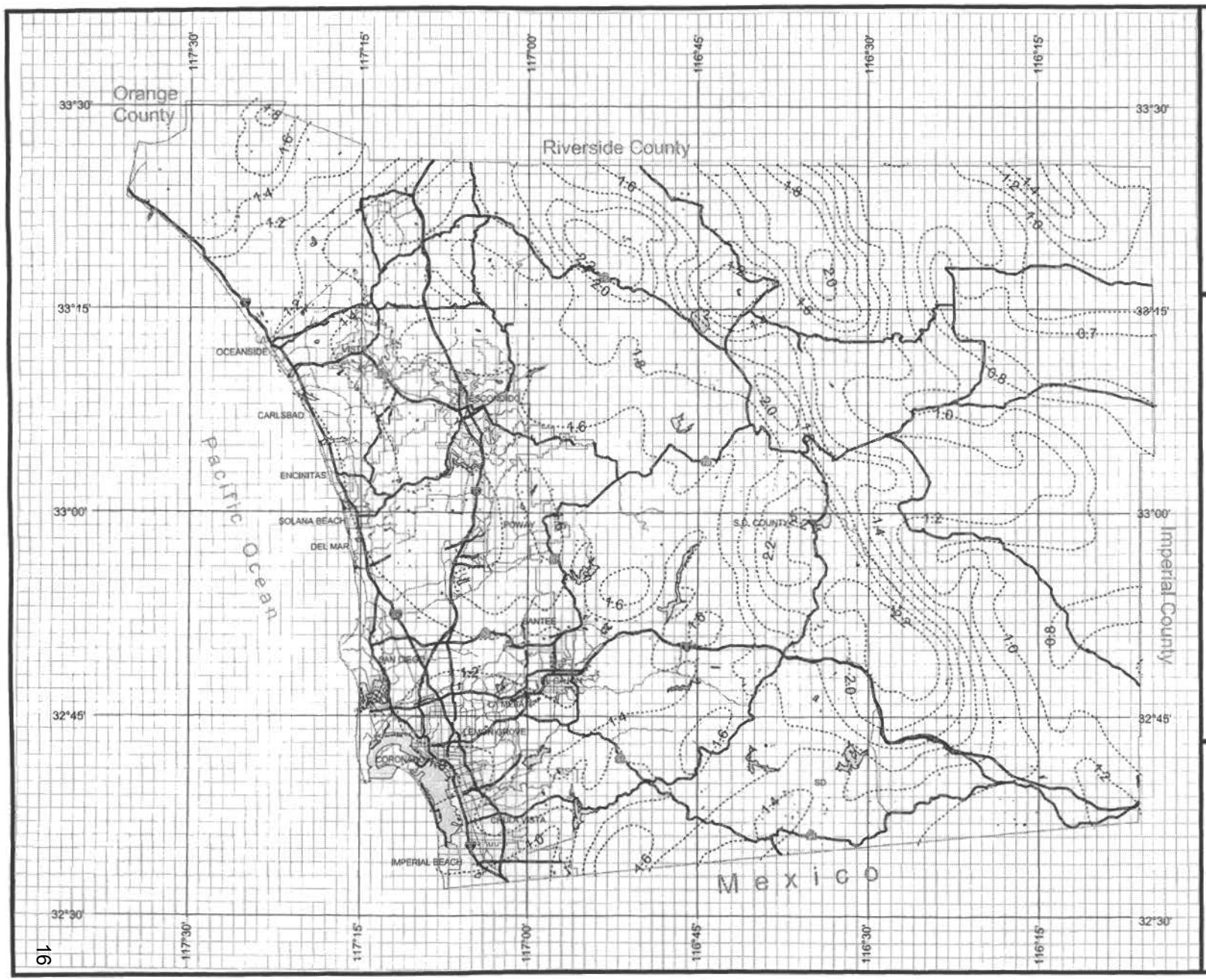
(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE
3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS

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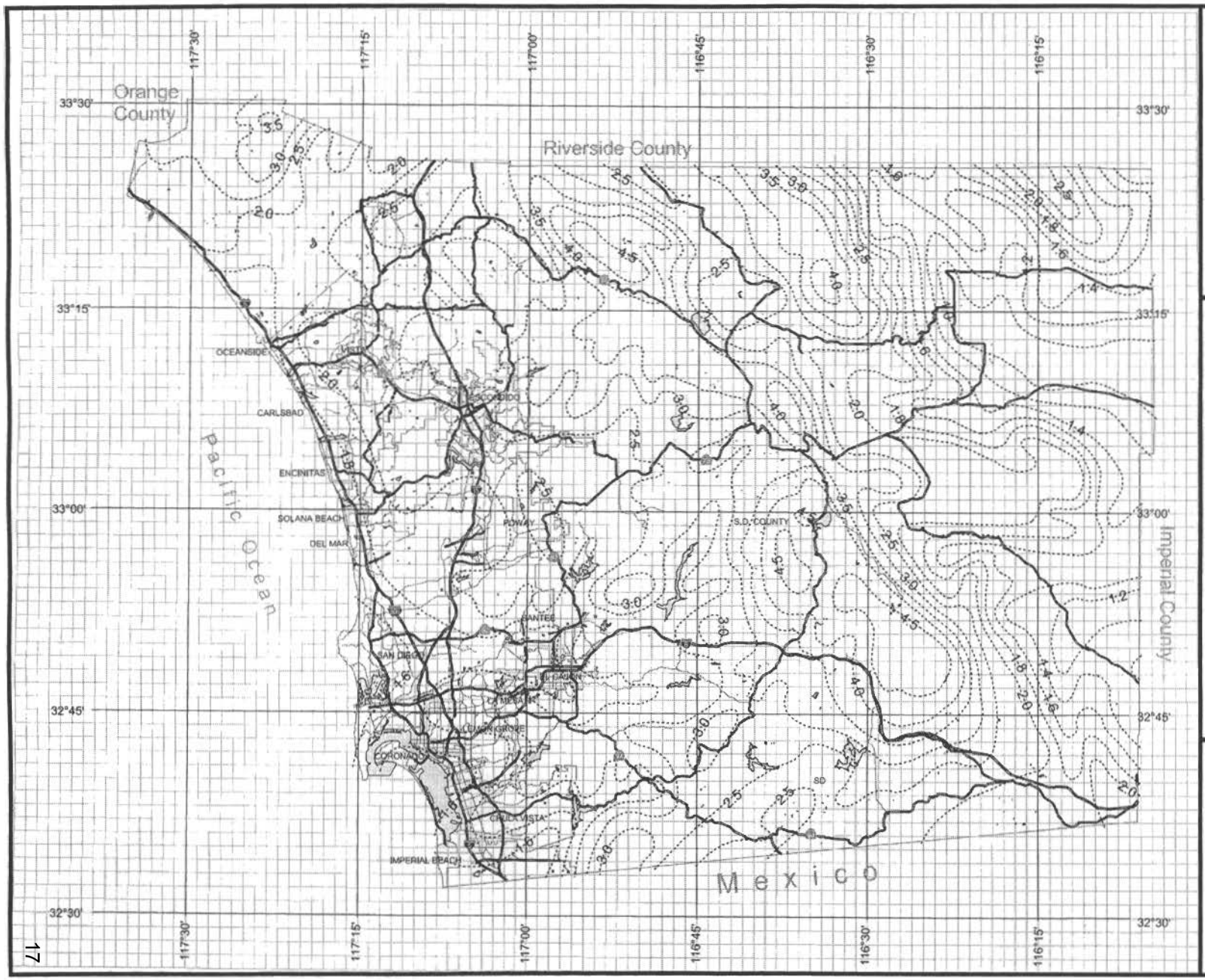
N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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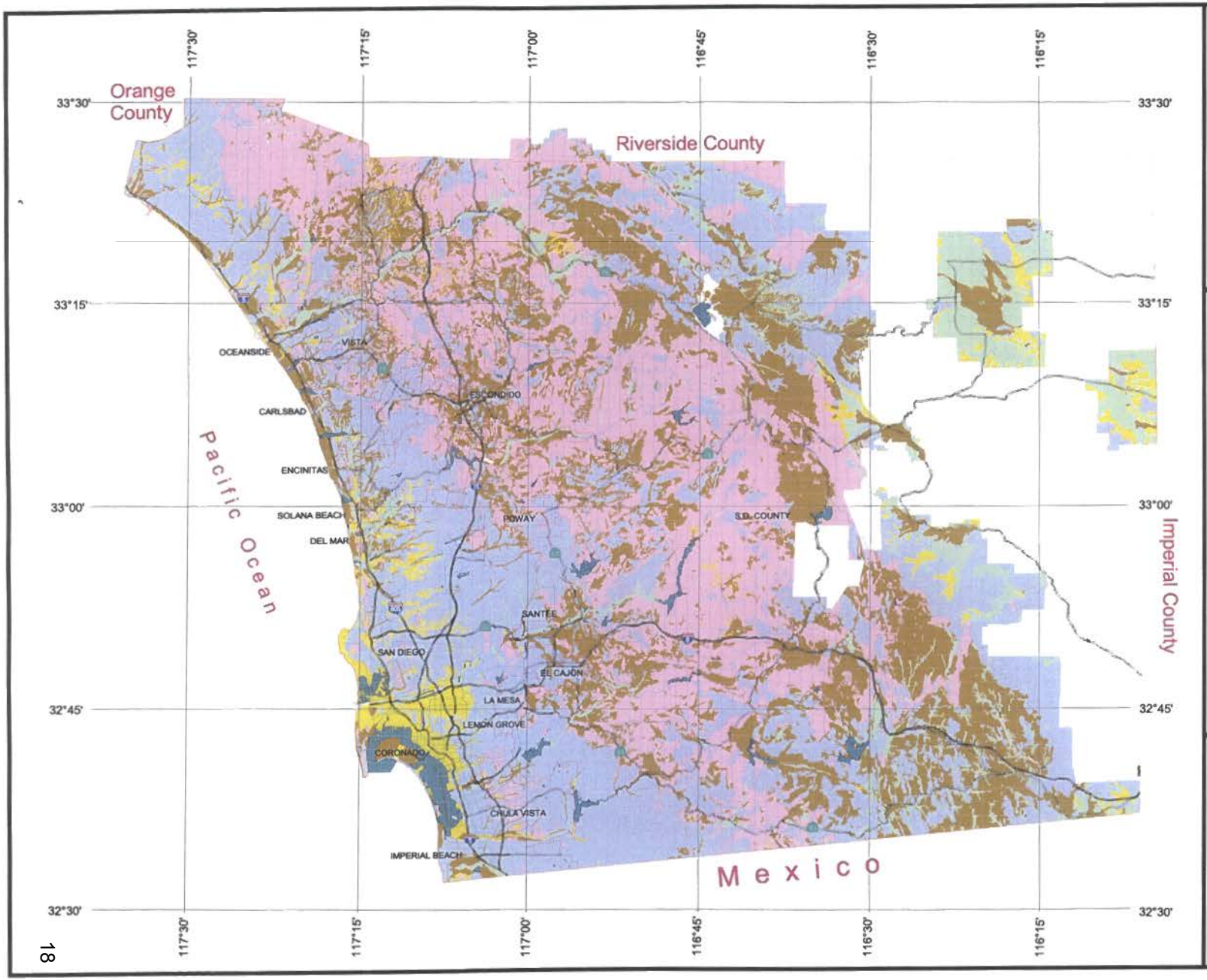
N W E S

3 0 3 Miles

County of San Diego Hydrology Manual

Soil Hydrologic Groups



Legend

Soil Groups

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

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Department of Public Works
Geographic Information Services

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3 0 3 Miles

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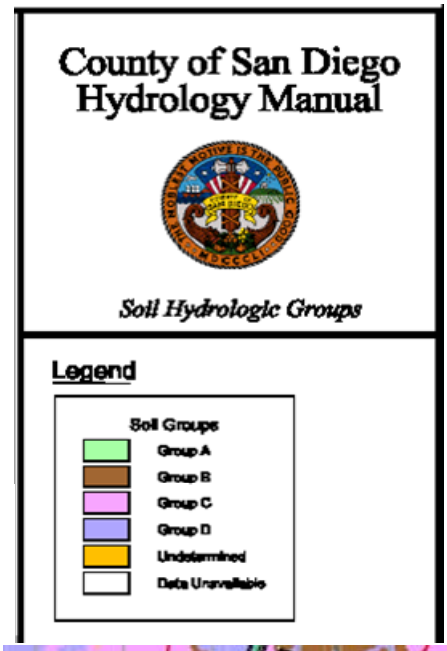
Hydraulic Soil Group Detail for

Project Name: ***North City Presbyterian Church***

Project Location: Address: ***11717 Poway Road***
San Diego, CA 92128

Coordinates of Project: Latitude 32°56'48"N
Longitude 117°4'35"W



**exerts from the Soils Group Map (per SDCHM = San Diego County Hydrology Manual, June 2003)*

Soil Type = **C**

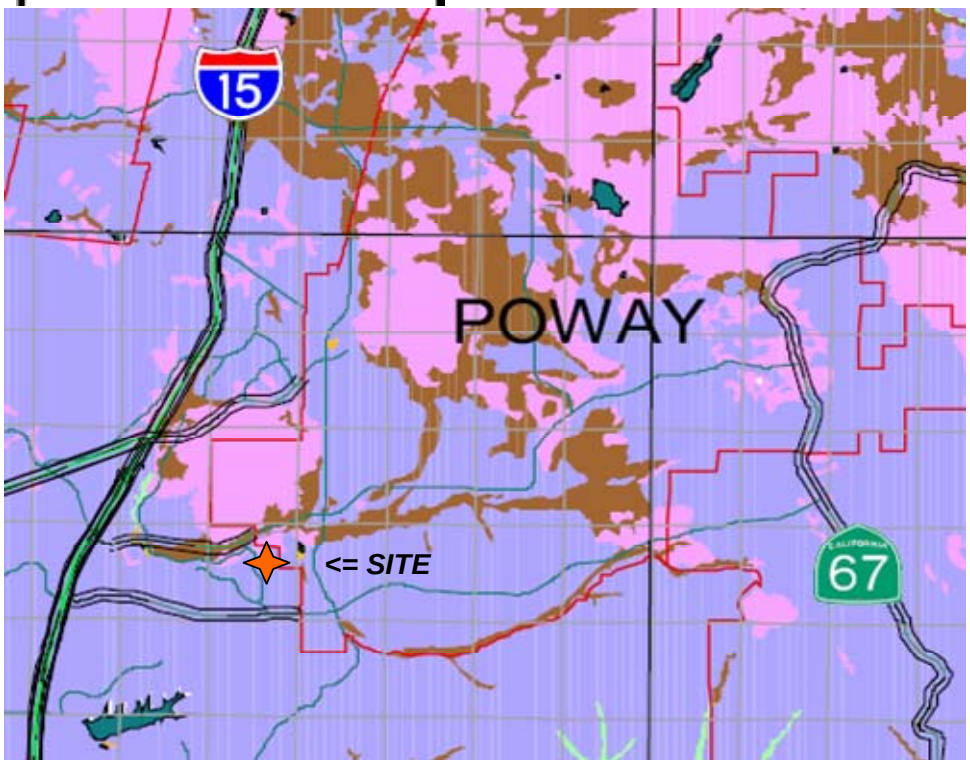


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TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
Residential:	D
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C $= \frac{50}{80} \times 0.85 = 0.53$

Runoff Coefficient Adjustment

Tabulated Runoff Coefficient C 0.85
Tabulated % Impervious 80%

Revised C = (Tabulated Runoff C) x (Actual Imperviousness) / (Tabulated % Impervious)

Total Disturbed Area A & B1 2.85

Post Development Area

Total Area 2.85
Post Development Imperv. Area 1.86
Actual % Impervious 65.3%
Revised C 0.69

Pre Development Area (Partially Developed)

Total Area A & B1 2.85
Pre Development Existing Impervious Area 1.6

Actual % Impervious 56.1%
Revised C 0.60

Undisturbed Area B2

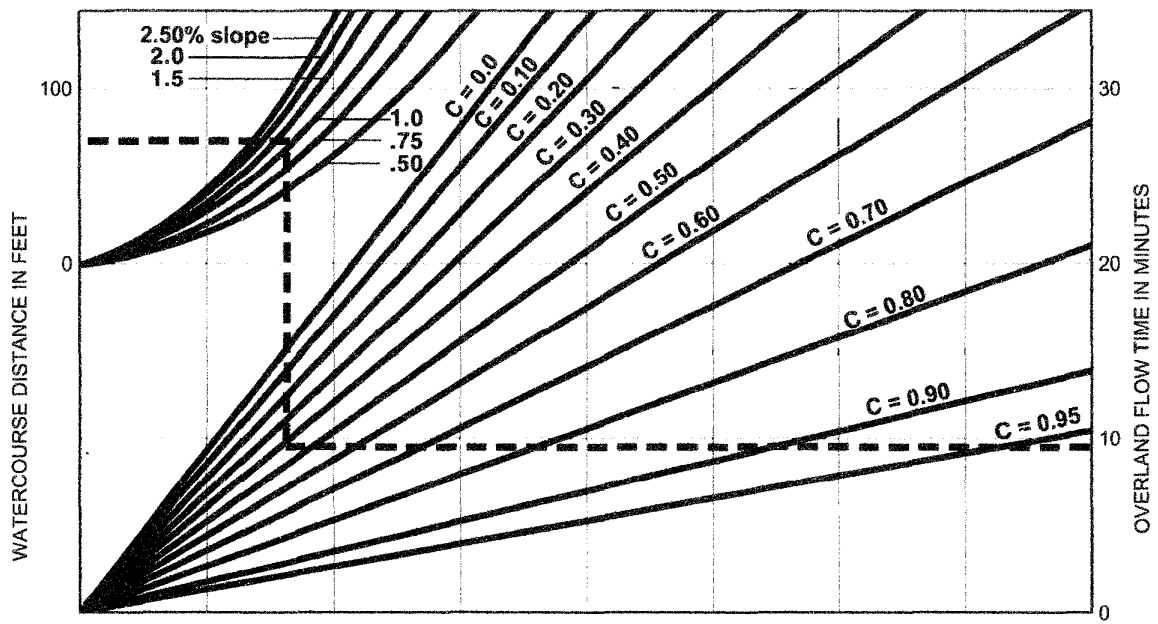
Total Area B2 0.63
Existing Impervious Area 0.41

Actual % Impervious 65.1%
Revised C 0.69

Offsite Area B3

Total Area B3 0.47
Impervious Area 0.21

Actual % Impervious 45.5%
Revised C 0.48



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

Rational Formula - Overland Time of Flow Nomograph

FIGURE

3-3

Time of Concentration

Location	Initial Average slope %	Initial L (ft)	**Initial TC Initial T (min)**	Add'l L (ft)	Average slope %	area (ac)	Q (cfs)	Mannings V (ft/s)	**Additional TC (travel time) Inc. T (min)**	**total T (min)**
										(5 minutes min)
							* Est. Average Q			
Offsite										
Area B3	6	80	5.5	370	5		0.6	1.7	3.6	9.1
Undisturbed										
Area B2	2.5	60	7.1	60	2.5			1.4	0.7	7.8
Pre Dev.										
Area A	3.8	80	4.5	85	3.8		3.00	2.5	0.6	5.1
Area B1	4	80	4.4	430	4		2.50	2.5	2.9	7.3
Post Dev.										
Area A	0.6	60	6.8	240	0.6		2.0	1	4.0	10.8
Area B1	1.8	60	4.7	490	4		2.5	2.5	3.3	8.0

Initial TC
(Figure 3-3)

$$T\ min = \frac{1.8(1.1-C)D^{1/2}}{S^{1/3}}$$

Initial TC	Pre-Dev Area A	Pre-Dev Area B1	Undisturbe Area B2	Offsite Area B3	Post-Dev Area A1	Post-Dev Area A2
C =	0.6	0.6	0.41	0.48	0.69	0.69
D ft =	60	60	60	80	60	60
S % =	3.8	4	2.5	6	0.6	1.8
T =	**4.47**	**4.39**	**7.09**	**5.49**	**6.78**	**4.70**

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Area A Pre Development Initial TC Average Q

Triangular

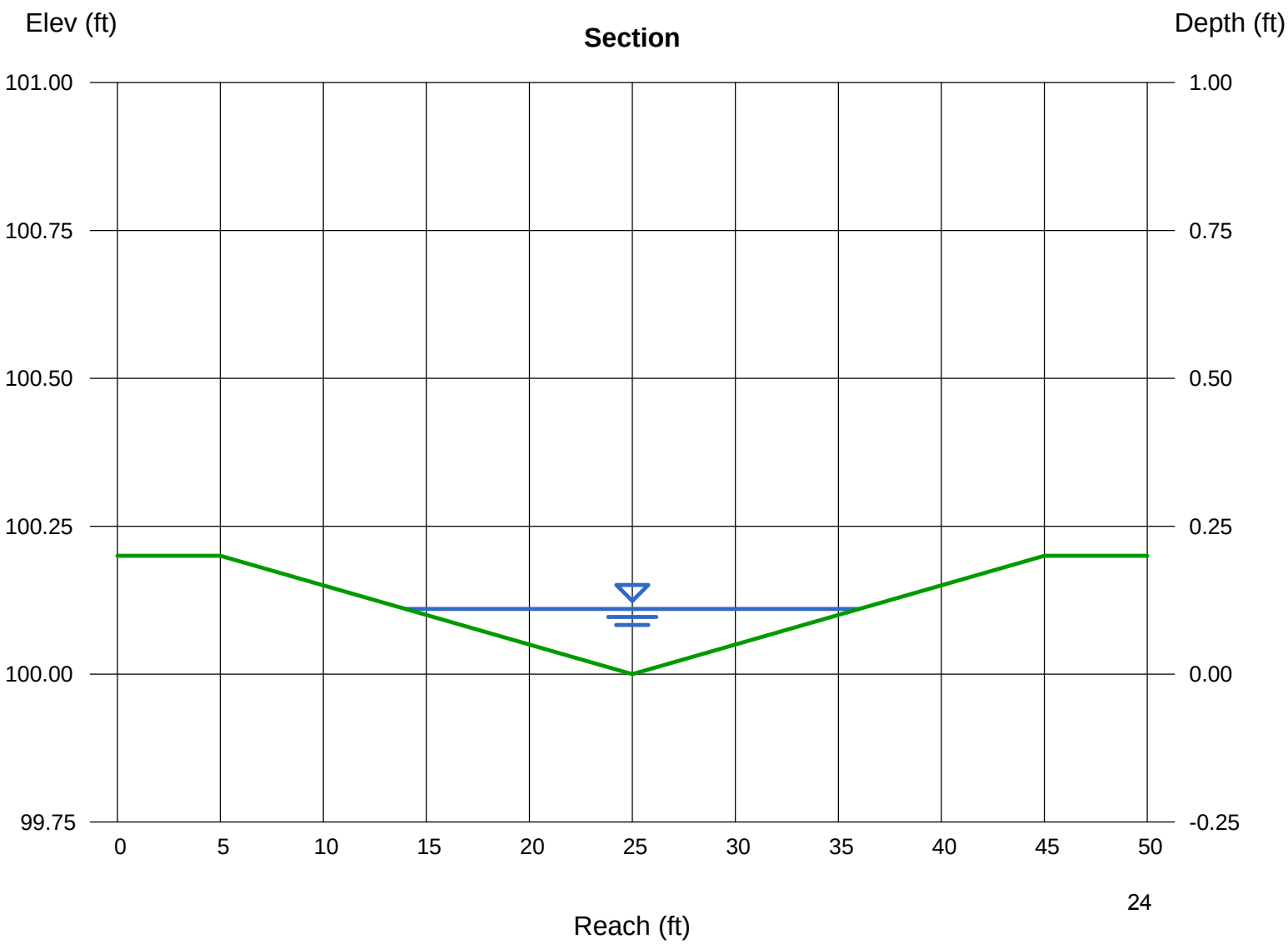
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	3.80
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	3.00

Highlighted

Depth (ft)	=	0.11
Q (cfs)	=	3.000
Area (sqft)	=	1.21
Velocity (ft/s)	=	2.48
Wetted Perim (ft)	=	22.00
Crit Depth, Yc (ft)	=	0.15
Top Width (ft)	=	22.00
EGL (ft)	=	0.21



Channel Report

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Area B1 Pre Development Initial TC Average Q

Triangular

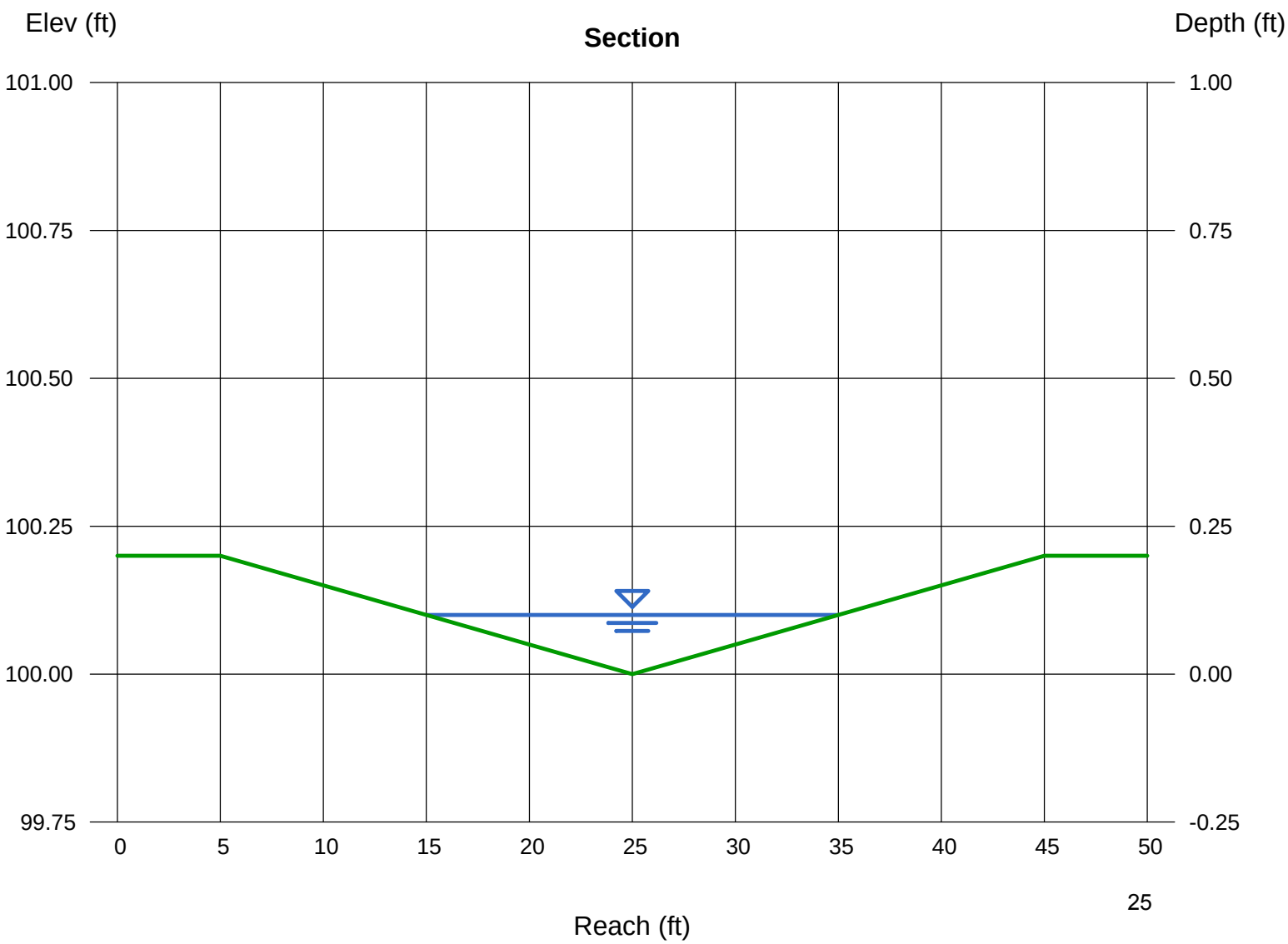
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	4.00
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	2.50

Highlighted

Depth (ft)	=	0.10
Q (cfs)	=	2.500
Area (sqft)	=	1.00
Velocity (ft/s)	=	2.50
Wetted Perim (ft)	=	20.00
Crit Depth, Yc (ft)	=	0.14
Top Width (ft)	=	20.00
EGL (ft)	=	0.20



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Undisturbed Area B2 Post Development Initial TC Average Q

Triangular

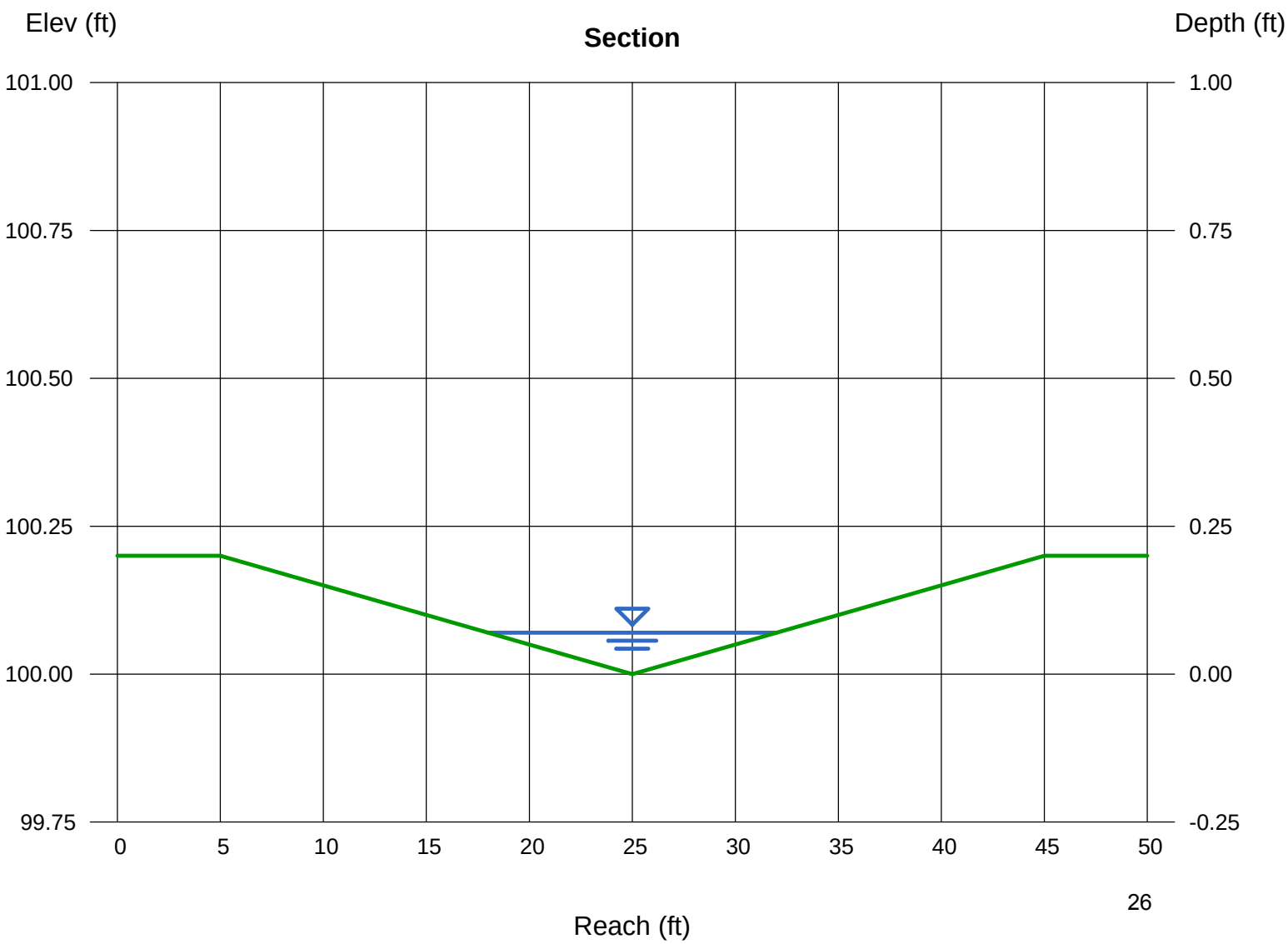
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	2.50
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	0.70

Highlighted

Depth (ft)	=	0.07
Q (cfs)	=	0.700
Area (sqft)	=	0.49
Velocity (ft/s)	=	1.43
Wetted Perim (ft)	=	14.00
Crit Depth, Yc (ft)	=	0.08
Top Width (ft)	=	14.00
EGL (ft)	=	0.10



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Offsite Area B3 Post Development Initial TC Average Q

Triangular

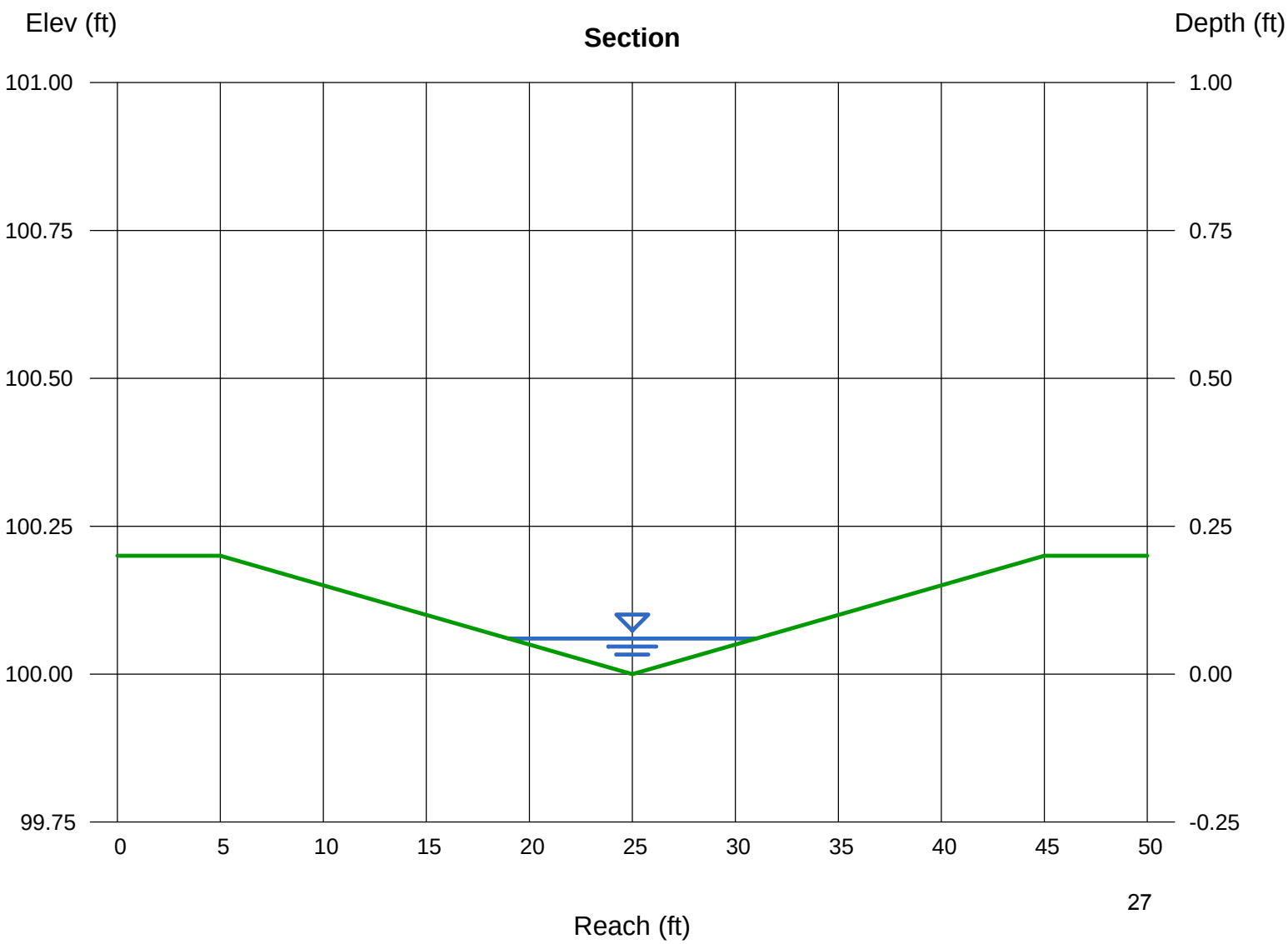
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	5.00
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	0.60

Highlighted

Depth (ft)	=	0.06
Q (cfs)	=	0.600
Area (sqft)	=	0.36
Velocity (ft/s)	=	1.67
Wetted Perim (ft)	=	12.00
Crit Depth, Yc (ft)	=	0.08
Top Width (ft)	=	12.00
EGL (ft)	=	0.10



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Area A Post Development Initial TC Average Q

Triangular

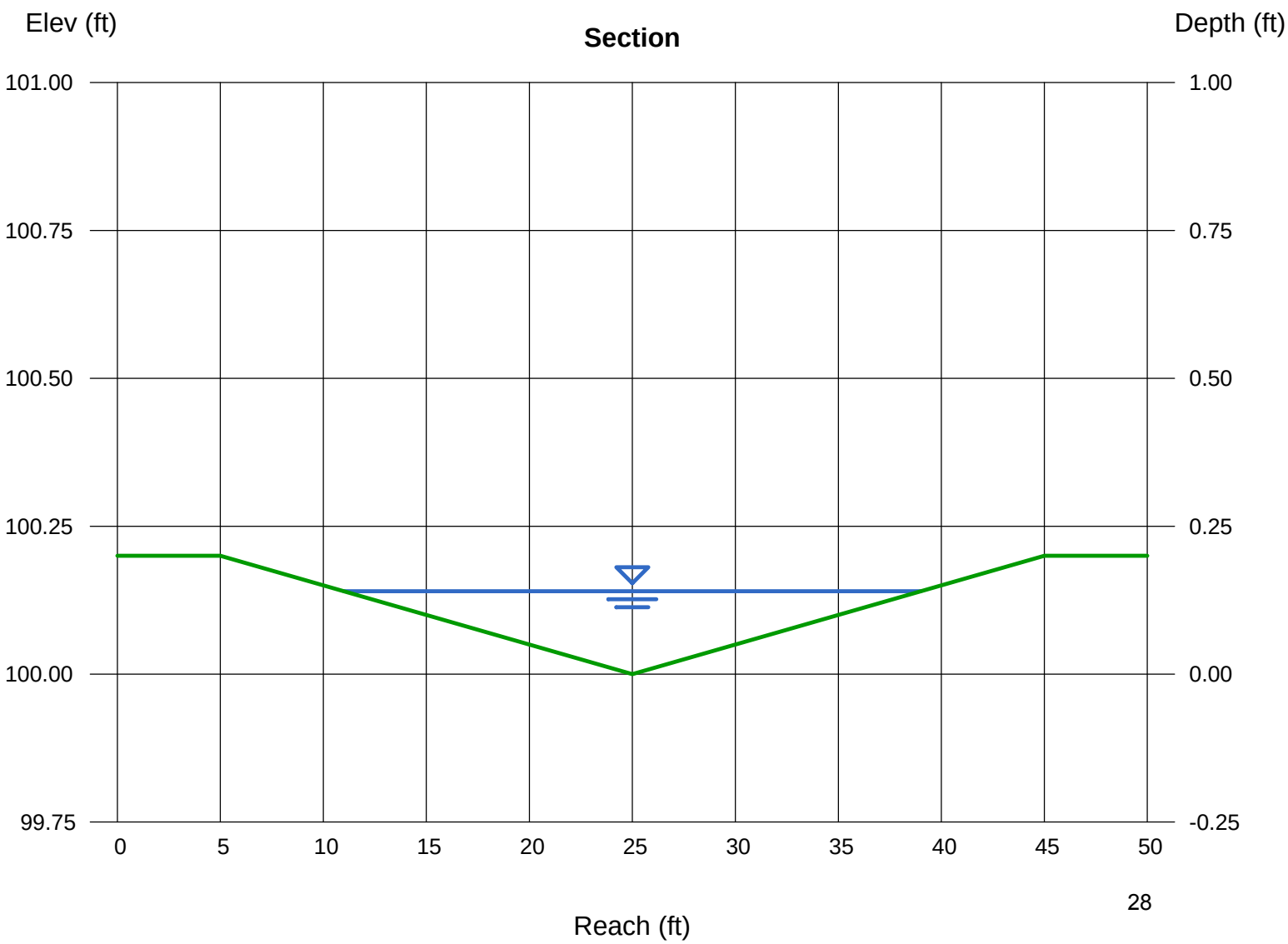
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	0.60
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	2.00

Highlighted

Depth (ft)	=	0.14
Q (cfs)	=	2.000
Area (sqft)	=	1.96
Velocity (ft/s)	=	1.02
Wetted Perim (ft)	=	28.00
Crit Depth, Yc (ft)	=	0.12
Top Width (ft)	=	28.00
EGL (ft)	=	0.16



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Area B1 Post Development Initial TC Average Q

Triangular

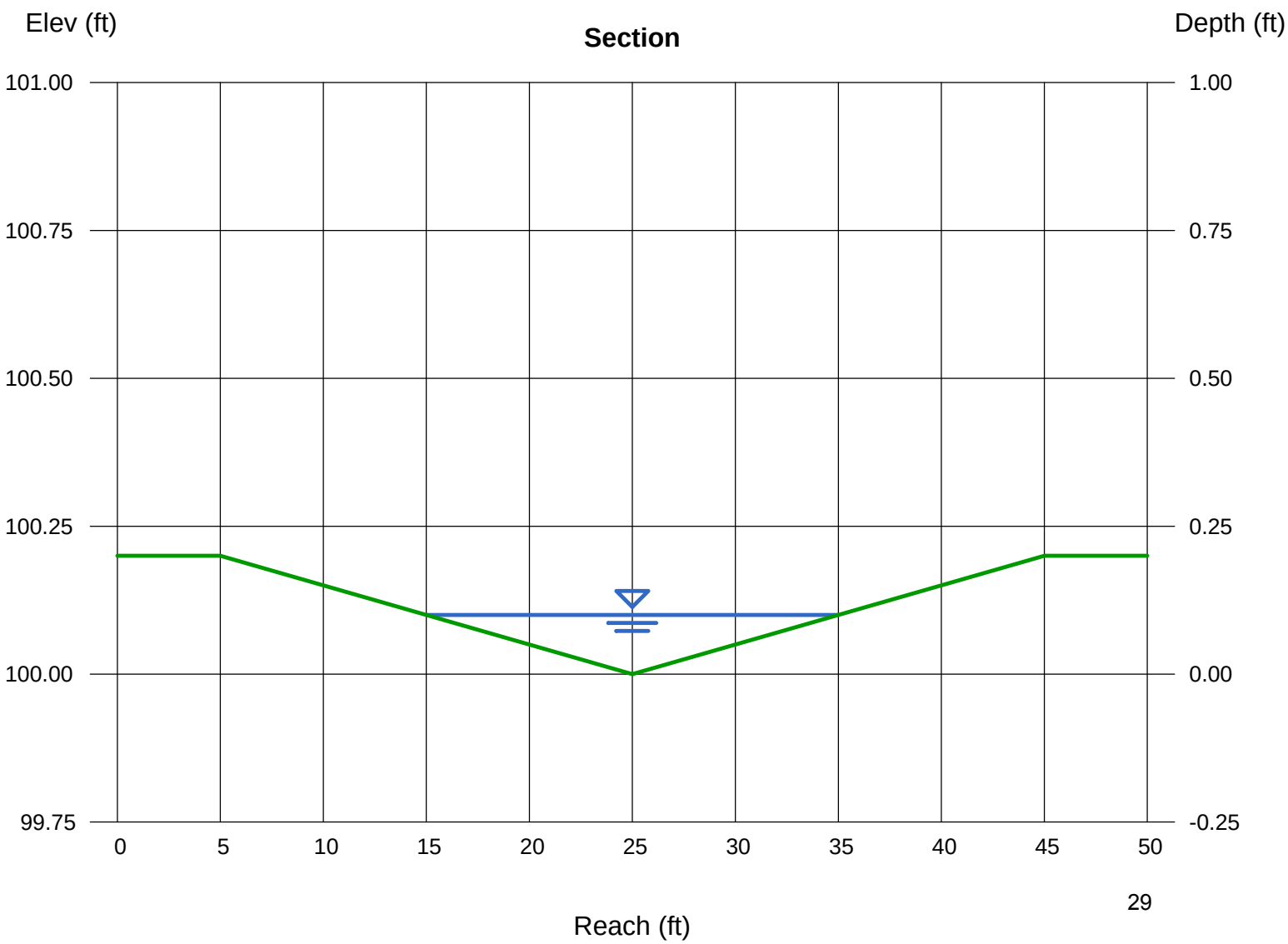
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	4.00
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	2.50

Highlighted

Depth (ft)	=	0.10
Q (cfs)	=	2.500
Area (sqft)	=	1.00
Velocity (ft/s)	=	2.50
Wetted Perim (ft)	=	20.00
Crit Depth, Yc (ft)	=	0.14
Top Width (ft)	=	20.00
EGL (ft)	=	0.20



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Area B2 Pipe Flow

Circular

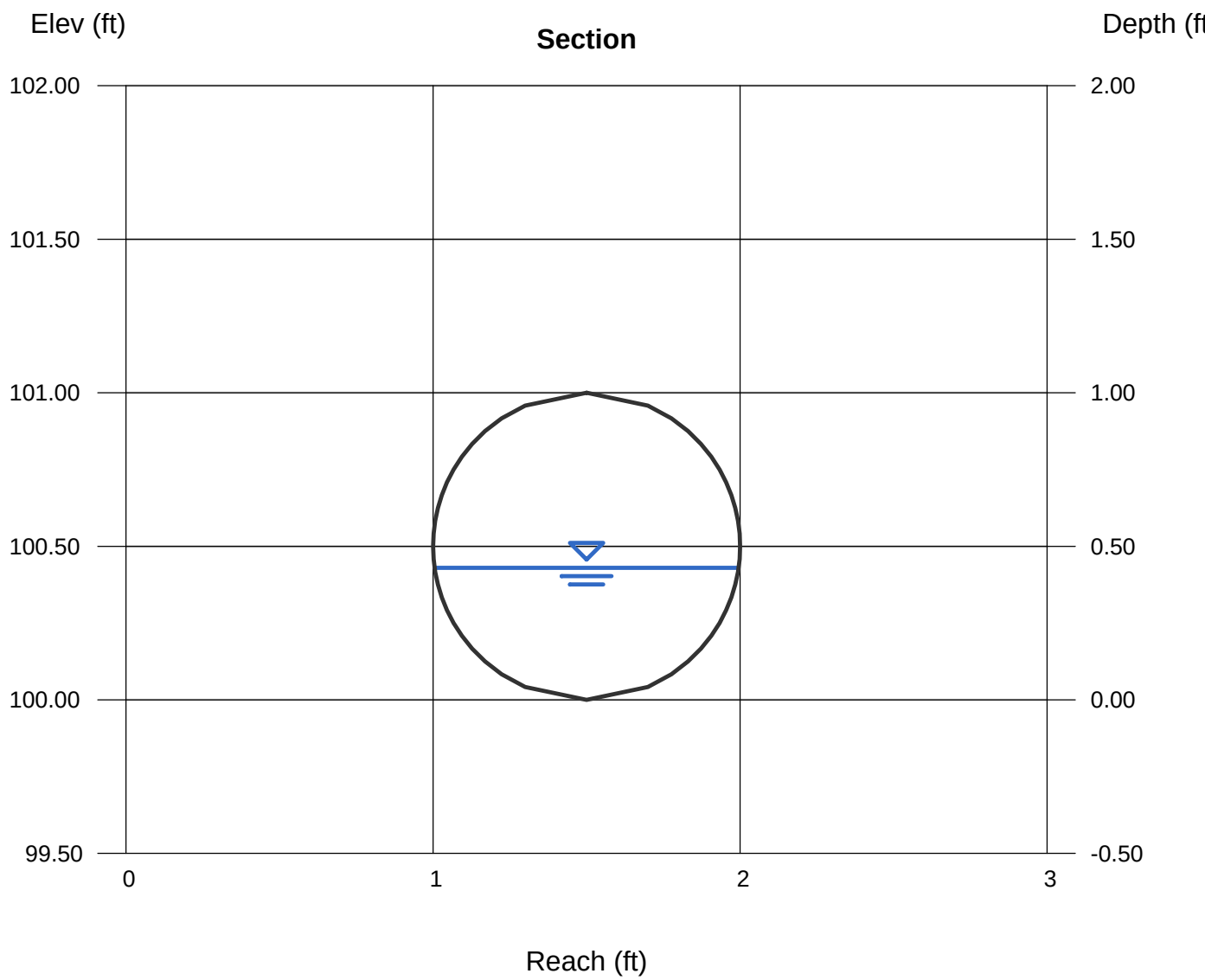
Diameter (ft)	=	1.00
Invert Elev (ft)	=	100.00
Slope (%)	=	0.50
N-Value	=	0.009

Calculations

Compute by:		Known Q
Known Q (cfs)	=	1.40

Highlighted

Depth (ft)	=	0.43
Q (cfs)	=	1.400
Area (sqft)	=	0.33
Velocity (ft/s)	=	4.30
Wetted Perim (ft)	=	1.43
Crit Depth, Yc (ft)	=	0.50
Top Width (ft)	=	0.99
EGL (ft)	=	0.72



ATTACHMENT C

TECHNICAL MEMORANDUM:

SWMM Modeling for Hydromodification Compliance of:

North City Presbyterian Church

Prepared For:

Spear Engineering
June 6, 2016

Prepared by:

Luis Parra, PhD, CPSWQ, ToR, D.WRE.
R.C.E. 66377

REC Consultants
2442 Second Avenue
San Diego, CA 92101
Telephone: (619) 232-9200

TECHNICAL MEMORANDUM

TO: Spear Engineering

FROM: Luis Parra, PhD, PE, CPSWQ, ToR, D.WRE.
David Edwards, PE.

DATE: June 6, 2016

RE: Summary of SWMM Modeling for Hydromodification Compliance for the North City Presbyterian Church, City of San Diego, CA.

INTRODUCTION

This memorandum summarizes the approach used to model the proposed church /communal development project site in the City of San Diego using the Environmental Protection Agency (EPA) Storm Water Management Model 5.0 (SWMM). SWMM models were prepared for the pre and post-developed conditions at the site in order to determine if the proposed LID biofiltration facilities have sufficient volume to meet Order R9-2013-001 requirements of the California Regional Water Quality Control Board San Diego Region (SDRWQCB), as explained in the Final Hydromodification Management Plan (HMP), dated March 2011, prepared for the County of San Diego by Brown and Caldwell.

SWMM MODEL DEVELOPMENT

The North City Presbyterian Church project proposes the addition of a communal religious center building to the currently developed site, which will include an access road and a servicing parking lot. Two (2) SWMM models were prepared for this study: the first for the pre-development and the second for the post-developed conditions. The project site drains to two Points of Compliance (POC) located to the east of the project site in the adjacent Peñasquitos Creek.

The SWMM model was used since we have found it to be more comparable to San Diego area watersheds than the alternative San Diego Hydrology Model (SDHM) and also because it is a non-proprietary model approved by the HMP document. For both SWMM models, flow duration curves were prepared to determine if the proposed HMP facilities are sufficient to meet the current HMP requirements.

The inputs required to develop SWMM models include rainfall, watershed characteristics, and BMP configurations. The Poway Gage from the Project Clean Water website was used for this study, since it is the most representative of the project site precipitation due to elevation and proximity to the project site. Please see gauge location and project location map on attachment 5.

Per the California Irrigation Management Information System “Reference Evaporation Zones” (CIMIS ETo Zone Map), the project site is located within the Zone 6 Evapotranspiration Area. Thus evapotranspiration values for the site were modeled using Zone 6 average monthly values from Table G.1-1 from the City of San Diego 2016 BMP Design Manual. The site was modeled with Type C hydrologic soil as this is the existing soil determined from the site specific geotechnical investigation. Soils have been assumed to be compacted in the existing condition to represent the current development of the

site, while fully compacted in the post developed conditions. Other SWMM inputs for the subareas are discussed in the appendices to this document, where the selection of parameters is explained in detail.

HMP MODELING

PRE DEVELOPED CONDITIONS

In current existing conditions, runoff from the developed project site discharges via overland flow to two points of compliance located at the eastern boundary of the project site on the adjacent Peñasquitos Creek. Table 1 below illustrates the pre-developed areas and impervious percentage accordingly.

TABLE 1 – SUMMARY OF PRE-DEVELOPED CONDITIONS

DMA	Tributary Area, A (Ac)	Impervious Percentage(1), Ip	POC
DMA-1-1	2.62	0%	1
DMA-1-2	1.33	0%	2
Total	**3.95**	**n/a**	**n/a**

Notes: (1) – Per the 2013 RWQCB permit, existing conditions impervious surfaces, that will remain the same in developed conditions, cannot be accounted for in existing conditions analysis if they account for over 50% of the area.

DEVELOPED CONDITIONS

Runoff from the developed project site is drained to two (2) onsite receiving biofiltration LID BMPs. Once flows are routed via the proposed LID BMPs, all onsite flows are then conveyed via storm drain to its corresponding existing points of discharge. Table 2 summarizes the post-developed area and impervious percentage accordingly.

TABLE 2 – SUMMARY OF POST-DEVELOPED CONDITIONS

DMA	Tributary Area(1), A (Ac)	Impervious Percentage(1), Ip	BMP	POC
DMA-B	2.62	65.25%	B	1
DMA-A	1.33	58.49%	A	2
TOTAL	**3.95**	**n/a**	**n/a**	**n/a**

Notes: (1) Tributary area includes the area of the LID. Therefore, the impervious percentage shown is calculated based on the total area. The subcatchments DMA's impervious percentage shown on the SWMM model don't include the area of the LID therefore those percentages are slightly different.

Two (2) LID biofiltration basins are located within the project site and are responsible for handling hydromodification requirements for the project site. In developed conditions, the basins will have a surface depth and a riser spillway structure set to an elevation (see dimensions in Table 3). Flows will then discharge from the basins via a low flow orifice outlet within the gravel layer. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving storm drain system.

Beneath the basins' invert lies the proposed LID biofiltration portion of the drainage facilities. This portion of the basin is comprised of a 3-inch layer of mulch, a 24-inch layer of amended soil (a highly sandy, organic rich composite with an infiltration capacity of at least 5 inches/hr) and a 18-inch layer of gravel for additional detention and to accommodate the French drain system. These systems are to be

located beneath the biofiltration layers to intercept treated storm water and convey these flows to a small diameter lower outlet orifice. Once flows have been routed by the outlet structure, flows are then drained to the receiving storm drain system prior to discharging to the corresponding POC at the eastern project boundary.

The biofiltration basins, which are lined to prevent infiltration due to geotechnical concerns, were modeled using the biofiltration LID module within SWMM. The biofiltration module can model the underground gravel storage layer, underdrain with an orifice plate, amended soil layer, and a surface storage pond up to the elevation of the invert of the spillway. It should be noted that detailed outlet structure location and elevations will be shown on the construction plans based on the recommendations of this study.

Water Quality

It is assumed all storm water quality requirements for the project will be met by the biofiltration LID BMPs (as the minimum required treatment footprints are met by the proposed BMP design). However, detailed water quality requirements are not discussed within this technical memo. For further information in regards to storm water quality requirements for the project and drawdown calculations, please refer to the site specific Storm Water Quality Management Plan (SWQMP).

BMP MODELING FOR HMP PURPOSES

Modeling of dual purpose Water Quality/HMP BMPs

Two (2) LID BMP biofiltration basins are proposed for water quality treatment and hydromodification conformance for the project site. Table 3 & 4 illustrate the dimensions required for HMP compliance according to the SWMM model that was undertaken for the project.

TABLE 3 – SUMMARY OF DEVELOPED DUAL PURPOSE BMPS

BMP	Tributary Area (Ac)(7)	DIMENSIONS					
		BMP Area(1) (ft^2)	Gravel Depth(2) (in)	Lower Orif. D (in)(3)	Depth Riser Invert (in)(4)	Weir Perimeter Length(5) (ft)	Total Surface Depth(6) (in)
BMP B	2.56	2557	18	1.50	18	12	24
BMP A	1.31	699	18	0.75	18	12	24

Notes:
(1): Area of amended soil equal to area of gravel
(2): Gravel depth needed to comply with hydromodification purposes
(3): Diameter of orifice in gravel layer with invert at bottom of layer; tied with hydromod min threshold ($0.1 \cdot Q_2$).
(4): Depth of ponding beneath riser structure's surface spillway.
(5): Overflow length, the internal perimeter of the riser is 12 ft (3 ft x 3 ft internal dimensions).
(6): Total surface depth of BMP from top crest elevation to surface invert.
(7): Tributary area to basin not including area of BMP.

TABLE 4 – SUMMARY OF RISER DETAILS:

BMP	Low Orifices			Lower Slot		Top Riser	
	#	Dia. (in)	Elev.(1) (ft)	BxH (ft)(3)	Elev.(1) (ft)	Length(2) (ft)	Elev.(1) (ft)
BMP-B	1	0.75	0.5	8 x 0.083	0.83	12	1.50
BMP-A	2	0.75	0.5	n/a	n/a	12	1.50

Notes: (1): Basin ground surface elevation assumed to be 0.00 ft elevation.
(2): Overflow length is the internal perimeter of the riser structure.
(3): Width B of slot can be distributed along 4 sides of riser by having a 2'x0.083 ' on each side.

FLOW DURATION CURVE COMPARISON

The Flow Duration Curve (FDC) for the site was compared at each POC by exporting the hourly runoff time series results from SWMM to a spreadsheet.

Q_2 and Q_{10} were determined with a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Cunnane plotting position method (which is the preferred plotting methodology in the HMP Permit). As the SWMM Model includes a statistical analysis based on the Weibull Plotting Position Method, the Weibull Method was also used within the spreadsheet to ensure that the results were similar to those obtained by the SWMM Model.

The range between 10% of Q_2 and Q_{10} was divided into 100 equal time intervals; the number of hours that each flow rate was exceeded was counted from the hourly series. Additionally, the intermediate peaks with a return period "i" were obtained (Q_i with i=3 to 9). For the purpose of the plot, the values were presented as percentage of time exceeded for each flow rate. FDC comparison at each POC is illustrated in Figures 1 and 2 in both normal and logarithmic scale. Attachment 5 provides a detailed drainage exhibit for the post-developed condition.

As can be seen in Figures 1 and 2, the FDC for the proposed condition with the HMP BMPs is within 110% of the curve for the existing condition in both peak flows and durations. The additional runoff volume generated from developing the site will be released to the existing point of discharge at a flow rate below the 10% Q_2 lower threshold for POC-1 and POC-2. Additionally, the project will also not increase peak flow rates between the Q_2 and the Q_{10}, as shown in the peak flow tables in Attachment 1.

SUMMARY

This study has demonstrated that the proposed HMP BMPs provided for the North City Presbyterian Church site is sufficient to meet the current HMP criteria for the Points of Compliance (POC), if the cross-section areas and volumes recommended within this technical memorandum, and the respective orifices and outlet structures are incorporated as specified within the proposed project site.

KEY ASSUMPTIONS

1. Type C Soil is representative of the existing condition site.

ATTACHMENTS

1. Q_2 to Q_{10} Comparison Tables
2. FDC Plots (log and natural "x" scale) and Flow Duration Table.
3. List of the "n" largest Peaks: Pre-Development and Post-Development Conditions
4. Elevations vs. Discharge Curves to be used in SWMM, Draw Down Calculations
5. Pre & Post Development Maps, Project plan and section sketches
6. SWMM Input Data in Input Format (Existing and Proposed Models)
7. SWMM Screens and Explanation of Significant Variables
8. Geotechnical Soil Survey
9. Summary files from the SWMM Model

REFERENCES

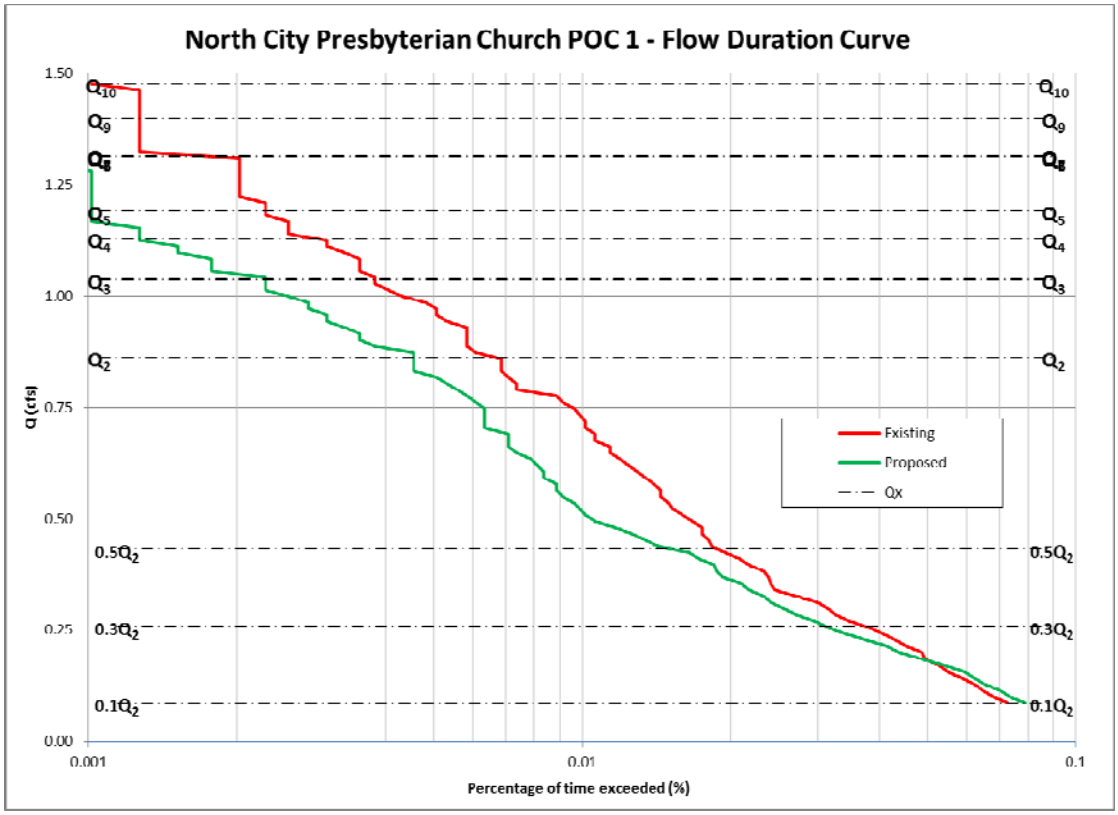
[1] – *"Review and Analysis of San Diego County Hydromodification Management Plan (HMP): Assumptions, Criteria, Methods, & Modeling Tools – Prepared for the Cities of San Marcos, Oceanside & Vista",* May 2012, TRW Engineering.

[2] – *"Final Hydromodification Management Plan (HMP) prepared for the County of San Diego",* March 2011, Brown and Caldwell.

[3] - Order R9-2007-001, California Regional Water Quality Control Board San Diego Region (SDRWQCB).

[4] – "*Handbook of Hydrology*", David R. Maidment, Editor in Chief. 1992, McGraw Hill.

[5] – "*City of San Diego BMP Design Manual*", February 2016.



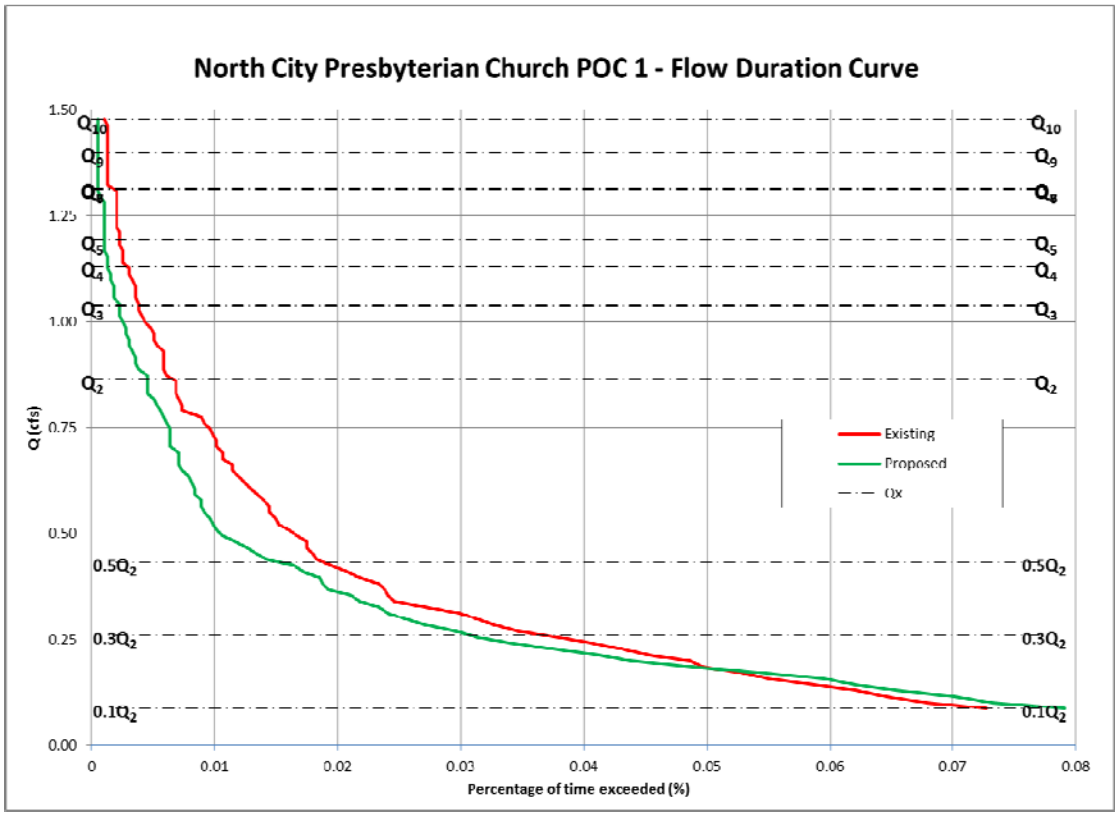
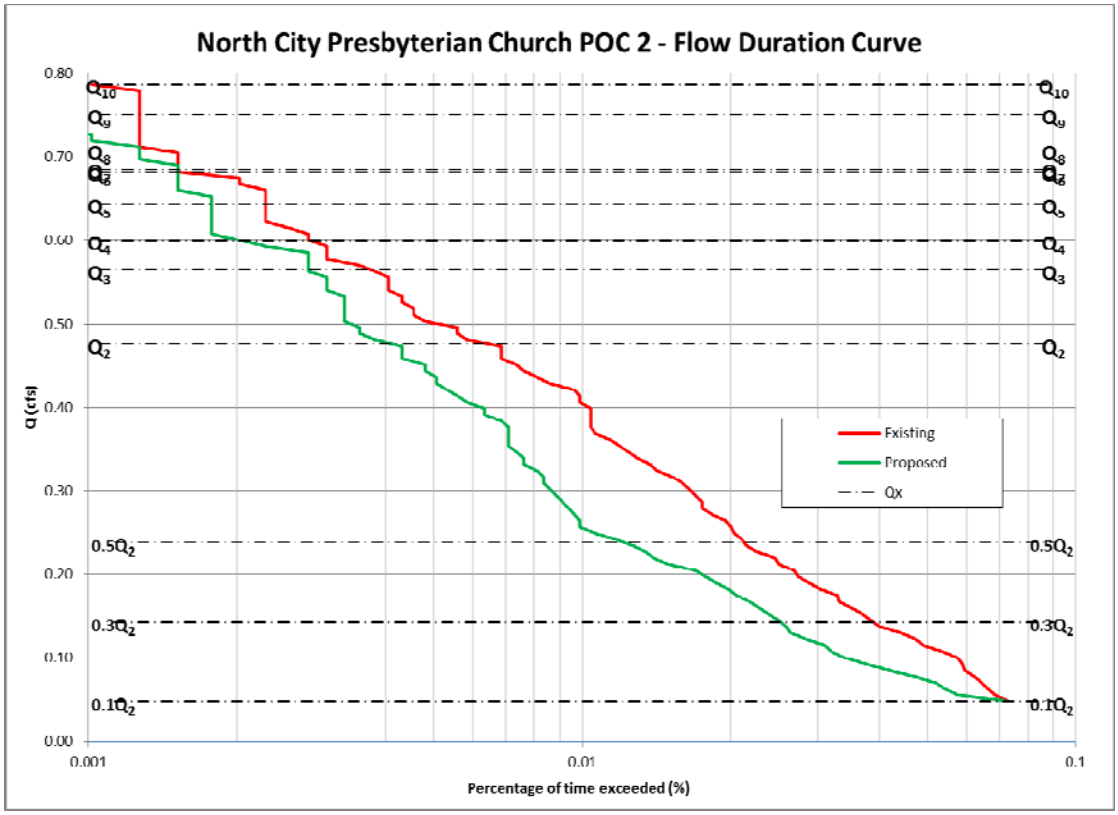


Figure 1a and 1b. Flow Duration Curve Comparison (logarithmic and normal "x" scale)



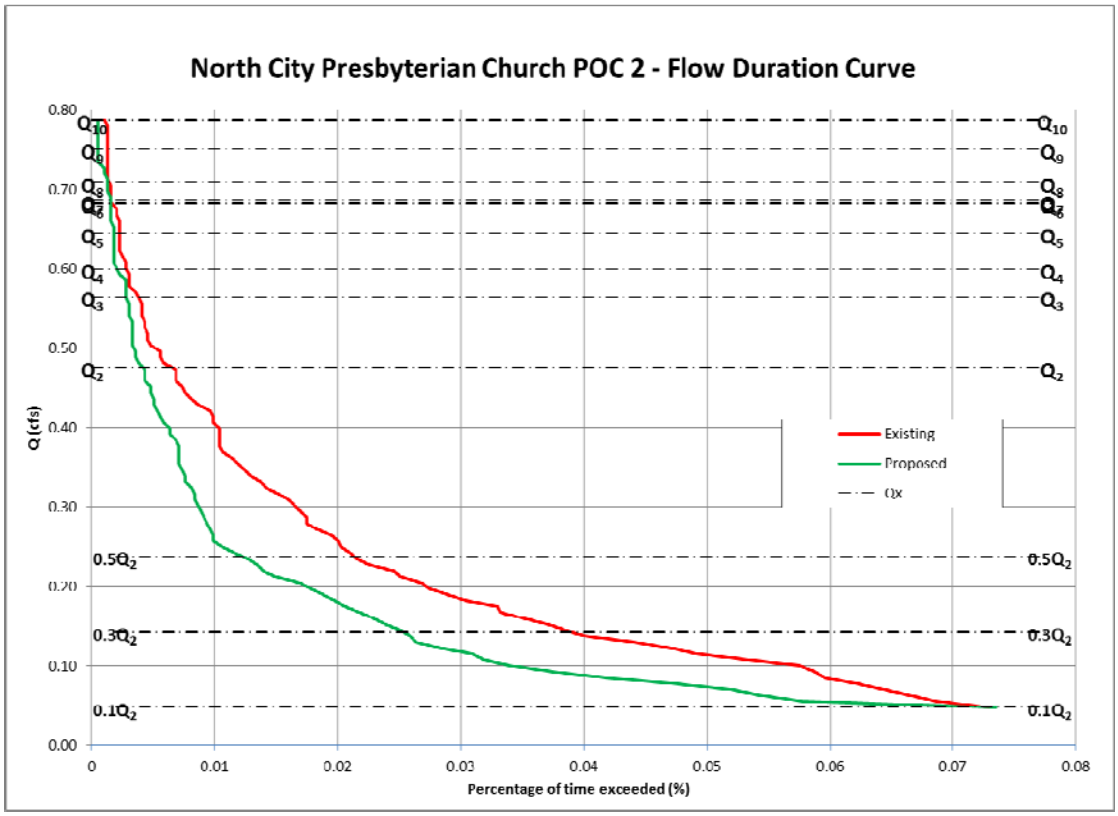


Figure 2a and 2b. Flow Duration Curve Comparison (logarithmic and normal "x" scale)

ATTACHMENT 1.

Q_2 to Q_{10} Comparison Table – POC 1

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
2-year	0.863	0.659	0.204
3-year	1.037	0.885	0.152
4-year	1.130	0.969	0.160
5-year	1.191	1.025	0.167
6-year	1.312	1.055	0.257
7-year	1.315	1.096	0.219
8-year	1.315	1.122	0.193
9-year	1.399	1.144	0.255
10-year	1.477	1.170	0.307

Q_2 to Q_{10} Comparison Table – POC 2

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
2-year	0.476	0.386	0.090
3-year	0.565	0.481	0.084
4-year	0.600	0.567	0.032
5-year	0.644	0.593	0.051
6-year	0.682	0.609	0.073
7-year	0.685	0.663	0.022
8-year	0.708	0.691	0.017
9-year	0.751	0.704	0.047
10-year	0.787	0.714	0.073

ATTACHMENT 2

FLOW DURATION CURVE ANALYSIS

1) Flow duration curve shall not exceed the existing conditions by more than 10%, neither in peak flow nor duration.

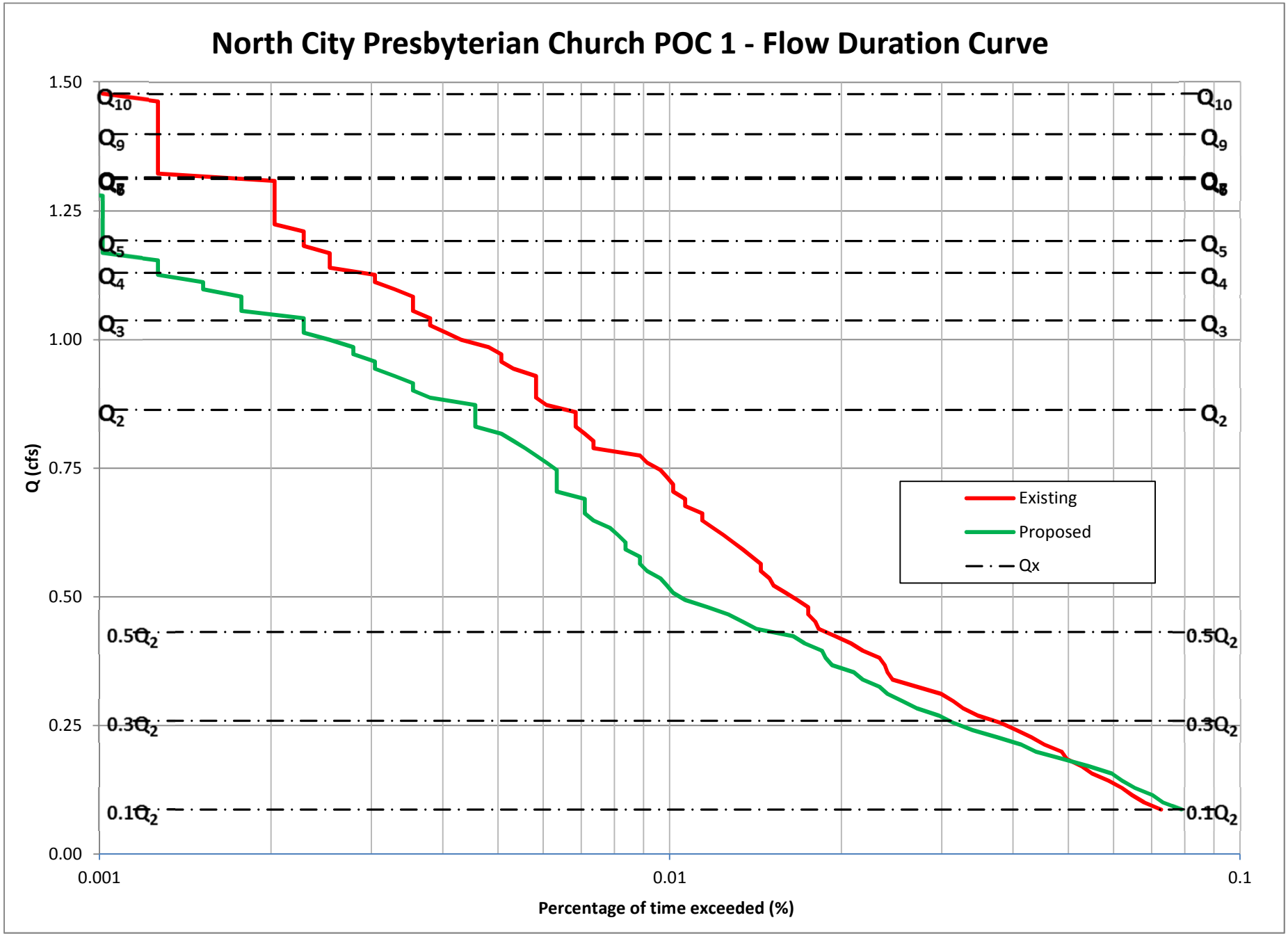
The figures on the following pages illustrate that the flow duration curve in post-development conditions after the proposed BMP is below the existing flow duration curve. The flow duration curve table following the curve shows that if the interval $0.10Q_2 – Q_{10}$ is divided in 100 sub-intervals, then a) the post development divided by pre-development durations are never larger than 110% (the permit allows up to 110%); and b) there are no more than 10 intervals in the range 101%-110% which would imply an excess over 10% of the length of the curve (the permit allows less than 10% of excesses measured as 101-110%).

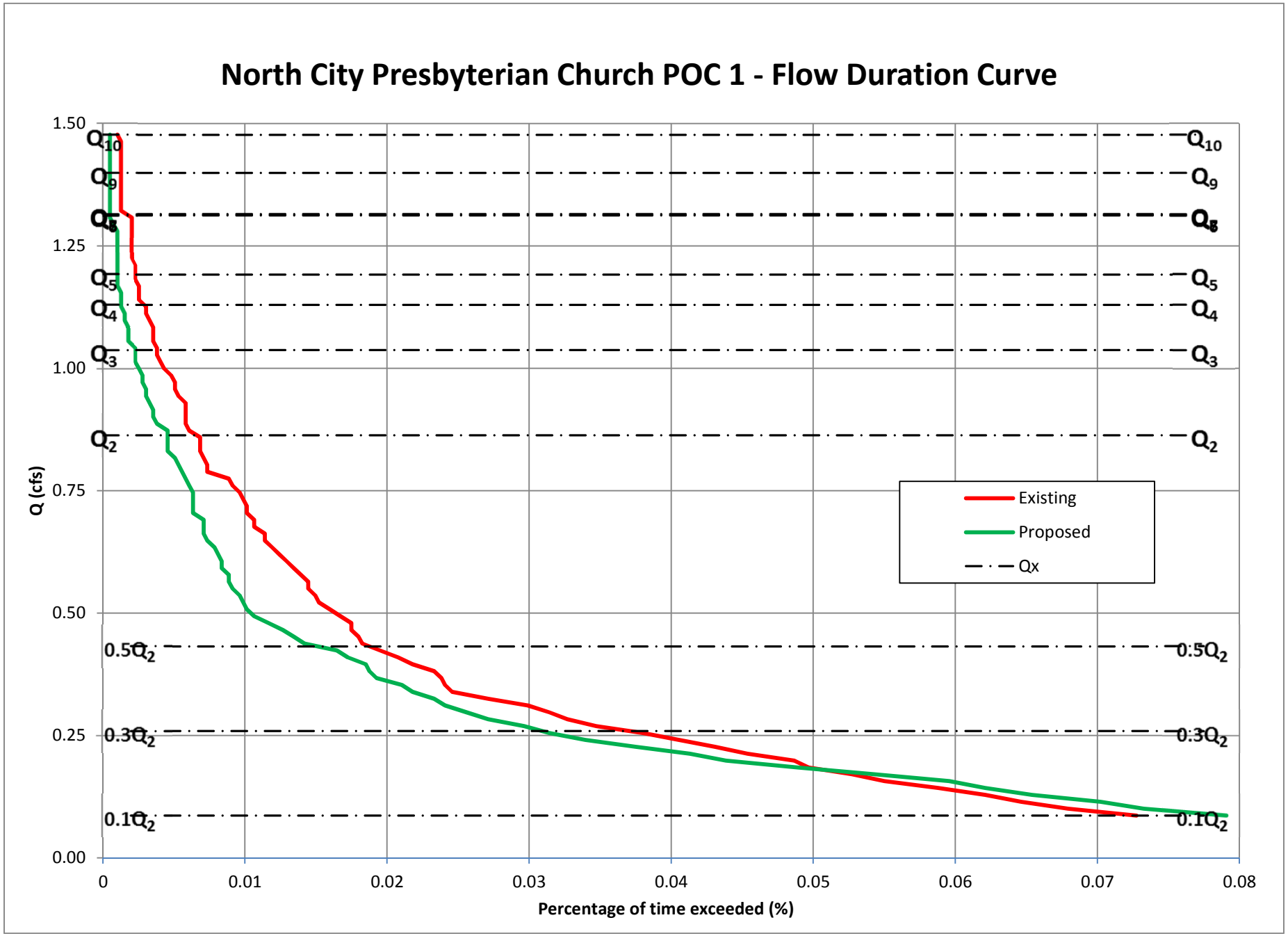
Consequently, the design passes the hydromodification test.

It is important to note that the flow duration curve can be expressed in the "x" axis as percentage of time, hours per year, total number of hours, or any other similar time variable. As those variables only differ by a multiplying constant, their plot in logarithmic scale is going to look exactly the same, and compliance can be observed regardless of the variable selected. However, in order to satisfy the City of San Diego HMP example, % of time exceeded is the variable of choice in the flow duration curve. The selection of a logarithmic scale in lieu of the normal scale is preferred, as differences between the pre-development and post-development curves can be seen more clearly in the entire range of analysis. Both graphics are presented just to prove the difference.

In terms of the "y" axis, the peak flow value is the variable of choice. As an additional analysis performed by REC, not only the range of analysis is clearly depicted (10% of Q_2 to Q_{10}) but also all intermediate flows are shown (Q_2, Q_3, Q_4, Q_5, Q_6, Q_7, Q_8 and Q_9) in order to demonstrate compliance at any range $Q_x – Q_{x+1}$. It must be pointed out that one of the limitations of both the SWMM and SDHM models is that the intermediate analysis is not performed (to obtain Q_i from i = 2 to 10). REC performed the analysis using the Cunnane Plotting position Method (the preferred method in the HMP permit) from the "n" largest independent peak flows obtained from the continuous time series.

The largest "n" peak flows are attached in this appendix, as well as the values of Q_i with a return period "i", from i=2 to 10. The Q_i values are also added into the flow-duration plot.


North City Presbyterian Church POC 1 - Flow Duration Curve
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Q (cfs)
0.001
0.01
0.1
Percentage of time exceeded (%)
Q10
Q9
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx


North City Presbyterian Church POC 1 - Flow Duration Curve
Q (cfs)
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
Percentage of time exceeded (%)
Q10
Q9
Q8
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx

Flow Duration Curve Data for North City Presbyterian Church POC 1 - Poway, CA

Q2 =	0.863	cfs	Fraction	10	%
Q10 =	1.48	cfs			
Step =	0.0140	cfs			
Count =	394487	hours			
	45.00	years			

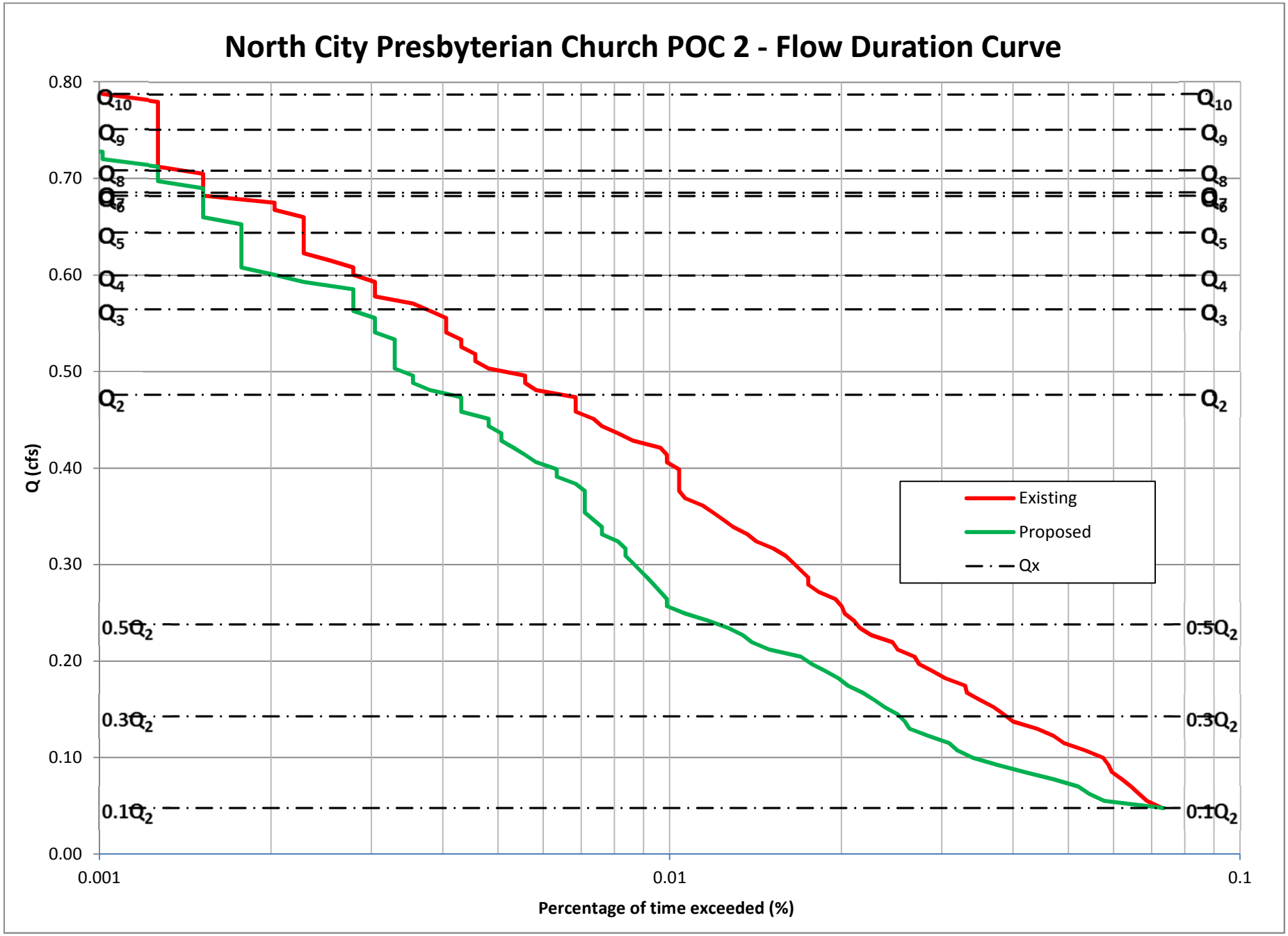
	Existing Condition			Detention Optimized			Pass or
Interval	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	Fail?
1	0.086	287	7.28E-02	312	7.91E-02	109%	Pass
2	0.100	268	6.79E-02	289	7.33E-02	108%	Pass
3	0.114	255	6.46E-02	277	7.02E-02	109%	Pass
4	0.128	245	6.21E-02	258	6.54E-02	105%	Pass
5	0.142	232	5.88E-02	245	6.21E-02	106%	Pass
6	0.157	217	5.50E-02	235	5.96E-02	108%	Pass
7	0.171	208	5.27E-02	214	5.42E-02	103%	Pass
8	0.185	196	4.97E-02	193	4.89E-02	98%	Pass
9	0.199	192	4.87E-02	173	4.39E-02	90%	Pass
10	0.213	179	4.54E-02	163	4.13E-02	91%	Pass
11	0.227	170	4.31E-02	148	3.75E-02	87%	Pass
12	0.241	160	4.06E-02	134	3.40E-02	84%	Pass
13	0.255	150	3.80E-02	124	3.14E-02	83%	Pass
14	0.269	137	3.47E-02	117	2.97E-02	85%	Pass
15	0.283	129	3.27E-02	107	2.71E-02	83%	Pass
16	0.297	124	3.14E-02	101	2.56E-02	81%	Pass
17	0.311	118	2.99E-02	95	2.41E-02	81%	Pass
18	0.325	107	2.71E-02	92	2.33E-02	86%	Pass
19	0.339	97	2.46E-02	86	2.18E-02	89%	Pass
20	0.353	95	2.41E-02	83	2.10E-02	87%	Pass
21	0.367	94	2.38E-02	76	1.93E-02	81%	Pass
22	0.381	92	2.33E-02	74	1.88E-02	80%	Pass
23	0.395	86	2.18E-02	73	1.85E-02	85%	Pass
24	0.409	82	2.08E-02	68	1.72E-02	83%	Pass
25	0.423	77	1.95E-02	65	1.65E-02	84%	Pass
26	0.437	72	1.83E-02	56	1.42E-02	78%	Pass
27	0.451	71	1.80E-02	53	1.34E-02	75%	Pass
28	0.466	69	1.75E-02	50	1.27E-02	72%	Pass
29	0.480	69	1.75E-02	46	1.17E-02	67%	Pass
30	0.494	66	1.67E-02	42	1.06E-02	64%	Pass
31	0.508	63	1.60E-02	40	1.01E-02	63%	Pass
32	0.522	60	1.52E-02	39	9.89E-03	65%	Pass
33	0.536	59	1.50E-02	38	9.63E-03	64%	Pass
34	0.550	57	1.44E-02	36	9.13E-03	63%	Pass
35	0.564	57	1.44E-02	35	8.87E-03	61%	Pass
36	0.578	55	1.39E-02	35	8.87E-03	64%	Pass

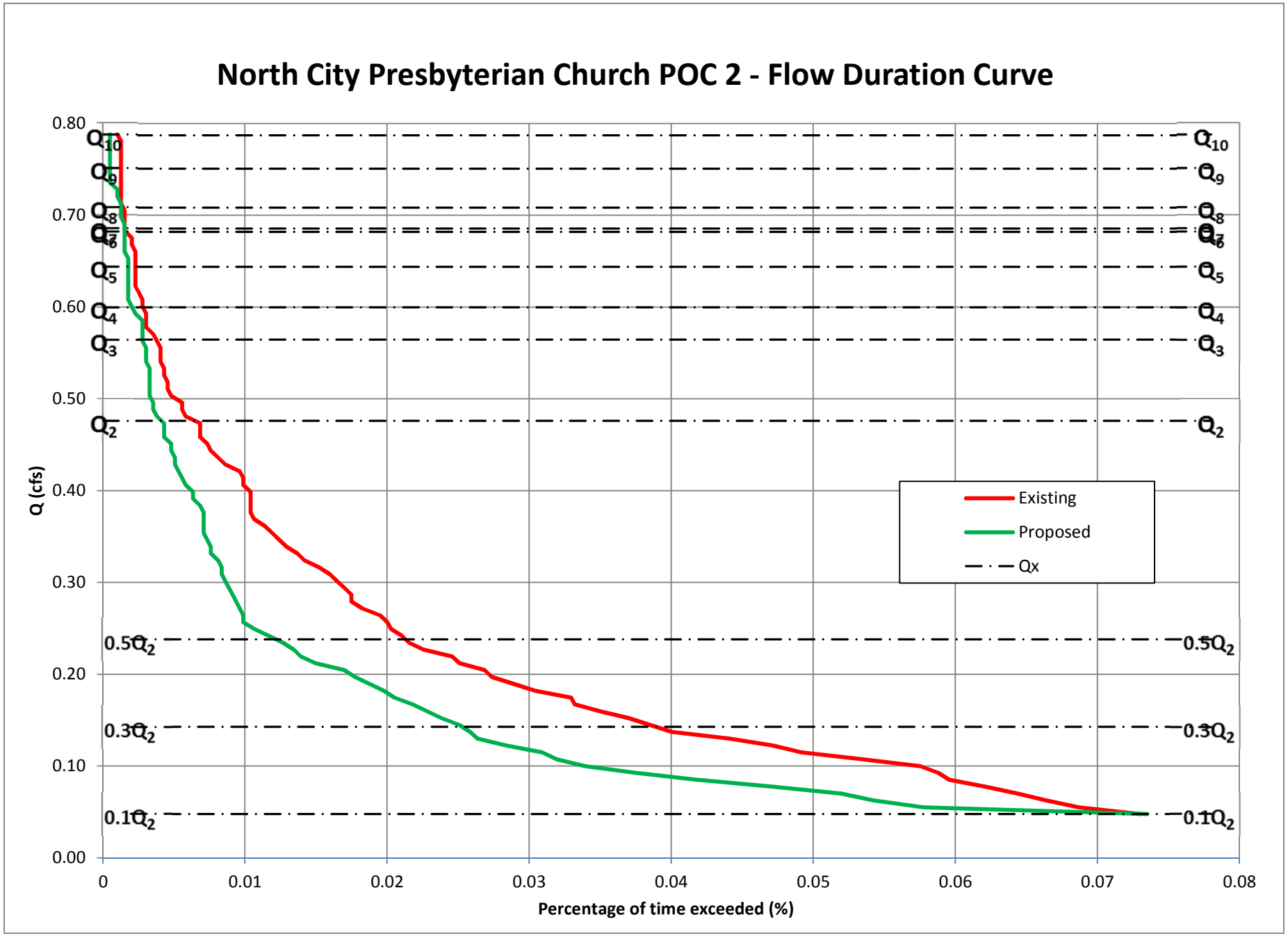
Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
37	0.592	53	1.34E-02	33	8.37E-03	62%	Pass
38	0.606	51	1.29E-02	33	8.37E-03	65%	Pass
39	0.620	49	1.24E-02	32	8.11E-03	65%	Pass
40	0.634	47	1.19E-02	31	7.86E-03	66%	Pass
41	0.648	45	1.14E-02	29	7.35E-03	64%	Pass
42	0.662	45	1.14E-02	28	7.10E-03	62%	Pass
43	0.676	42	1.06E-02	28	7.10E-03	67%	Pass
44	0.690	42	1.06E-02	28	7.10E-03	67%	Pass
45	0.704	40	1.01E-02	25	6.34E-03	63%	Pass
46	0.718	40	1.01E-02	25	6.34E-03	63%	Pass
47	0.732	39	9.89E-03	25	6.34E-03	64%	Pass
48	0.746	38	9.63E-03	25	6.34E-03	66%	Pass
49	0.760	36	9.13E-03	24	6.08E-03	67%	Pass
50	0.775	35	8.87E-03	23	5.83E-03	66%	Pass
51	0.789	29	7.35E-03	22	5.58E-03	76%	Pass
52	0.803	29	7.35E-03	21	5.32E-03	72%	Pass
53	0.817	28	7.10E-03	20	5.07E-03	71%	Pass
54	0.831	27	6.84E-03	18	4.56E-03	67%	Pass
55	0.845	27	6.84E-03	18	4.56E-03	67%	Pass
56	0.859	27	6.84E-03	18	4.56E-03	67%	Pass
57	0.873	24	6.08E-03	18	4.56E-03	75%	Pass
58	0.887	23	5.83E-03	15	3.80E-03	65%	Pass
59	0.901	23	5.83E-03	14	3.55E-03	61%	Pass
60	0.915	23	5.83E-03	14	3.55E-03	61%	Pass
61	0.929	23	5.83E-03	13	3.30E-03	57%	Pass
62	0.943	21	5.32E-03	12	3.04E-03	57%	Pass
63	0.957	20	5.07E-03	12	3.04E-03	60%	Pass
64	0.971	20	5.07E-03	11	2.79E-03	55%	Pass
65	0.985	19	4.82E-03	11	2.79E-03	58%	Pass
66	0.999	17	4.31E-03	10	2.53E-03	59%	Pass
67	1.013	16	4.06E-03	9	2.28E-03	56%	Pass
68	1.027	15	3.80E-03	9	2.28E-03	60%	Pass
69	1.041	15	3.80E-03	9	2.28E-03	60%	Pass
70	1.055	14	3.55E-03	7	1.77E-03	50%	Pass
71	1.069	14	3.55E-03	7	1.77E-03	50%	Pass
72	1.084	14	3.55E-03	7	1.77E-03	50%	Pass
73	1.098	13	3.30E-03	6	1.52E-03	46%	Pass
74	1.112	12	3.04E-03	6	1.52E-03	50%	Pass
75	1.126	12	3.04E-03	5	1.27E-03	42%	Pass
76	1.140	10	2.53E-03	5	1.27E-03	50%	Pass
77	1.154	10	2.53E-03	5	1.27E-03	50%	Pass
78	1.168	10	2.53E-03	4	1.01E-03	40%	Pass
79	1.182	9	2.28E-03	4	1.01E-03	44%	Pass
80	1.196	9	2.28E-03	4	1.01E-03	44%	Pass
81	1.210	9	2.28E-03	4	1.01E-03	44%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
82	1.224	8	2.03E-03	4	1.01E-03	50%	Pass
83	1.238	8	2.03E-03	4	1.01E-03	50%	Pass
84	1.252	8	2.03E-03	4	1.01E-03	50%	Pass
85	1.266	8	2.03E-03	4	1.01E-03	50%	Pass
86	1.280	8	2.03E-03	4	1.01E-03	50%	Pass
87	1.294	8	2.03E-03	3	7.60E-04	38%	Pass
88	1.308	8	2.03E-03	2	5.07E-04	25%	Pass
89	1.322	5	1.27E-03	2	5.07E-04	40%	Pass
90	1.336	5	1.27E-03	2	5.07E-04	40%	Pass
91	1.350	5	1.27E-03	2	5.07E-04	40%	Pass
92	1.364	5	1.27E-03	2	5.07E-04	40%	Pass
93	1.378	5	1.27E-03	2	5.07E-04	40%	Pass
94	1.393	5	1.27E-03	2	5.07E-04	40%	Pass
95	1.407	5	1.27E-03	2	5.07E-04	40%	Pass
96	1.421	5	1.27E-03	2	5.07E-04	40%	Pass
97	1.435	5	1.27E-03	2	5.07E-04	40%	Pass
98	1.449	5	1.27E-03	2	5.07E-04	40%	Pass
99	1.463	5	1.27E-03	2	5.07E-04	40%	Pass
100	1.477	4	1.01E-03	2	5.07E-04	50%	Pass

Peak Flows calculated with Cunnane Plotting Position

Return Period (years)	Pre-dev. Q (cfs)	Post-Dev. Q (cfs)	Reduction (cfs)
10	1.477	1.170	0.307
9	1.399	1.144	0.255
8	1.315	1.122	0.193
7	1.315	1.096	0.219
6	1.312	1.055	0.257
5	1.191	1.025	0.167
4	1.130	0.969	0.160
3	1.037	0.885	0.152
2	0.863	0.659	0.204


North City Presbyterian Church POC 2 - Flow Duration Curve
Q (cfs)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.001
0.01
0.1
Percentage of time exceeded (%)
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx


North City Presbyterian Church POC 2 - Flow Duration Curve
Q (cfs)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
Percentage of time exceeded (%)
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx

Flow Duration Curve Data for North City Presbyterian Church POC 2 - Poway, CA

Q2 =	0.476	cfs	Fraction	10	%
Q10 =	0.79	cfs			
Step =	0.0075	cfs			
Count =	394487	hours			
	45.00	years			

	Existing Condition			Detention Optimized			Pass or
Interval	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	Fail?
1	0.048	288	7.30E-02	290	7.35E-02	101%	Pass
2	0.055	271	6.87E-02	228	5.78E-02	84%	Pass
3	0.063	262	6.64E-02	214	5.42E-02	82%	Pass
4	0.070	254	6.44E-02	205	5.20E-02	81%	Pass
5	0.077	245	6.21E-02	186	4.71E-02	76%	Pass
6	0.085	235	5.96E-02	165	4.18E-02	70%	Pass
7	0.092	232	5.88E-02	148	3.75E-02	64%	Pass
8	0.100	227	5.75E-02	134	3.40E-02	59%	Pass
9	0.107	211	5.35E-02	126	3.19E-02	60%	Pass
10	0.115	194	4.92E-02	122	3.09E-02	63%	Pass
11	0.122	186	4.71E-02	112	2.84E-02	60%	Pass
12	0.130	174	4.41E-02	104	2.64E-02	60%	Pass
13	0.137	158	4.01E-02	102	2.59E-02	65%	Pass
14	0.145	152	3.85E-02	99	2.51E-02	65%	Pass
15	0.152	146	3.70E-02	94	2.38E-02	64%	Pass
16	0.160	138	3.50E-02	90	2.28E-02	65%	Pass
17	0.167	131	3.32E-02	86	2.18E-02	66%	Pass
18	0.175	130	3.30E-02	81	2.05E-02	62%	Pass
19	0.182	120	3.04E-02	78	1.98E-02	65%	Pass
20	0.190	114	2.89E-02	74	1.88E-02	65%	Pass
21	0.197	108	2.74E-02	70	1.77E-02	65%	Pass
22	0.204	106	2.69E-02	67	1.70E-02	63%	Pass
23	0.212	99	2.51E-02	59	1.50E-02	60%	Pass
24	0.219	97	2.46E-02	55	1.39E-02	57%	Pass
25	0.227	89	2.26E-02	53	1.34E-02	60%	Pass
26	0.234	85	2.15E-02	50	1.27E-02	59%	Pass
27	0.242	83	2.10E-02	46	1.17E-02	55%	Pass
28	0.249	80	2.03E-02	42	1.06E-02	53%	Pass
29	0.257	79	2.00E-02	39	9.89E-03	49%	Pass
30	0.264	77	1.95E-02	39	9.89E-03	51%	Pass
31	0.272	72	1.83E-02	38	9.63E-03	53%	Pass
32	0.279	69	1.75E-02	37	9.38E-03	54%	Pass
33	0.287	69	1.75E-02	36	9.13E-03	52%	Pass
34	0.294	67	1.70E-02	35	8.87E-03	52%	Pass
35	0.302	65	1.65E-02	34	8.62E-03	52%	Pass
36	0.309	63	1.60E-02	33	8.37E-03	52%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
37	0.317	60	1.52E-02	33	8.37E-03	55%	Pass
38	0.324	56	1.42E-02	32	8.11E-03	57%	Pass
39	0.331	54	1.37E-02	30	7.60E-03	56%	Pass
40	0.339	51	1.29E-02	30	7.60E-03	59%	Pass
41	0.346	49	1.24E-02	29	7.35E-03	59%	Pass
42	0.354	47	1.19E-02	28	7.10E-03	60%	Pass
43	0.361	45	1.14E-02	28	7.10E-03	62%	Pass
44	0.369	42	1.06E-02	28	7.10E-03	67%	Pass
45	0.376	41	1.04E-02	28	7.10E-03	68%	Pass
46	0.384	41	1.04E-02	27	6.84E-03	66%	Pass
47	0.391	41	1.04E-02	25	6.34E-03	61%	Pass
48	0.399	41	1.04E-02	25	6.34E-03	61%	Pass
49	0.406	39	9.89E-03	23	5.83E-03	59%	Pass
50	0.414	39	9.89E-03	22	5.58E-03	56%	Pass
51	0.421	38	9.63E-03	21	5.32E-03	55%	Pass
52	0.429	34	8.62E-03	20	5.07E-03	59%	Pass
53	0.436	32	8.11E-03	20	5.07E-03	63%	Pass
54	0.444	30	7.60E-03	19	4.82E-03	63%	Pass
55	0.451	29	7.35E-03	19	4.82E-03	66%	Pass
56	0.458	27	6.84E-03	17	4.31E-03	63%	Pass
57	0.466	27	6.84E-03	17	4.31E-03	63%	Pass
58	0.473	27	6.84E-03	17	4.31E-03	63%	Pass
59	0.481	23	5.83E-03	15	3.80E-03	65%	Pass
60	0.488	22	5.58E-03	14	3.55E-03	64%	Pass
61	0.496	22	5.58E-03	14	3.55E-03	64%	Pass
62	0.503	19	4.82E-03	13	3.30E-03	68%	Pass
63	0.511	18	4.56E-03	13	3.30E-03	72%	Pass
64	0.518	18	4.56E-03	13	3.30E-03	72%	Pass
65	0.526	17	4.31E-03	13	3.30E-03	76%	Pass
66	0.533	17	4.31E-03	13	3.30E-03	76%	Pass
67	0.541	16	4.06E-03	12	3.04E-03	75%	Pass
68	0.548	16	4.06E-03	12	3.04E-03	75%	Pass
69	0.556	16	4.06E-03	12	3.04E-03	75%	Pass
70	0.563	15	3.80E-03	11	2.79E-03	73%	Pass
71	0.571	14	3.55E-03	11	2.79E-03	79%	Pass
72	0.578	12	3.04E-03	11	2.79E-03	92%	Pass
73	0.585	12	3.04E-03	11	2.79E-03	92%	Pass
74	0.593	12	3.04E-03	9	2.28E-03	75%	Pass
75	0.600	11	2.79E-03	8	2.03E-03	73%	Pass
76	0.608	11	2.79E-03	7	1.77E-03	64%	Pass
77	0.615	10	2.53E-03	7	1.77E-03	70%	Pass
78	0.623	9	2.28E-03	7	1.77E-03	78%	Pass
79	0.630	9	2.28E-03	7	1.77E-03	78%	Pass
80	0.638	9	2.28E-03	7	1.77E-03	78%	Pass
81	0.645	9	2.28E-03	7	1.77E-03	78%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
82	0.653	9	2.28E-03	7	1.77E-03	78%	Pass
83	0.660	9	2.28E-03	6	1.52E-03	67%	Pass
84	0.668	8	2.03E-03	6	1.52E-03	75%	Pass
85	0.675	8	2.03E-03	6	1.52E-03	75%	Pass
86	0.683	6	1.52E-03	6	1.52E-03	100%	Pass
87	0.690	6	1.52E-03	6	1.52E-03	100%	Pass
88	0.698	6	1.52E-03	5	1.27E-03	83%	Pass
89	0.705	6	1.52E-03	5	1.27E-03	83%	Pass
90	0.712	5	1.27E-03	5	1.27E-03	100%	Pass
91	0.720	5	1.27E-03	4	1.01E-03	80%	Pass
92	0.727	5	1.27E-03	4	1.01E-03	80%	Pass
93	0.735	5	1.27E-03	2	5.07E-04	40%	Pass
94	0.742	5	1.27E-03	2	5.07E-04	40%	Pass
95	0.750	5	1.27E-03	2	5.07E-04	40%	Pass
96	0.757	5	1.27E-03	2	5.07E-04	40%	Pass
97	0.765	5	1.27E-03	2	5.07E-04	40%	Pass
98	0.772	5	1.27E-03	2	5.07E-04	40%	Pass
99	0.780	5	1.27E-03	2	5.07E-04	40%	Pass
100	0.787	4	1.01E-03	2	5.07E-04	50%	Pass

Peak Flows calculated with Cunnane Plotting Position

Return Period (years)	Pre-dev. Q (cfs)	Post-Dev. Q (cfs)	Reduction (cfs)
10	0.787	0.714	0.073
9	0.751	0.704	0.047
8	0.708	0.691	0.017
7	0.685	0.663	0.022
6	0.682	0.609	0.073
5	0.644	0.593	0.051
4	0.600	0.567	0.032
3	0.565	0.481	0.084
2	0.476	0.386	0.090

ATTACHMENT 3

List of the "n" Largest Peaks: Pre & Post-Developed Conditions

Basic Probabilistic Equation:

R = 1/P R: Return period (years).

P: Probability of a flow to be equaled or exceeded any given year (dimensionless).

Cunnane Equation:

$$P = \frac{i-0.4}{n+0.2}$$

Weibull Equation:

$$P = \frac{i}{n+1}$$

i: Position of the peak whose probability is desired (sorted from large to small)

n: number of years analyzed.

Explanation of Variables for the Tables in this Attachment

Peak: Refers to the peak flow at the date given, taken from the continuous simulation hourly results of the n year analyzed.

Posit: If all peaks are sorted from large to small, the position of the peak in a sorting analysis is included under the variable Posit.

Date: Date of the occurrence of the peak at the outlet from the continuous simulation

Note: all peaks are not annual maxima; instead they are defined as event maxima, with a threshold to separate peaks of at least 12 hours. In other words, any peak P in a time series is defined as a value where dP/dt = 0, and the peak is the largest value in 25 hours (12 hours before, the hour of occurrence and 12 hours after the occurrence, so it is in essence a daily peak).

List of Peak events and Determination of P2 and P10 (Pre-Development)
North City Presbyterian Church POC 1 - Poway

T (Year)	Cunnane (cfs)	Weibull (cfs)
10	**1.48**	**1.49**
9	**1.40**	**1.45**
8	**1.32**	**1.35**
7	**1.32**	**1.32**
6	**1.31**	**1.31**
5	**1.19**	**1.20**
4	**1.13**	**1.13**
3	**1.04**	**1.04**
2	**0.86**	**0.86**

Note:
Cunnane is the preferred method by the HMP permit.

Peaks (cfs)	Date	Posit	Period of Return (Years)	
			Weibull	Cunnane
0.589	12/6/1966	45	1.02	1.01
0.598	2/8/1993	44	1.05	1.04
0.602	4/14/2003	43	1.07	1.06
0.606	2/15/1992	42	1.10	1.09
0.62	1/9/1998	41	1.12	1.11
0.63	4/1/1982	40	1.15	1.14
0.673	12/5/1966	39	1.18	1.17
0.674	11/29/1982	38	1.21	1.20
0.703	2/21/2005	37	1.24	1.23
0.729	2/21/2000	36	1.28	1.27
0.753	1/18/1993	35	1.31	1.31
0.758	3/8/1974	34	1.35	1.35
0.764	2/17/1998	33	1.39	1.39
0.775	4/21/1988	32	1.44	1.43
0.776	1/4/1995	31	1.48	1.48
0.777	2/6/1976	30	1.53	1.53
0.777	9/10/1976	29	1.59	1.58
0.78	11/16/1972	28	1.64	1.64
0.78	2/16/1980	27	1.70	1.70
0.807	11/23/1965	26	1.77	1.77
0.86	2/27/2001	25	1.84	1.84
0.86	2/12/2003	24	1.92	1.92
0.863	3/17/1963	23	2.00	2.00
0.932	1/29/1980	22	2.09	2.09
0.935	4/18/1995	21	2.19	2.19
0.952	1/6/1979	20	2.30	2.31
0.985	3/1/1983	19	2.42	2.43
0.994	1/9/2005	18	2.56	2.57
1.003	2/8/1983	17	2.71	2.72
1.02	11/30/1982	16	2.88	2.90
1.053	1/7/1974	15	3.07	3.10
1.094	2/28/1970	14	3.29	3.32
1.101	11/12/1976	13	3.54	3.59
1.127	12/29/1978	12	3.83	3.90
1.136	12/18/1978	11	4.18	4.26
1.169	2/14/1998	10	4.60	4.71
1.211	11/5/1987	9	5.11	5.26
1.312	12/29/2004	8	5.75	5.95
1.315	2/3/1998	7	6.57	6.85
1.315	2/8/1998	6	7.67	8.07
1.474	3/17/1982	5	9.20	9.83
1.518	1/10/1978	4	11.50	12.56
1.593	1/25/1995	3	15.33	17.38
1.629	3/24/1983	2	23.00	28.25
1.824	2/21/1980	1	46.00	75.33

List of Peak events and Determination of P2 and P10 (Post-Development)
North City Presbyterian Church POC 1 - Poway

T (Year)	Cunnane (cfs)	Weibull (cfs)	Peaks (cfs)			Period of Return (Years)	
10	**1.17**	**1.20**		Date	Posit	Weibull	Cunnane
9	**1.14**	**1.16**	0.353	10/20/2004	45	1.02	1.01
8	**1.12**	**1.13**	0.36	1/11/1980	44	1.05	1.04
7	**1.10**	**1.10**	0.397	12/9/1965	43	1.07	1.06
6	**1.06**	**1.06**	0.406	3/1/1991	42	1.10	1.09
5	**1.02**	**1.03**	0.408	11/25/1985	41	1.12	1.11
4	**0.97**	**0.98**	0.418	1/29/1980	40	1.15	1.14
3	**0.89**	**0.89**	0.427	3/17/1982	39	1.18	1.17
2	**0.66**	**0.66**	0.437	1/15/1978	38	1.21	1.20
			0.445	11/30/1982	37	1.24	1.23
			0.447	1/11/2005	36	1.28	1.27
			0.45	1/16/1978	35	1.31	1.31
			0.467	1/8/1993	34	1.35	1.35
			0.48	2/22/2004	33	1.39	1.39
			0.488	1/14/1993	32	1.44	1.43
			0.497	4/8/1975	31	1.48	1.48
			0.504	1/9/2005	30	1.53	1.53
			0.511	2/15/1986	29	1.59	1.58
			0.522	3/1/1978	28	1.64	1.64
			0.58	10/27/2004	27	1.70	1.70
			0.61	2/8/1993	26	1.77	1.77
			0.642	2/8/1976	25	1.84	1.84
			0.646	3/2/1983	24	1.92	1.92
			0.659	4/1/1982	23	2.00	2.00
			0.691	2/16/1980	22	2.09	2.09
			0.703	1/25/1969	21	2.19	2.19
			0.752	3/5/1995	20	2.30	2.31
			0.799	12/5/1966	19	2.42	2.43
			0.816	2/21/2005	18	2.56	2.57
			0.829	11/22/1996	17	2.71	2.72
			0.884	12/4/1974	16	2.88	2.90
			0.886	4/18/1995	15	3.07	3.10
			0.895	1/4/1995	14	3.29	3.32
			0.921	11/23/1965	13	3.54	3.59
			0.959	2/3/1998	12	3.83	3.90
			0.995	3/1/1983	11	4.18	4.26
			1.005	12/18/1978	10	4.60	4.71
			1.042	12/29/1978	9	5.11	5.26
			1.053	2/8/1998	8	5.75	5.95
			1.092	12/29/2004	7	6.57	6.85
			1.124	1/6/1979	6	7.67	8.07
			1.162	1/29/1980	5	9.20	9.83
			1.281	11/12/1976	4	11.50	12.56
			1.3	2/28/1970	3	15.33	17.38
			1.507	1/10/1978	2	23.00	28.25
			1.597	2/21/1980	1	46.00	75.33

Note:
Cunnane is the preferred method by the HMP permit.

List of Peak events and Determination of P2 and P10 (Pre-Development)
North City Presbyterian Church POC 2 - Poway

T (Year)	Cunnane (cfs)	Weibull (cfs)
10	**0.79**	**0.79**
9	**0.75**	**0.78**
8	**0.71**	**0.73**
7	**0.69**	**0.69**
6	**0.68**	**0.68**
5	**0.64**	**0.65**
4	**0.60**	**0.60**
3	**0.56**	**0.57**
2	**0.48**	**0.48**

Note:
Cunnane is the preferred method by the HMP permit.

Peaks (cfs)	Date	Posit	Period of Return (Years)	
			Weibull	Cunnane
0.342	1/31/1996	45	1.02	1.01
0.345	12/4/1974	44	1.05	1.04
0.349	12/5/1966	43	1.07	1.06
0.352	2/6/1998	42	1.10	1.09
0.361	4/14/2003	41	1.12	1.11
0.364	2/8/1993	40	1.15	1.14
0.368	1/9/1998	39	1.18	1.17
0.372	2/21/2005	38	1.21	1.20
0.402	1/4/1995	37	1.24	1.23
0.405	2/16/1980	36	1.28	1.27
0.42	9/10/1976	35	1.31	1.31
0.423	2/21/2000	34	1.35	1.35
0.424	2/6/1976	33	1.39	1.39
0.425	11/23/1965	32	1.44	1.43
0.429	3/8/1974	31	1.48	1.48
0.431	2/17/1998	30	1.53	1.53
0.443	11/29/1982	29	1.59	1.58
0.447	1/18/1993	28	1.64	1.64
0.452	4/21/1988	27	1.70	1.70
0.454	11/16/1972	26	1.77	1.77
0.474	2/27/2001	25	1.84	1.84
0.474	2/12/2003	24	1.92	1.92
0.476	1/29/1980	23	2.00	2.00
0.486	3/17/1963	22	2.09	2.09
0.497	1/6/1979	21	2.19	2.19
0.503	3/1/1983	20	2.30	2.31
0.505	4/18/1995	19	2.42	2.43
0.52	1/9/2005	18	2.56	2.57
0.534	2/8/1983	17	2.71	2.72
0.56	1/7/1974	16	2.88	2.90
0.569	11/30/1982	15	3.07	3.10
0.571	2/28/1970	14	3.29	3.32
0.574	11/12/1976	13	3.54	3.59
0.594	12/18/1978	12	3.83	3.90
0.614	2/14/1998	11	4.18	4.26
0.621	12/29/1978	10	4.60	4.71
0.664	11/5/1987	9	5.11	5.26
0.682	2/3/1998	8	5.75	5.95
0.682	2/8/1998	7	6.57	6.85
0.71	12/29/2004	6	7.67	8.07
0.787	3/17/1982	5	9.20	9.83
0.79	1/10/1978	4	11.50	12.56
0.844	1/25/1995	3	15.33	17.38
0.867	3/24/1983	2	23.00	28.25
0.956	2/21/1980	1	46.00	75.33

List of Peak events and Determination of P2 and P10 (Post-Development)
North City Presbyterian Church POC 2 - Poway

T (Year)	Cunnane (cfs)	Weibull (cfs)	Peaks (cfs)			Period of Return (Years)	
10	**0.71**	**0.72**		Date	Posit	Weibull	Cunnane
9	**0.70**	**0.71**	0.187	3/1/1991	45	1.02	1.01
8	**0.69**	**0.70**	0.188	11/25/1985	44	1.05	1.04
7	**0.66**	**0.67**	0.202	1/29/1980	43	1.07	1.06
6	**0.61**	**0.62**	0.202	11/30/1982	42	1.10	1.09
5	**0.59**	**0.59**	0.204	1/7/1993	41	1.12	1.11
4	**0.57**	**0.57**	0.211	1/15/1978	40	1.15	1.14
3	**0.48**	**0.48**	0.215	1/16/1978	39	1.18	1.17
2	**0.39**	**0.39**	0.22	1/11/2005	38	1.21	1.20
			0.229	3/17/1982	37	1.24	1.23
			0.235	1/8/1993	36	1.28	1.27
			0.24	3/1/1978	35	1.31	1.31
			0.244	4/8/1975	34	1.35	1.35
			0.244	1/14/1993	33	1.39	1.39
			0.246	2/15/1986	32	1.44	1.43
			0.252	4/1/1982	31	1.48	1.48
			0.254	1/9/2005	30	1.53	1.53
			0.278	4/21/1988	29	1.59	1.58
			0.287	2/8/1993	28	1.64	1.64
			0.295	10/27/2004	27	1.70	1.70
			0.324	2/8/1976	26	1.77	1.77
			0.327	3/2/1983	25	1.84	1.84
			0.353	1/25/1969	24	1.92	1.92
			0.386	3/5/1995	23	2.00	2.00
			0.405	12/5/1966	22	2.09	2.09
			0.406	2/16/1980	21	2.19	2.19
			0.411	11/22/1996	20	2.30	2.31
			0.422	2/21/2005	19	2.42	2.43
			0.455	12/4/1974	18	2.56	2.57
			0.456	1/4/1995	17	2.71	2.72
			0.476	11/23/1965	16	2.88	2.90
			0.485	4/18/1995	15	3.07	3.10
			0.499	12/29/2004	14	3.29	3.32
			0.54	3/1/1983	13	3.54	3.59
			0.56	2/14/1998	12	3.83	3.90
			0.586	1/29/1980	11	4.18	4.26
			0.589	1/6/1979	10	4.60	4.71
			0.596	12/29/1978	9	5.11	5.26
			0.606	1/7/1974	8	5.75	5.95
			0.659	12/18/1978	7	6.57	6.85
			0.693	11/12/1976	6	7.67	8.07
			0.713	2/28/1970	5	9.20	9.83
			0.729	2/8/1998	4	11.50	12.56
			0.734	2/3/1998	3	15.33	17.38
			0.854	1/10/1978	2	23.00	28.25
			0.982	2/21/1980	1	46.00	75.33

Note:
Cunnane is the preferred method by the HMP permit.

ATTACHMENT 4

AREA VS ELEVATION

The storage provided by the LID BMP is entered into the LID Module within SWMM – please refer to Attachment 7 for further information.

Volume provided above the first surface outlet is accounted for in the basin module within SWMM. A stage-storage relationship is provided within this Module, a copy of which is located on the following pages.

DISCHARGE VS ELEVATION

The orifice has been selected to maximize its size while still restricting flows to conform with the required 10% of the Q2 event flow as mandated in the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. While REC acknowledges that the orifice is small, to increase the size of the outlet would impact the basin's ability to restrict flows beneath the HMP thresholds, thus preventing the BMP from conformance with HMP requirements.

In order to further reduce the risk of blockage of the orifices, regular maintenance of the riser and orifice must be performed to ensure potential blockages are minimized. A detail of the orifice and riser structure is provided in Attachment 5 of this memorandum.

A stage-discharge relationship is provided on the following pages for the surface outlet structure. The LID low flow orifice discharge relationship is addressed within the LID Module within SWMM – please refer to Attachment 7 for further information.

DISCHARGE EQUATIONS

1) Weir:

$$Q_W = C_W \cdot L \cdot H^{3/2} \qquad (1)$$

2) Slot:

As an orifice: $$Q_s = B_s \cdot h_s \cdot c_g \cdot \sqrt{2g\left(H - \frac{h_s}{2}\right)} \qquad (2.a)$$

As a weir: $$Q_s = C_W \cdot B_s \cdot H^{3/2} \qquad (2.b)$$

For H > h_s slot works as weir until orifice equation provides a smaller discharge. The elevation such that equation (2.a) = equation (2.b) is the elevation at which the behavior changes from weir to orifice.

3) Vertical Orifices

As an orifice: $$Q_o = 0.25 \cdot \pi D^2 \cdot c_g \cdot \sqrt{2g\left(H - \frac{D}{2}\right)} \qquad (3.a)$$

As a weir: Critical depth and geometric family of circular sector must be solved to determined Q as a function of H:

$$\frac{Q_O^2}{g} = \frac{A_{cr}^3}{T_{cr}}; \quad H = y_{cr} + \frac{A_{cr}}{2 \cdot T_{cr}}; \; T_{cr} = 2\sqrt{y_{cr}(D - y_{cr})}\,; \quad A_{cr} = \frac{D^2}{8}[\alpha_{cr} - sin(\alpha_{cr})]\,;$$

$$y_{cr} = \frac{D}{2}[1 - sin(0.5 \cdot \alpha_{cr})] \qquad (3.b.1, 3.b.2, 3.b.3, 3.b.4 \text{ and } 3.b.5)$$

There is a value of H (approximately H = 110% D) from which orifices no longer work as weirs as critical depth is not possible at the entrance of the orifice. This value of H is obtained equaling the discharge using critical equations and equations (3.b).

A mathematical model is prepared with the previous equations depending on the type o discharge.

The following are the variables used above:

Q_W, Q_s, Q_O = Discharge of weir, slot or orifice (cfs)

C_W, c_g : Coefficients of discharge of weir (typically 3.1) and orifice (0.61 to 0.62)

L, B_s, D, h_s : Length of weir, width of slot, diameter of orifice and height of slot, respectively; (ft)

H: Level of water in the pond over the invert of slot, weir or orifice (ft)

A_{cr}, T_{cr}, y_{cr}, α_{cr}: Critical variables for circular sector: area (sq-ft), top width (ft), critical depth (ft), and angle to the center, respectively.

Stage-Area for Biofiltration BMP Basin B

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	2557	**0**	**BIOFILTRATION (1)**
0.08	2608	215	
0.17	2660	435	
0.25	2712	659	
0.33	2764	887	
0.42	2817	1119	
0.50	2870	1356	**SURFACE DISCHARGE (2)**
0.58	2924	1598	
0.67	2978	1844	
0.75	3032	2094	
0.83	3087	2349	
0.92	3142	2608	
1.00	3198	2873	
1.08	3254	3141	
1.17	3310	3415	
1.25	3367	3693	
1.33	3425	3976	
1.42	3482	4264	
1.50	3540	4557	**EMERGENCY WEIR (3)**
1.58	3599	4854	
1.67	3658	5156	
1.75	3717	5464	
1.83	3776	5776	
1.92	3837	6093	
2.00	3897	6415	

SUB SURFACE STORAGE BMP B

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	2557	1534	**Amended Soil Base (0.3 voids)**
-3.50	2557	1534	**Gravel Base (0.4 voids)**
Gravel & Amended Soil	**TOTAL =**	3068	(ft^3)
Surface Total	**TOTAL =**	1356	(ft^3)
IMP	**TOTAL =**	**4425**	**(ft^3)**

(1): The area at any surface elevation corresponds to the area of gravel and amended soil (Bio-retention layer)
(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)
(3): This elevation corresponds to the top of the riser elevation.

Effective Depth:	6.36 in

Stage-Area for Biofiltration BMP Basin A

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	699	**0**	**BIOFILTRATION (1)**
0.08	741	60	
0.17	784	124	
0.25	828	191	
0.33	871	262	
0.42	915	336	
0.50	960	414	**SURFACE DISCHARGE (2)**
0.58	1005	496	
0.67	1050	582	
0.75	1096	671	
0.83	1142	764	
0.92	1188	861	
1.00	1235	962	
1.08	1282	1067	
1.17	1330	1176	
1.25	1378	1289	
1.33	1426	1406	
1.42	1475	1526	
1.50	1524	1651	**EMERGENCY WEIR (3)**
1.58	1574	1781	
1.67	1624	1914	
1.75	1674	2051	
1.83	1725	2193	
1.92	1776	2339	
2.00	1828	2489	

SUB SURFACE STORAGE BMP A

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	699	419	**Amended Soil Base (0.3 voids)**
-3.50	699	419	**Gravel Base (0.4 voids)**
Gravel & Amended Soil	**TOTAL =**	839	(ft^3)
Surface Total	**TOTAL =**	414	(ft^3)
IMP	**TOTAL =**	**1253**	**(ft^3)**

(1): The area at any surface elevation corresponds to the area of gravel and amended soil (Bio-retention layer)
(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)
(3): This elevation corresponds to the top of the riser elevation.

Effective Depth:	7.11 in

Outlet structure for Discharge of Basin B

*Note: h = head above the invert of the lowest surface discharge opening.

Discharge vs Elevation Table

Low orifice	0.750 "	Lower slot		Lower Weir			
Number of orif:	1	Number of slots:	1	Number of weirs:	0		
Cg-low:	0.61	Invert:	0.33 ft	Invert:	0.000 ft		
		B	8.00 ft	B:	0.000 ft		
Middle orifice	2.500 "	hslot	0.083 ft				
Number of orif:	0						
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir	
invert elev:	0 ft	Number of slots:	0	Number of weirs:	0	Invert:	1.000 ft
		Invert:	0.00 ft	Invert:	0.000 ft	W:	12.00 ft
		B:	0.00 ft	B:	0.00 ft		
		hslot	0.000 ft				

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.042	0.667	0.200	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0013
0.083	1.333	0.400	0.003	0.004	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0034
0.125	2.000	0.600	0.005	0.006	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0046
0.167	2.667	0.800	0.006	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0055
0.208	3.333	1.000	0.006	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0063
0.250	4.000	1.200	0.007	0.012	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0070
0.292	4.667	1.400	0.008	0.029	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0077
0.333	5.333	1.600	0.008	0.073	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0083
0.375	6.000	1.800	0.009	0.088	0.009	0.000	0.000	0.000	0.211	0.000	0.000	0.000	0.000	0.2197
0.417	6.667	2.000	0.009	0.093	0.009	0.000	0.000	0.000	0.597	0.000	0.000	0.000	0.000	0.6059
0.458	7.333	2.200	0.010	0.098	0.010	0.000	0.000	0.000	0.942	0.000	0.000	0.000	0.000	0.9519
0.500	8.000	2.400	0.010	0.103	0.010	0.000	0.000	0.000	1.154	0.000	0.000	0.000	0.000	1.1641
0.542	8.667	2.600	0.011	0.107	0.011	0.000	0.000	0.000	1.332	0.000	0.000	0.000	0.000	1.3430
0.583	9.333	2.800	0.011	0.112	0.011	0.000	0.000	0.000	1.490	0.000	0.000	0.000	0.000	1.5007
0.625	10.000	3.000	0.012	0.116	0.012	0.000	0.000	0.000	1.632	0.000	0.000	0.000	0.000	1.6433
0.667	10.667	3.200	0.012	0.120	0.012	0.000	0.000	0.000	1.762	0.000	0.000	0.000	0.000	1.7745
0.708	11.333	3.400	0.012	0.124	0.012	0.000	0.000	0.000	1.884	0.000	0.000	0.000	0.000	1.8965
0.750	12.000	3.600	0.013	0.127	0.013	0.000	0.000	0.000	1.998	0.000	0.000	0.000	0.000	2.0112
0.792	12.667	3.800	0.013	0.131	0.013	0.000	0.000	0.000	2.107	0.000	0.000	0.000	0.000	2.1197
0.833	13.333	4.000	0.013	0.135	0.013	0.000	0.000	0.000	2.209	0.000	0.000	0.000	0.000	2.2228
0.875	14.000	4.200	0.014	0.138	0.014	0.000	0.000	0.000	2.308	0.000	0.000	0.000	0.000	2.3214
0.917	14.667	4.400	0.014	0.141	0.014	0.000	0.000	0.000	2.402	0.000	0.000	0.000	0.000	2.4160
0.958	15.333	4.600	0.014	0.145	0.014	0.000	0.000	0.000	2.493	0.000	0.000	0.000	0.000	2.5070
1.000	16.000	4.800	0.015	0.148	0.015	0.000	0.000	0.000	2.580	0.000	0.000	0.000	0.000	2.5948
1.042	16.667	5.000	0.015	0.151	0.015	0.000	0.000	0.000	2.665	0.000	0.000	0.000	0.316	2.9961
1.083	17.333	5.200	0.015	0.154	0.015	0.000	0.000	0.000	2.747	0.000	0.000	0.000	0.895	3.6569
1.125	18.000	5.400	0.016	0.157	0.016	0.000	0.000	0.000	2.826	0.000	0.000	0.000	1.644	4.4860
1.167	18.667	5.600	0.016	0.160	0.016	0.000	0.000	0.000	2.904	0.000	0.000	0.000	2.531	5.4508
1.208	19.333	5.800	0.016	0.163	0.016	0.000	0.000	0.000	2.979	0.000	0.000	0.000	3.537	6.5328
1.250	20.000	6.000	0.017	0.166	0.017	0.000	0.000	0.000	3.053	0.000	0.000	0.000	4.650	7.7193
1.292	20.667	6.200	0.017	0.169	0.017	0.000	0.000	0.000	3.125	0.000	0.000	0.000	5.860	9.0010
1.333	21.333	6.400	0.017	0.171	0.017	0.000	0.000	0.000	3.195	0.000	0.000	0.000	7.159	10.3710
1.375	22.000	6.600	0.017	0.174	0.017	0.000	0.000	0.000	3.263	0.000	0.000	0.000	8.543	11.8235
1.417	22.667	6.800	0.018	0.177	0.018	0.000	0.000	0.000	3.331	0.000	0.000	0.000	10.005	13.3536
1.458	23.333	7.000	0.018	0.179	0.018	0.000	0.000	0.000	3.397	0.000	0.000	0.000	11.543	14.9575
1.500	24.000	7.200	0.018	0.182	0.018	0.000	0.000	0.000	3.461	0.000	0.000	0.000	13.152	16.6318

Outlet structure for Discharge of Basin A

*Note: h = head above the invert of the lowest surface discharge opening.

Discharge vs Elevation Table

Low orifice	0.750 "	Lower slot		Lower Weir			
Number of orif:	2	Number of slots:	0	Number of weirs:	0		
Cg-low:	0.61	Invert:	0.00 ft	Invert:	0.000 ft		
		B	0.00 ft	B:	0.000 ft		
Middle orifice	2.500 "	hslot	0.000 ft				
Number of orif:	0						
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir	
invert elev:	0 ft	Number of slots:	0	Number of weirs:	0	Invert:	1.000 ft
		Invert:	0.00 ft	Invert:	0.000 ft	W:	12.00 ft
		B:	0.00 ft	B:	0.00 ft		
		hslot	0.000 ft				

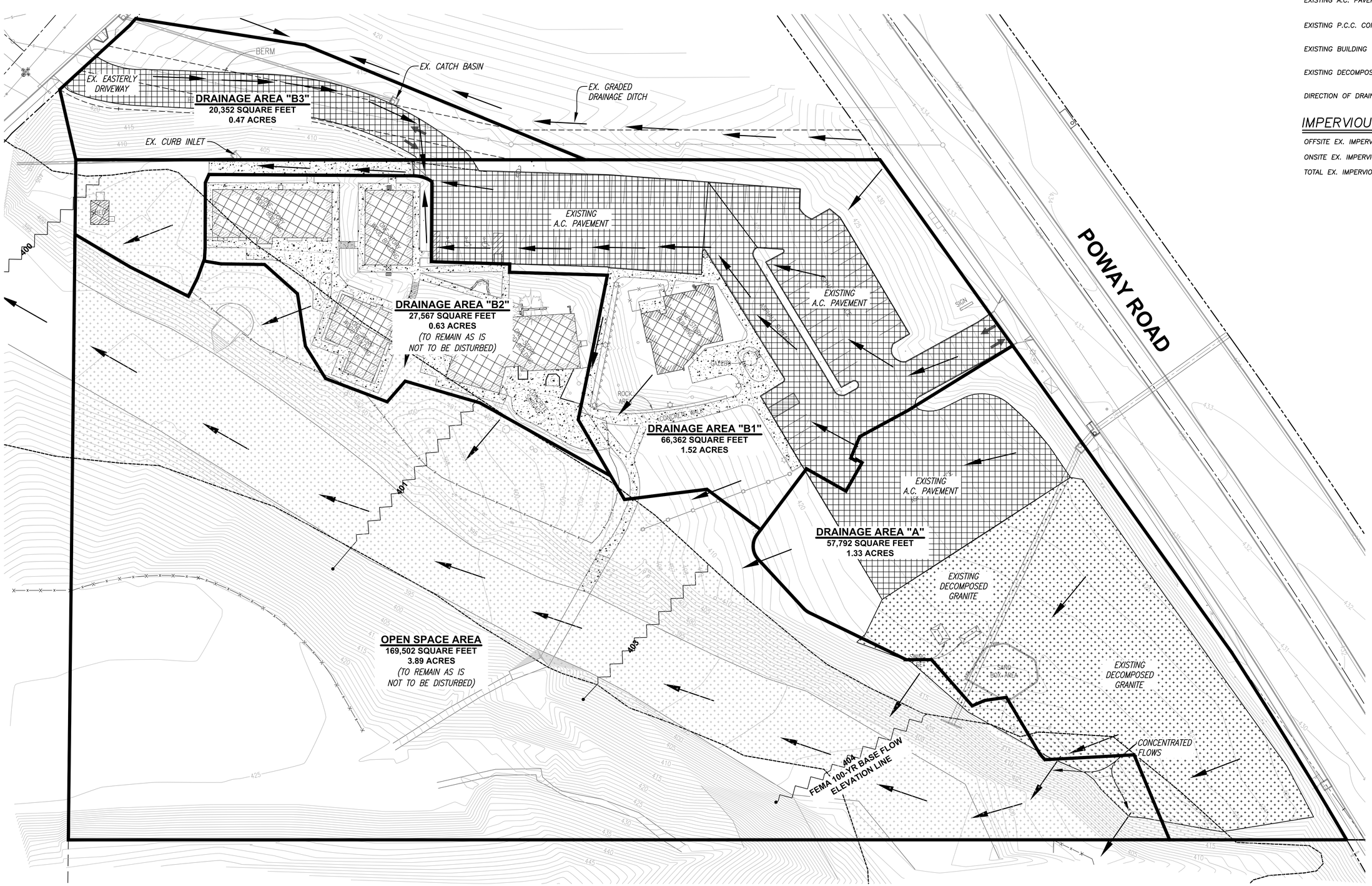
h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.042	0.667	0.200	0.003	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0025
0.083	1.333	0.400	0.007	0.008	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0069
0.125	2.000	0.600	0.009	0.012	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0092
0.167	2.667	0.800	0.011	0.014	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0111
0.208	3.333	1.000	0.013	0.014	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0126
0.250	4.000	1.200	0.014	0.023	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0140
0.292	4.667	1.400	0.015	0.057	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0153
0.333	5.333	1.600	0.017	0.147	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0165
0.375	6.000	1.800	0.018	0.176	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0176
0.417	6.667	2.000	0.019	0.186	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0186
0.458	7.333	2.200	0.020	0.196	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0196
0.500	8.000	2.400	0.021	0.206	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0206
0.542	8.667	2.600	0.021	0.215	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0215
0.583	9.333	2.800	0.022	0.223	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0223
0.625	10.000	3.000	0.023	0.231	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0231
0.667	10.667	3.200	0.024	0.239	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0239
0.708	11.333	3.400	0.025	0.247	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0247
0.750	12.000	3.600	0.025	0.255	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0255
0.792	12.667	3.800	0.026	0.262	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0262
0.833	13.333	4.000	0.027	0.269	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0269
0.875	14.000	4.200	0.028	0.276	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0276
0.917	14.667	4.400	0.028	0.283	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0283
0.958	15.333	4.600	0.029	0.289	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0289
1.000	16.000	4.800	0.030	0.296	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0296
1.042	16.667	5.000	0.030	0.302	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.316	0.3466
1.083	17.333	5.200	0.031	0.308	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.895	0.9257
1.125	18.000	5.400	0.031	0.314	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.644	1.6754
1.167	18.667	5.600	0.032	0.320	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.531	2.5631
1.208	19.333	5.800	0.033	0.326	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.537	3.5700
1.250	20.000	6.000	0.033	0.332	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.650	4.6832
1.292	20.667	6.200	0.034	0.337	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.860	5.8934
1.333	21.333	6.400	0.034	0.343	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.159	7.1934
1.375	22.000	6.600	0.035	0.348	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.543	8.5774
1.417	22.667	6.800	0.035	0.354	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.005	10.0406
1.458	23.333	7.000	0.036	0.359	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.543	11.5788
1.500	24.000	7.200	0.036	0.364	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.152	13.1886

ATTACHMENT 5

Pre & Post-Developed Maps, Project Plan and Detention

Section Sketches

NORTH CITY PRESBYTERIAN CHURCH
PRE DEVELOPMENT OVERVIEW MAP



LEGEND

- EXISTING CONTOURS
- DRAINAGE AREA
- FEMA MAP NO. 06073C1354–F 100 YR FLOODWAY BOUNDARY
- EXISTING A.C. PAVEMENT
- EXISTING P.C.C. CONCRETE
- EXISTING BUILDING
- EXISTING DECOMPOSED GRANITE
- DIRECTION OF DRAINAGE

IMPERVIOUS AREAS

OFFSITE EX. IMPERVIOUS AREA = 6,430 sf

ONSITE EX. IMPERVIOUS AREA = 69,884 sf

TOTAL EX. IMPERVIOUS AREA = 76,314 sf

PLOT DATE: 5/25/2016 3:47 PM S:\AutoCad Projects\2007\07-127 North City Church\07-127 Pre-Dev DAM.dwg

SPEAR & ASSOCIATES, INC. JOB NO. 07–127 NJD

NORTH CITY PRESBYTERIAN CHURCH
POST DEVELOPMENT BMP OVERVIEW MAP

30 15 0 30 60 90

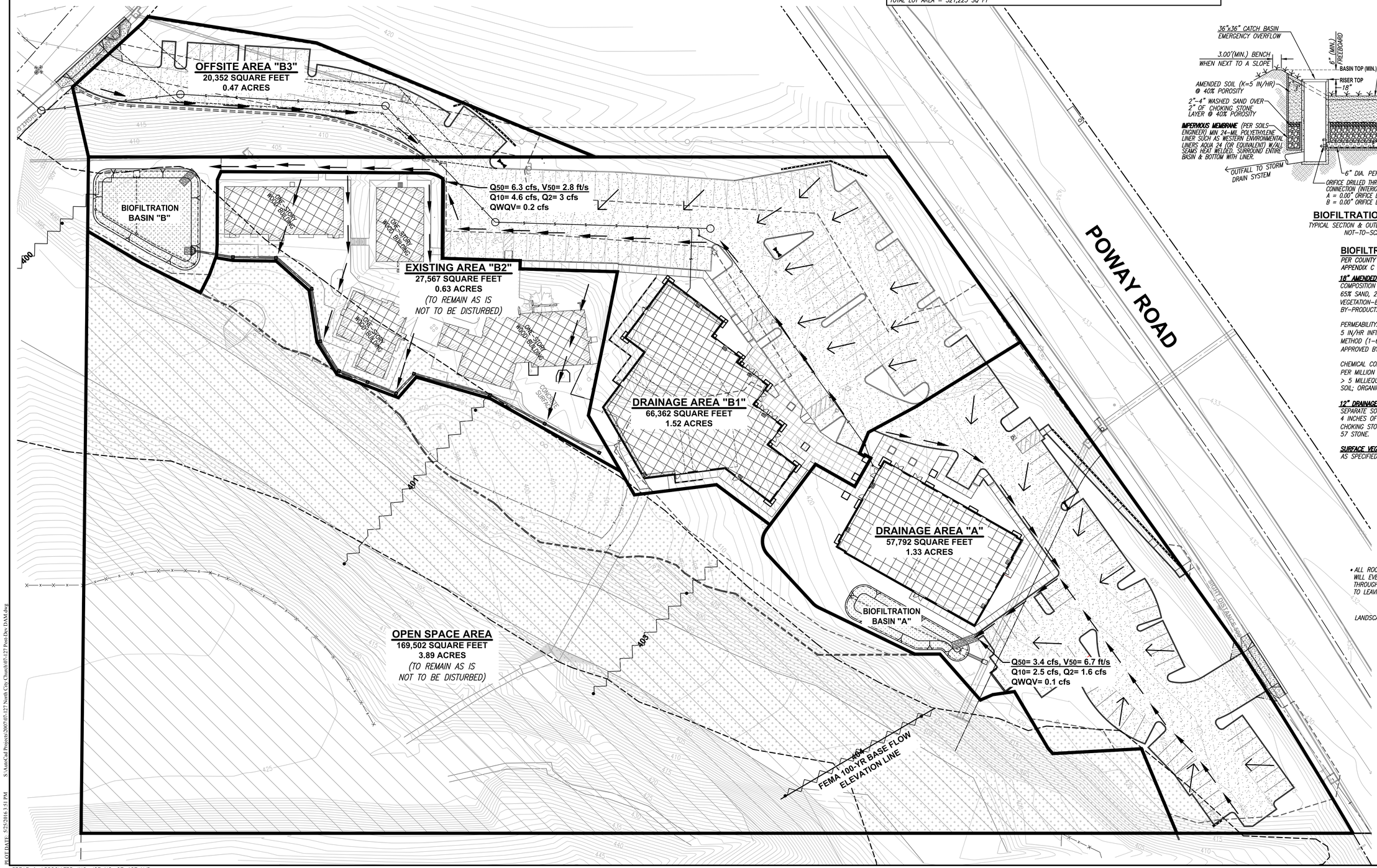
SCALE: 1" = 30'

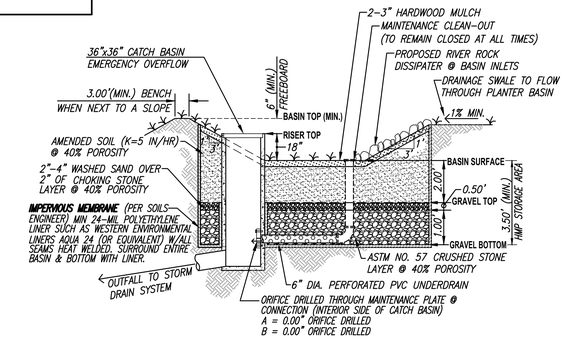
DRAINAGE AREA DMA BREAKDOWN

SYMBOL	DRAINAGE AREA SURFACE	SOIL TYPE	'A' (EAST SIDE)	'B1' (WEST SIDE)	EXISTING AREA 'B2' (TO REMAIN AS IS & UNDISTURBED)	OPEN SPACE (TO REMAIN AS IS & UNDISTURBED)	OFFSITE 'B3' PRIVATE ACCESS & PARKING EASEMENT
	BUILDING ROOFTOP	TYPE 'C'	7,310 SQ FT	10,498 SQ FT	9,392 SQ FT	0 SQ FT	0 SQ FT
	PARKING/DRIVE AISLE IMPERVIOUS AREA	TYPE 'C'	23,332 SQ FT	30,574 SQ FT	0 SQ FT	0 SQ FT	9,268 SQ FT
	HARDSCAPING/SIDEWALK	TYPE 'C'	3,162 SQ FT	6,290 SQ FT	8,548 SQ FT	0 SQ FT	0 SQ FT
	LANDSCAPING AREA	TYPE 'C'	23,988 SQ FT	19,000 SQ FT	9,627 SQ FT	169,502 SQ FT	11,084 SQ FT
	TOTAL =		57,792 SQ FT	66,362 SQ FT	27,567 SQ FT	169,502 SQ FT	20,352 SQ FT
	TOTAL LOT AREA = 321,223 SQ FT						

LEGEND

- EXISTING CONTOURS (380)
- DRAINAGE AREA
- FEMA MAP NO. 06073C1354–F 100 YR FLOODWAY BOUNDARY
- DIRECTION OF DRAINAGE
- SHEET FLOW





BIOFILTRATION BASIN

TYPICAL SECTION & OUTLET CONNECTION
NOT–TO–SCALE

BIOFILTRATION BASIN MEDIA

PER COUNTY OF SAN DIEGO 2014 LID HANDBOOK, APPENDIX C FACT SHEETS.

18" AMENDED SOIL LAYER

COMPOSITION AND TEXTURE:
65% SAND, 20% SANDY LOAM, & 15% COMPOST (FROM VEGETATION–BASED FEEDSTOCK). ANIMAL WASTES OR BY–PRODUCTS SHOULD NOT BE APPLIED.

PERMEABILITY:
5 IN/HR INFILTRATION RATE FOR THE FLOW–BASED SUSMP METHOD (1–6IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION).

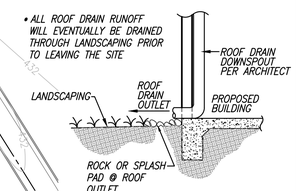
CHEMICAL COMPOSITION: TOTAL PHOSPHORUS < 15 PARTS PER MILLION (PPM); PH 6–8; CATION EXCHANGE CAPACITY > 5 MILLIEQUIVALENTS PER 100 GRAMS (MEQ/100 G) OF SOIL; ORGANIC MATTER CONTENT < 5 PERCENT BY WEIGHT.

12" DRAINAGE LAYER

SEPARATE SOIL MEDIA FROM UNDERDRAIN LAYER WITH 2 TO 4 INCHES OF WASHED SAND, FOLLOWED BY 2 INCHES OF CHOKING STONE (ASTM NO. 8) OVER 1.0–FOOT OF ASTM NO. 57 STONE.

SURFACE VEGETATION

AS SPECIFIED BY THE LANDSCAPE ARCHITECT PLANS.



ROOF DRAIN OUTLET

TYPICAL ROOF DRAIN OUTLET AT LANDSCAPED AREAS
NO SCALE

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SPEAR & ASSOCIATES, INC. JOB NO. 07–127 NJD

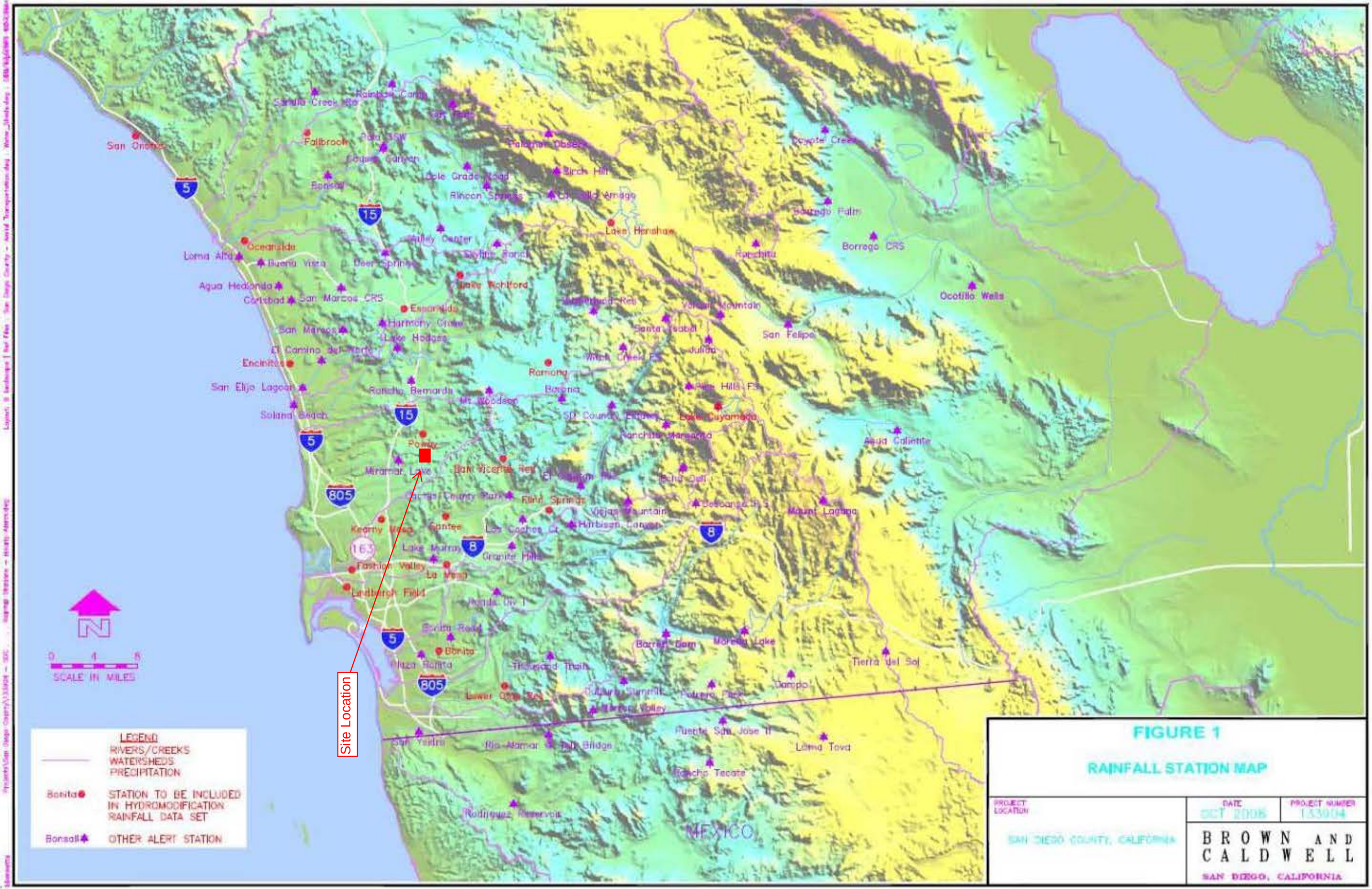
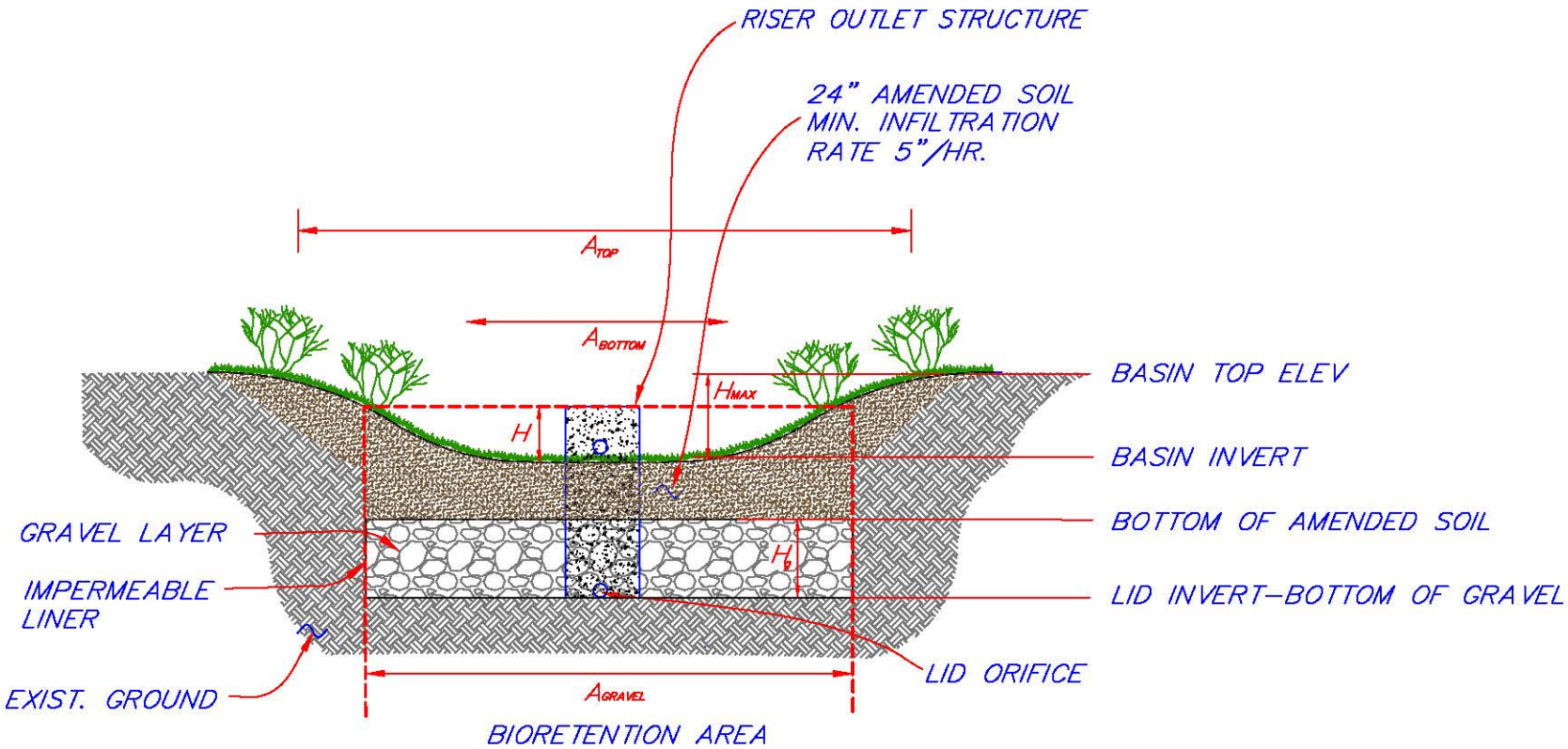


FIGURE 1

RAINFALL STATION MAP

PROJECT LOCATION	DATE	PROJECT NUMBER
SAN DIEGO COUNTY, CALIFORNIA	OCT 2005	153904

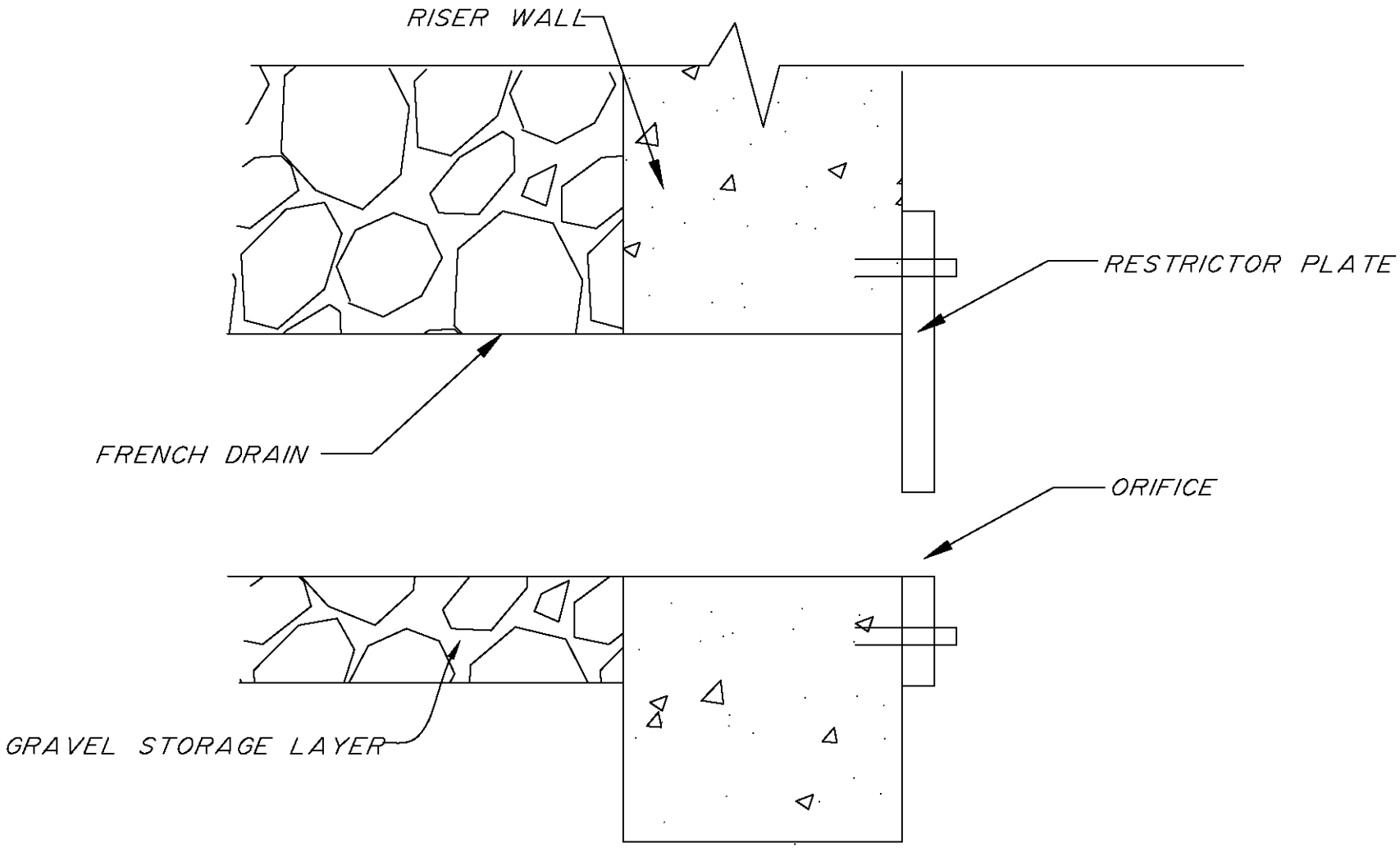
BROWN AND CALDWELL
SAN DIEGO, CALIFORNIA



BIOFILTRATION AREA CROSS SECTION

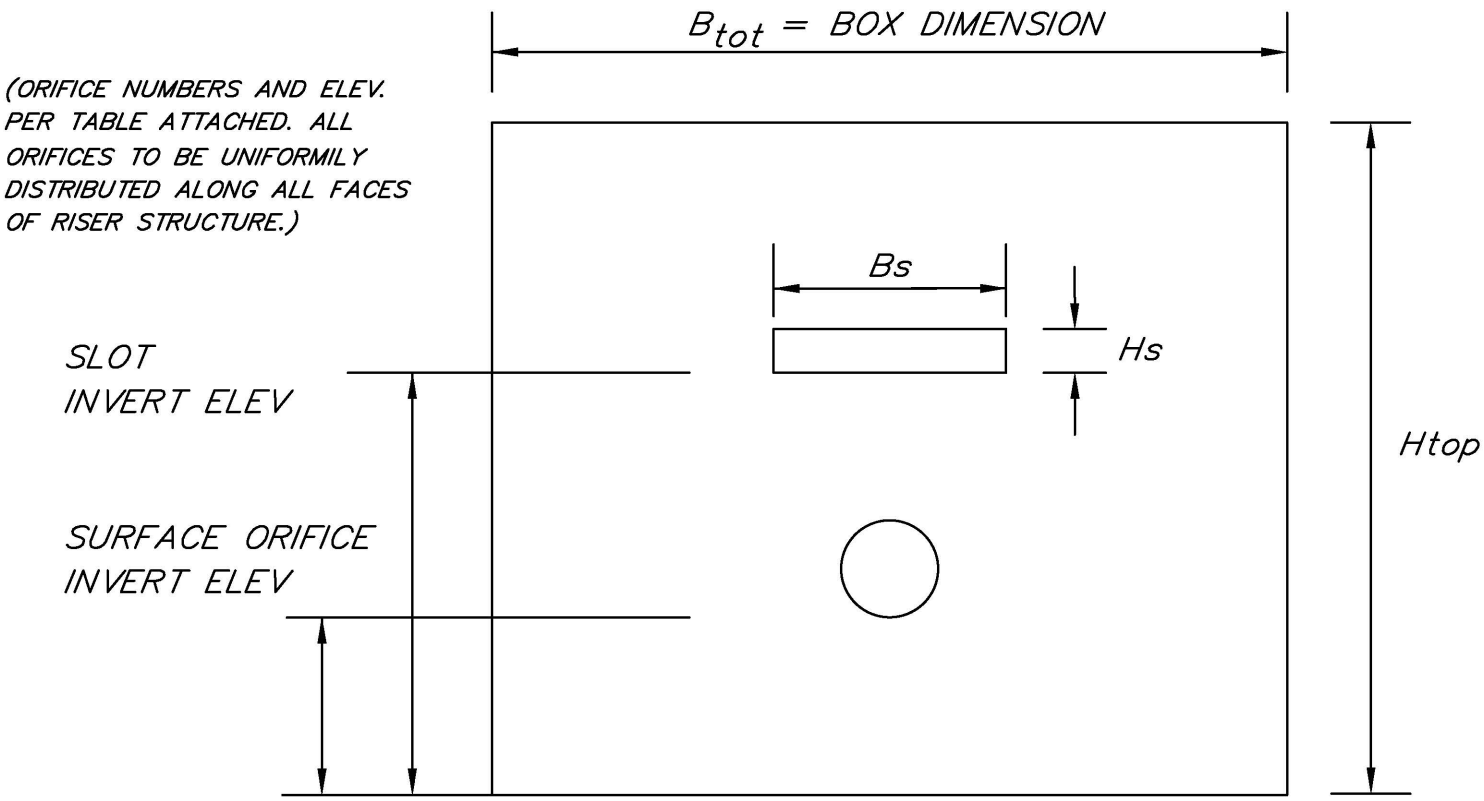
NOT TO SCALE

BMP	H(FT)	H_{MAX} (FT)	Hg (FT)	LID (INCHES)	A_{GRAVEL} (FT^2)	A_{BOTTOM} (FT^2)	A_{TOP} (FT^2)
B	1.50	2.00	1.5	1.50	2557	2557	3897
A	1.50	2.00	1.5	0.75	699	699	1828



LID ORIFICE DETAIL

NOT TO SCALE

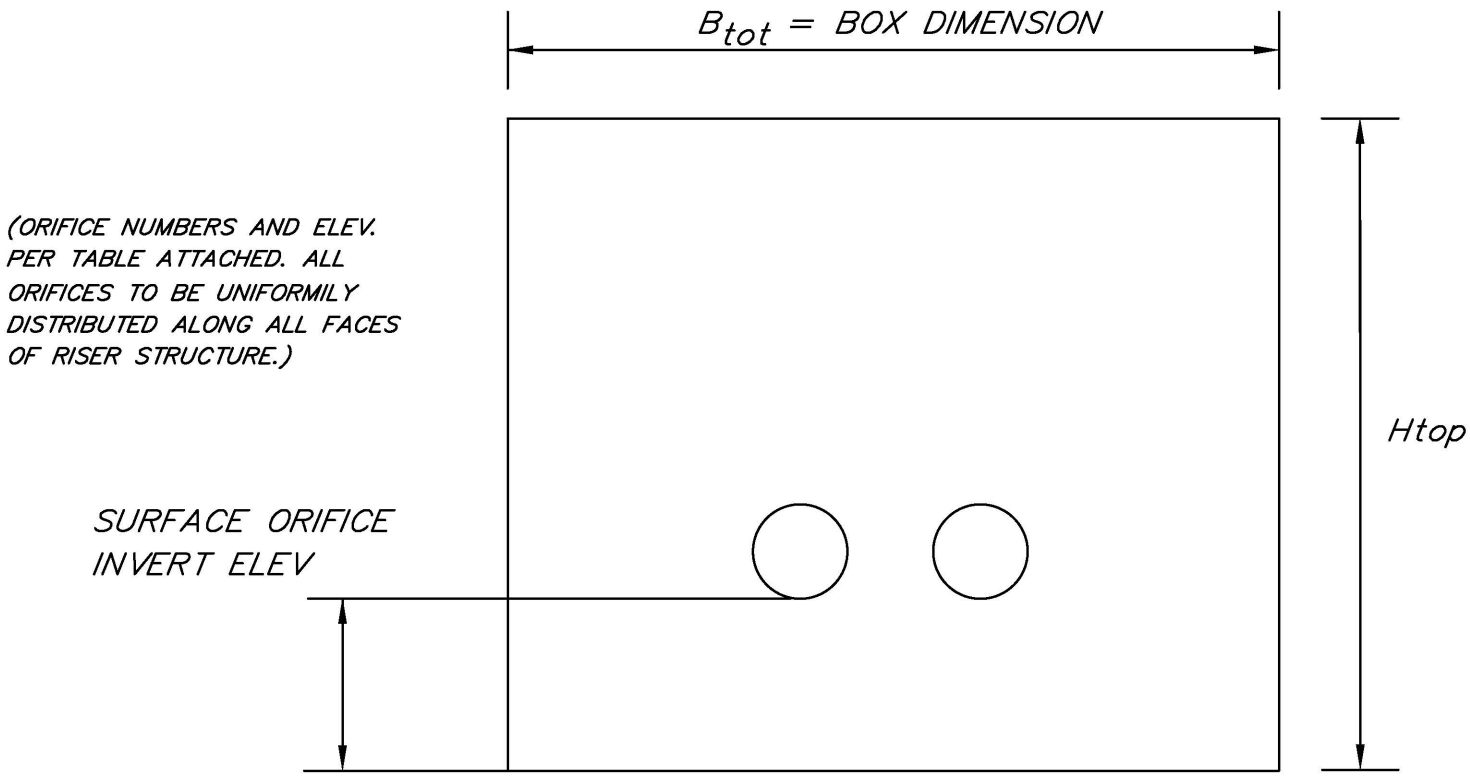


BIOFILTRATION OUTLET STRUCTURE DETAIL BASIN B - SECTION (TYP)

NOT TO SCALE

BASIN	SURFACE ORIFICE #/DIAM	SURFACE ORIFICE ELEV (FT)	SLOT Bs (FT)	SLOT Hs (FT)	SLOT ELEV (FT)	SPILLWAY Btot (FT)	SPILLWAY Htop (FT)
B	1-0.75"	0.5	8.00	0.083	0.83	12.0	1.50

NOTE: Btot IS THE INSIDE PERIMETER OF THE OUTLET STRUCTURE.



BIOFILTRATION OUTLET STRUCTURE DETAIL BASIN A- SECTION (TYP)

NOT TO SCALE

BASIN	SURFACE ORIFICE		SPILLWAY	
	#-DIAM	ELEV (FT)	Btot (FT)	Htop (FT)
A	2-0.75"	0.50	12.0	1.50

NOTE: Btot IS THE INSIDE PERIMETER OF THE OUTLET STRUCTURE.

ATTACHMENT 6

SWMM Input Data in Input Format (Existing & Proposed Models)

PRE_DEV

```
[TITLE]

[OPTIONS]
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           10/05/1962
START_TIME           00:00:00
REPORT_START_DATE    10/05/1962
REPORT_START_TIME    00:00:00
END_DATE             10/05/2007
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type       Parameters
;;---------- ----------
MONTHLY      0.06   0.08   0.11   0.16   0.18   0.21   0.21   0.20   0.16   0.12   0.08   0.06
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Poway            INTENSITY 1:00   1.0    TIMESERIES Poway

[SUBCATCHMENTS]
;;                                                   Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
DMA-1-1          Poway            POC-1            2.6235   0        476      3        0
DMA-1-2          Poway            POC-2            1.3267   0        482      3        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1-1          0.012      0.10       0.05       0.10       25         OUTLET
DMA-1-2          0.012      0.10       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
DMA-1-1          6          0.075      0.32
DMA-1-2          6          0.075      0.32

[OUTFALLS]
;;               Invert     Outfall    Stage/Table      Tide
;;Name           Elev.      Type       Time Series      Gate
;;-------------- ---------- ---------- ---------------- ----
POC-1            0          FREE                        NO
POC-2            0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
```

```
Poway            FILE "PowayRain.prn"

[REPORT]
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -482.569 8033.483 432.622 11300.683
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            -440.969           8181.992
POC-2            370.048            8202.966

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-1-1          -440.969           10552.119
DMA-1-2          391.022            10545.127

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Poway            39.759             11152.174
```

POST_DEV

```
[TITLE]

[OPTIONS]
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           10/05/1962
START_TIME           00:00:00
REPORT_START_DATE    10/05/1962
REPORT_START_TIME    00:00:00
END_DATE             10/05/2007
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type       Parameters
;;---------- ----------
MONTHLY      0.06   0.08   0.11   0.16   0.18   0.21   0.21   0.2    0.16   0.12   0.08   0.06
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Poway            INTENSITY 1:00   1.0    TIMESERIES Poway

[SUBCATCHMENTS]
;;                                                   Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
DMA-A            Poway            LID_A            1.31067  59.2     214      3        0
DMA_B            Poway            LID_B            2.56483  66.7     243      3        0
LID_A            Poway            DIV_A            0.016047 0.0      10       0        0
LID_B            Poway            DIV_B            0.058701 0.0      10       0        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-A            0.012      0.10       0.05       0.10       25         OUTLET
DMA_B            0.012      0.10       0.05       0.10       25         OUTLET
LID_A            0.012      0.10       0.05       0.10       25         OUTLET
LID_B            0.012      0.10       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
DMA-A            6          0.075      0.32
DMA_B            6          0.075      0.32
LID_A            6          0.075      0.32
LID_B            6          0.075      0.32

[LID_CONTROLS]
;;               Type/Layer Parameters
;;-------------- ---------- ----------
LID_A            BC
```

POST_DEV

```
LID_A            SURFACE    7.11       0.05       0.0        0.0        5
LID_A            SOIL       24         0.4        0.2        0.1        5          5          1.5
LID_A            STORAGE    18         0.67       0          0
LID_A            DRAIN      0.2679     0.5        0          6

LID_B            BC
LID_B            SURFACE    6.36       0.05       0.0        0.0        5
LID_B            SOIL       24         0.4        0.2        0.1        5          5          1.5
LID_B            STORAGE    18         0.67       0          0
LID_B            DRAIN      0.2930     0.5        0          6

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSatur  FromImprv  ToPerv     Report
File
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- -------
----
LID_A            LID_A            1       699        0          0          100        0
LID_B            LID_B            1       2557       0          0          100        0

[OUTFALLS]
;;               Invert     Outfall    Stage/Table      Tide
;;Name           Elev.      Type       Time Series      Gate
;;-------------- ---------- ---------- ---------------- ----
POC-2            0          FREE                        NO
POC-1            0          FREE                        NO

[DIVIDERS]
;;               Invert     Diverted         Divider
;;Name           Elev.      Link             Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DIV_A            0          BYPASS_A         CUTOFF     0.01819    0          0          0          0
DIV_B            0          BYPASS_B         CUTOFF     0.07115    0          0          0          0

[STORAGE]
;;               Invert   Max.     Init.    Storage    Curve                      Ponded   Evap.
;;Name           Elev.    Depth    Depth    Curve      Params                     Area     Frac.
Infiltration Parameters
;;-------------- -------- -------- -------- ---------- -------- -------- -------- -------- -------- ----
-------------------
BASIN_A          0        1.5      0        TABULAR    STORAGE_A                  1828     0
BASIN_B          0        1.5      0        TABULAR    STORAGE_B                  3897     0

[CONDUITS]
;;               Inlet            Outlet                      Manning    Inlet      Outlet     Init.
Max.
;;Name           Node             Node             Length     N          Offset     Offset     Flow
Flow
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ---------
- ----------
BYPASS_A         DIV_A            BASIN_A          10         0.01       0          0          0
0
BYPASS_B         DIV_B            BASIN_B          10         0.01       0          0          0
0
UDRAIN_B         DIV_B            POC-1            10         0.01       0          0          0
0
UDRAIN_A         DIV_A            POC-2            10         0.01       0          0          0
0

[OUTLETS]
;;               Inlet            Outlet           Outflow    Outlet          Qcoeff/
Flap
;;Name           Node             Node             Height     Type            QTable           Qexpon
Gate
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------
- ----
OUTLET_A         BASIN_A          POC-2            0          TABULAR/HEAD    OUT_A
NO
OUTLET_B         BASIN_B          POC-1            0          TABULAR/HEAD    OUT_B
NO

[XSECTIONS]
```

POST_DEV

```
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels
;;-------------- ------------ ---------------- ---------- ---------- ---------- ----------
BYPASS_A         DUMMY        0                0          0          0          1
BYPASS_B         DUMMY        0                0          0          0          1
UDRAIN_B         DUMMY        0                0          0          0          1
UDRAIN_A         DUMMY        0                0          0          0          1

[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate
;;-------------- ---------- ---------- ---------- ----------

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
OUT_A            Rating     0.000      0.0000
OUT_A                       0.042      0.0025
OUT_A                       0.083      0.0069
OUT_A                       0.125      0.0092
OUT_A                       0.167      0.0111
OUT_A                       0.208      0.0126
OUT_A                       0.250      0.0140
OUT_A                       0.292      0.0153
OUT_A                       0.333      0.0165
OUT_A                       0.375      0.0176
OUT_A                       0.417      0.0186
OUT_A                       0.458      0.0196
OUT_A                       0.500      0.0206
OUT_A                       0.542      0.0215
OUT_A                       0.583      0.0223
OUT_A                       0.625      0.0231
OUT_A                       0.667      0.0239
OUT_A                       0.708      0.0247
OUT_A                       0.750      0.0255
OUT_A                       0.792      0.0262
OUT_A                       0.833      0.0269
OUT_A                       0.875      0.0276
OUT_A                       0.917      0.0283
OUT_A                       0.958      0.0289
OUT_A                       1.000      0.0296
OUT_A                       1.042      0.3466
OUT_A                       1.083      0.9257
OUT_A                       1.125      1.6754
OUT_A                       1.167      2.5631
OUT_A                       1.208      3.5700
OUT_A                       1.250      4.6832
OUT_A                       1.292      5.8934
OUT_A                       1.333      7.1934
OUT_A                       1.375      8.5774
OUT_A                       1.417      10.0406
OUT_A                       1.458      11.5788
OUT_A                       1.500      13.1886

OUT_B            Rating     0.000      0.000
OUT_B                       0.042      0.001
OUT_B                       0.083      0.003
OUT_B                       0.125      0.005
OUT_B                       0.167      0.006
OUT_B                       0.208      0.006
OUT_B                       0.250      0.007
OUT_B                       0.292      0.008
OUT_B                       0.333      0.008
OUT_B                       0.375      0.220
OUT_B                       0.417      0.606
OUT_B                       0.458      0.952
OUT_B                       0.500      1.164
OUT_B                       0.542      1.343
OUT_B                       0.583      1.501
OUT_B                       0.625      1.643
OUT_B                       0.667      1.774
OUT_B                       0.708      1.897
OUT_B                       0.750      2.011
```

```
OUT_B                       0.792      2.120
OUT_B                       0.833      2.223
OUT_B                       0.875      2.321
OUT_B                       0.917      2.416
OUT_B                       0.958      2.507
OUT_B                       1.000      2.595
OUT_B                       1.042      2.996
OUT_B                       1.083      3.657
OUT_B                       1.125      4.486
OUT_B                       1.167      5.451
OUT_B                       1.208      6.533
OUT_B                       1.250      7.719
OUT_B                       1.292      9.001
OUT_B                       1.333      10.371
OUT_B                       1.375      11.823
OUT_B                       1.417      13.354
OUT_B                       1.458      14.958
OUT_B                       1.500      16.632

STORAGE_A        Storage    0.00       960
STORAGE_A                   0.08       1005
STORAGE_A                   0.17       1050
STORAGE_A                   0.25       1096
STORAGE_A                   0.33       1142
STORAGE_A                   0.42       1188
STORAGE_A                   0.50       1235
STORAGE_A                   0.58       1282
STORAGE_A                   0.67       1330
STORAGE_A                   0.75       1378
STORAGE_A                   0.83       1426
STORAGE_A                   0.92       1475
STORAGE_A                   1.00       1524
STORAGE_A                   1.08       1574
STORAGE_A                   1.17       1624
STORAGE_A                   1.25       1674
STORAGE_A                   1.33       1725
STORAGE_A                   1.42       1776
STORAGE_A                   1.50       1828

STORAGE_B        Storage    0.00       2870
STORAGE_B                   0.08       2924
STORAGE_B                   0.17       2978
STORAGE_B                   0.25       3032
STORAGE_B                   0.33       3087
STORAGE_B                   0.42       3142
STORAGE_B                   0.50       3198
STORAGE_B                   0.58       3254
STORAGE_B                   0.67       3310
STORAGE_B                   0.75       3367
STORAGE_B                   0.83       3425
STORAGE_B                   0.92       3482
STORAGE_B                   1.00       3540
STORAGE_B                   1.08       3599
STORAGE_B                   1.17       3658
STORAGE_B                   1.25       3717
STORAGE_B                   1.33       3776
STORAGE_B                   1.42       3837
STORAGE_B                   1.50       3897

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Poway            FILE "PowayRain.prn"

[REPORT]
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL
```

POST_DEV

```
[TAGS]

[MAP]
DIMENSIONS -3625.732 7210.305 948.263 11290.394
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-2            -1021.257          7395.764
POC-1            -1563.237          7405.525
DIV_A            -1021.257          9146.822
DIV_B            -1558.357          9162.501
BASIN_A          740.354            9147.859
BASIN_B          -3417.823          9162.501

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-A            -1021.266          10845.763
DMA_B            -1602.281          10865.792
LID_A            -1021.266          9734.110
LID_B            -1572.998          9743.279

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Poway            -1299.691          11104.936
```

ATTACHMENT 7

EPA SWMM FIGURES AND EXPLANATIONS

Per the attached, the reader can see the screens associated with the EPA-SWMM Model in both pre-development and post-development conditions. Each portion, i.e., sub-catchments, outfalls, storage units, weir as a discharge, and outfalls (point of compliance), are also shown.

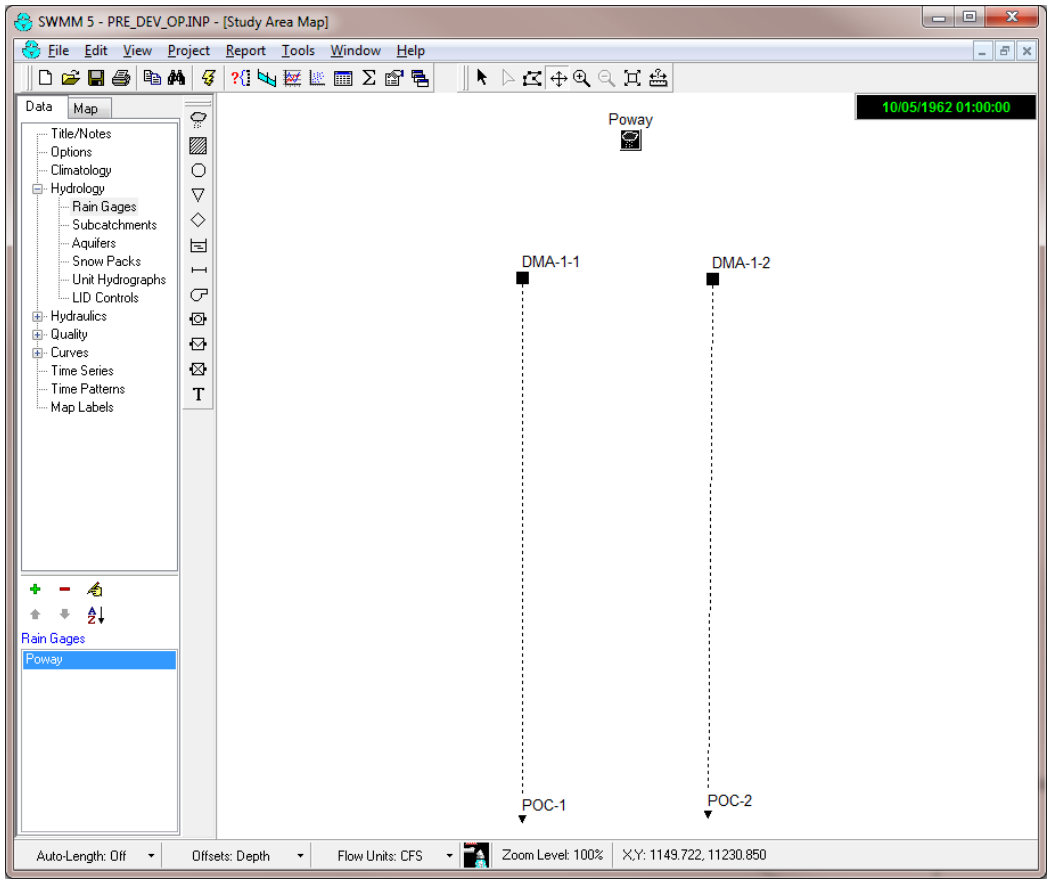
Variables for modeling are associated with typical recommended values by the EPA-SWMM model, typical values found in technical literature (such as Maidment's Handbook of Hydrology). Recommended values for the SWMM model have been attained from the interim Orange County criteria established for their SWMM calibration. Currently, no recommended values have been established by the San Diego County HMP Permit for the SWMM Model.

Soil characteristics of the existing soils were determined from the NRCS Web Soil Survey (located in Attachment 8 of this report).

Some values incorporated within the SWMM model have been determined from the professional experience of REC using conservative assumptions that have a tendency to increase the size of the needed BMP and also generate a long-term runoff as a percentage of rainfall similar to those measured in gage stations in Southern California by the USGS.

A Technical document prepared by Tory R Walker Engineering for the Cities of San Marcos, Oceanside and Vista (Reference [1]) can also be consulted for additional information regarding typical values for SWMM parameters.

PRE-DEVELOPED CONDITION



Outfall POC-1

Property	Value
Name	POC-1
X-Coordinate	-440.969
Y-Coordinate	8181.992
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

User-assigned name of outfall

Rain Gage Poway

Property	Value
Name	Poway
X-Coordinate	39.759
Y-Coordinate	11152.174
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	TIMESERIES
TIME SERIES:	
- Series Name	Poway
DATA FILE:	
- File Name	*
- Station ID	*
- Rain Units	IN

User-assigned name of rain gage

Outfall POC-2

Property	Value
Name	POC-2
X-Coordinate	370.048
Y-Coordinate	8202.966
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

User-assigned name of outfall

Subcatchment DMA-1-1

Property	Value
Name	DMA-1-1
X-Coordinate	-440.969
Y-Coordinate	10552.119
Description	
Tag	
Rain Gage	Poway
Outlet	POC-1
Area	2.6235
Width	476
% Slope	3
% Imperv	0
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

User-assigned name of subcatchment

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

Subcatchment DMA-1-2

Property	Value
Name	DMA-1-2
X-Coordinate	391.022
Y-Coordinate	10545.127
Description	
Tag	
Rain Gage	Poway
Outlet	POC-2
Area	1.3267
Width	482
% Slope	3
% Imperv	0
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

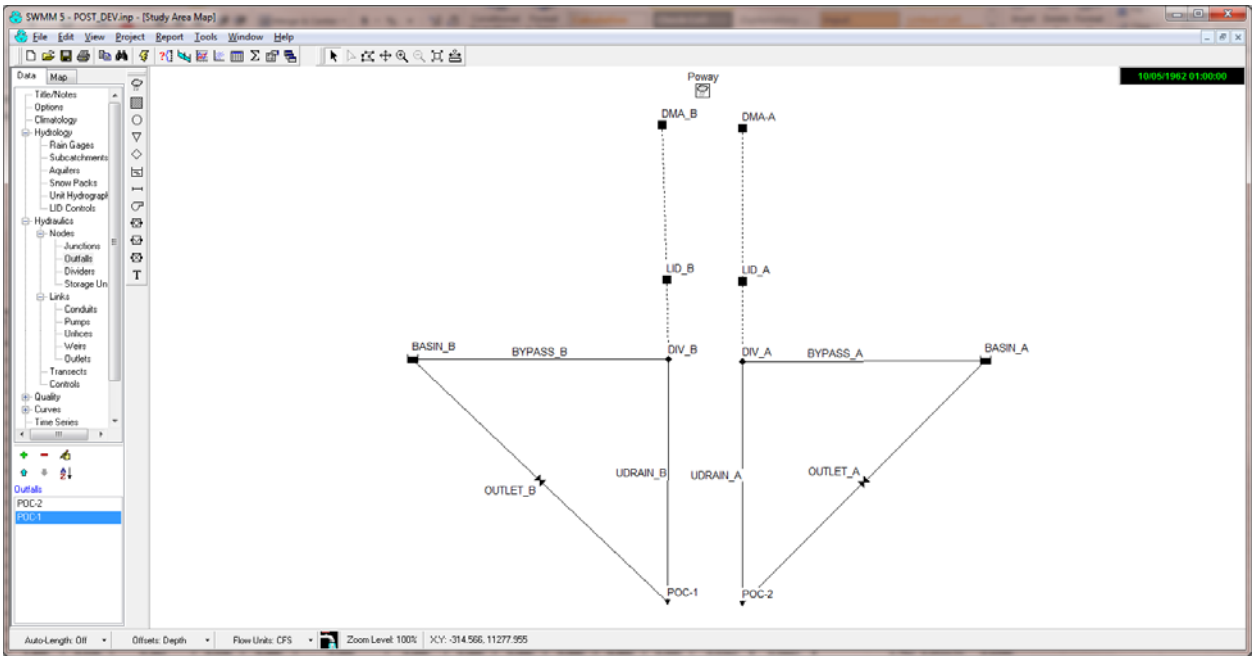
User-assigned name of subcatchment

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

POST-DEVELOPED CONDITION



Rain Gage Poway

Property	Value
Name	Poway
X-Coordinate	-1299.691
Y-Coordinate	11104.936
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	TIMESERIES
TIME SERIES:	
- Series Name	Poway
DATA FILE:	
- File Name	*
- Station ID	*
- Rain Units	IN

Name of rainfall data file

Outfall POC-1

Property	Value
Name	POC-1
X-Coordinate	-1563.237
Y-Coordinate	7405.525
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

Outfall POC-2

Property	Value
Name	POC-2
X-Coordinate	-1021.257
Y-Coordinate	7395.764
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

Subcatchment DMA_B

Property	Value
Name	DMA_B
X-Coordinate	-1602.281
Y-Coordinate	10865.792
Description	
Tag	
Rain Gage	Poway
Outlet	LID_B
Area	2.56483
Width	243
% Slope	3
% Imperv	66.7
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Mannings N for pervious area

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

Subcatchment LID_B

Property	Value
Name	LID_B
X-Coordinate	-1572.998
Y-Coordinate	9743.279
Description	
Tag	
Rain Gage	Poway
Outlet	DIV_B
Area	0.058701
Width	10
% Slope	0
% Imperv	0.0
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Subcatchment DMA-A

Property	Value
Name	DMA-A
X-Coordinate	-1021.266
Y-Coordinate	10845.763
Description	
Tag	
Rain Gage	Poway
Outlet	LID_A
Area	1.31067
Width	214
% Slope	3
% Imperv	59.2
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

Subcatchment LID_A

Property	Value
Name	LID_A
X-Coordinate	-1021.266
Y-Coordinate	9734.110
Description	
Tag	
Rain Gage	Poway
Outlet	DIV_A
Area	0.016047
Width	10
% Slope	0
% Imperv	0.0
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

EXPLANATION OF SELECTED VARIABLES

EXPLANATION OF SELECTED VARIABLES

Sub-Catchment Areas:

Please refer to the attached diagrams that indicate the DMA and Bio-Retention BMP (BMP) sub areas modeled within the project site at both the pre and post developed conditions draining to the POC.

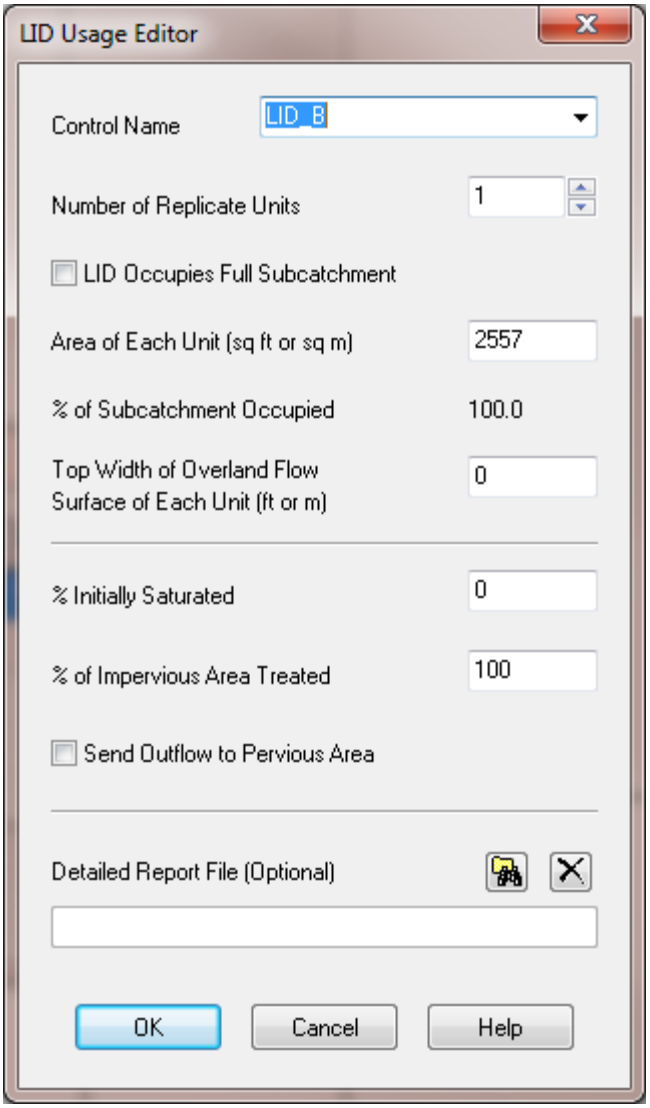
Parameters for the pre- and post-developed models include soil type C as determined from the site specific Natural Resources Conservation Service (NRCS) geologic review (attached at the end of this appendix). Suction head, conductivity and initial deficit corresponds to average values expected for these soils types, according to sources consulted, professional experience, and approximate values obtained by the interim Orange County modeling approach.

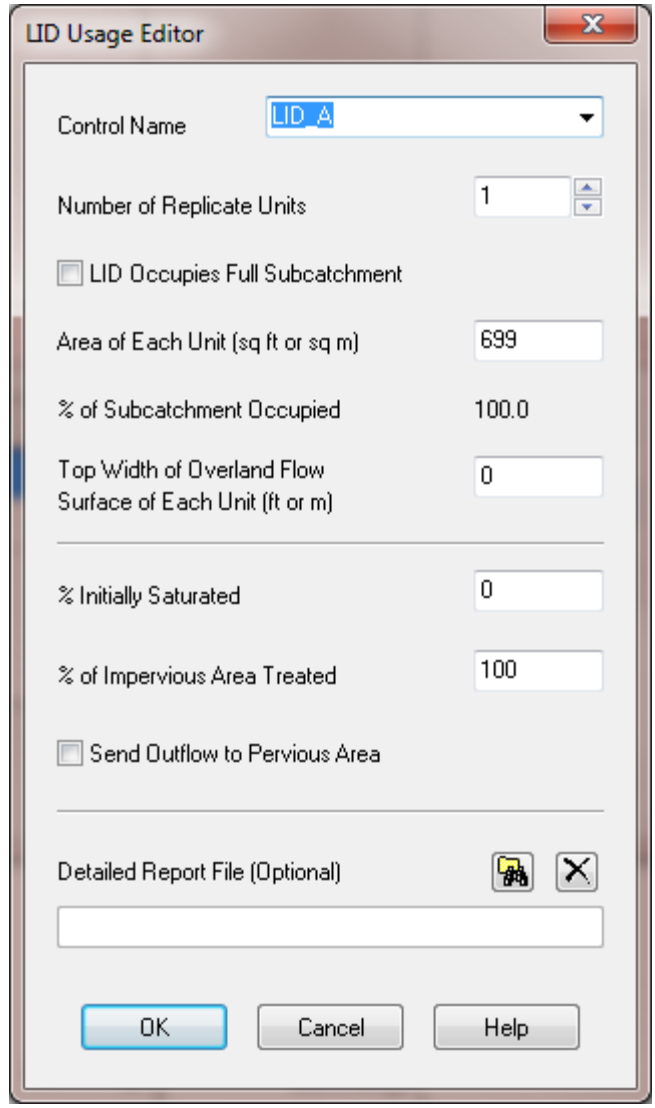
REC selected infiltration values, such that the percentage of total precipitation that becomes runoff, is realistic for the soil types and slightly smaller than measured values for Southern California watersheds.

Selection of a Kinematic Approach: As the continuous model is based on hourly rainfall, and the time of concentration for the pre-development and post-development conditions is significantly smaller than 60 minutes, precise routing of the flows through the impervious surfaces, the underdrain pipe system, and the discharge pipe was considered unnecessary. The truncation error of the precipitation into hourly steps is much more significant than the precise routing in a system where the time of concentration is much smaller than 1 hour.

Sub-Catchment BMP:

The area of bio-filtration must be equal to the area of the development tributary to the bioretention facility (area that drains into the biofiltration, equal external area plus bio-filtration itself). Five (5) decimal places were given regarding the areas of the bio-filtration to insure that the area used by the program for the LID subroutine corresponds exactly with this tributary.


LID Usage Editor
Control Name
LID_B
Number of Replicate Units
1
LID Occupies Full Subcatchment
Area of Each Unit (sq ft or sq m)
2557
% of Subcatchment Occupied
100.0
Top Width of Overland Flow Surface of Each Unit (ft or m)
0
% Initially Saturated
0
% of Impervious Area Treated
100
Send Outflow to Pervious Area
Detailed Report File (Optional)
OK
Cancel
Help


LID Usage Editor
Control Name
LID_A
Number of Replicate Units
1
LID Occupies Full Subcatchment
Area of Each Unit (sq ft or sq m)
699
% of Subcatchment Occupied
100.0
Top Width of Overland Flow Surface of Each Unit (ft or m)
0
% Initially Saturated
0
% of Impervious Area Treated
100
Send Outflow to Pervious Area
Detailed Report File (Optional)
OK
Cancel
Help

LID Control Editor

Control Name: LID_B

LID Type: Bio-Retention Cell

Process Layers: Surface | Soil | Storage | Underdrain

Storage Depth (in. or mm)	6.36
Vegetation Volume Fraction	0.05
Surface Roughness (Mannings n)	0.0
Surface Slope (percent)	0.0

LID Control Editor

Control Name: LID_B

LID Type: Bio-Retention Cell

Process Layers: Surface | Soil | Storage | Underdrain

Thickness (in. or mm)	24
Porosity (volume fraction)	0.4
Field Capacity (volume fraction)	0.2
Wilting Point (volume fraction)	0.1
Conductivity (in/hr or mm/hr)	5
Conductivity Slope	5
Suction Head (in. or mm)	1.5

LID Control Editor

Control Name: LID_B

LID Type: Bio-Retention Cell

Process Layers: Surface | Soil | Storage | Underdrain

Height (in. or mm)	18
Void Ratio (Voids / Solids)	0.67
Conductivity (in/hr or mm/hr)	0
Clogging Factor	0

Note: use a Conductivity of 0 if the LID unit has an impermeable bottom.

LID Control Editor

Control Name: LID_B

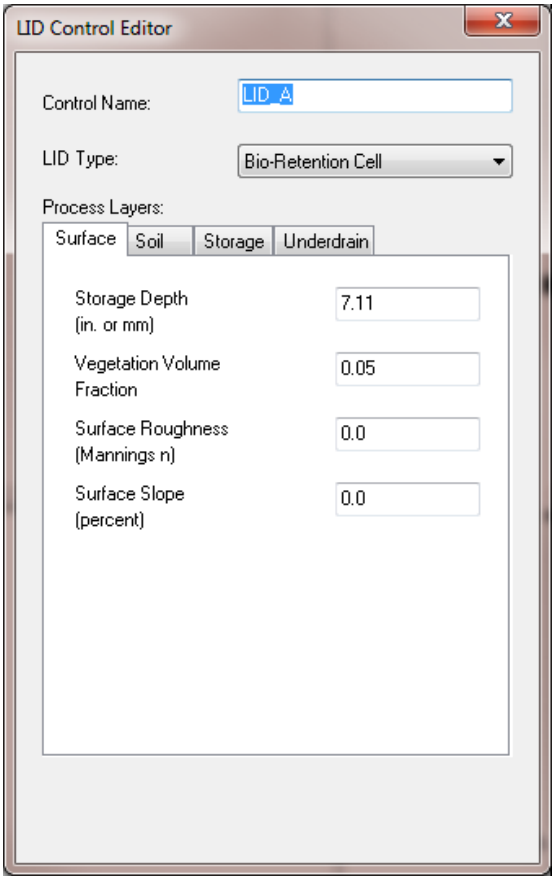
LID Type: Bio-Retention Cell

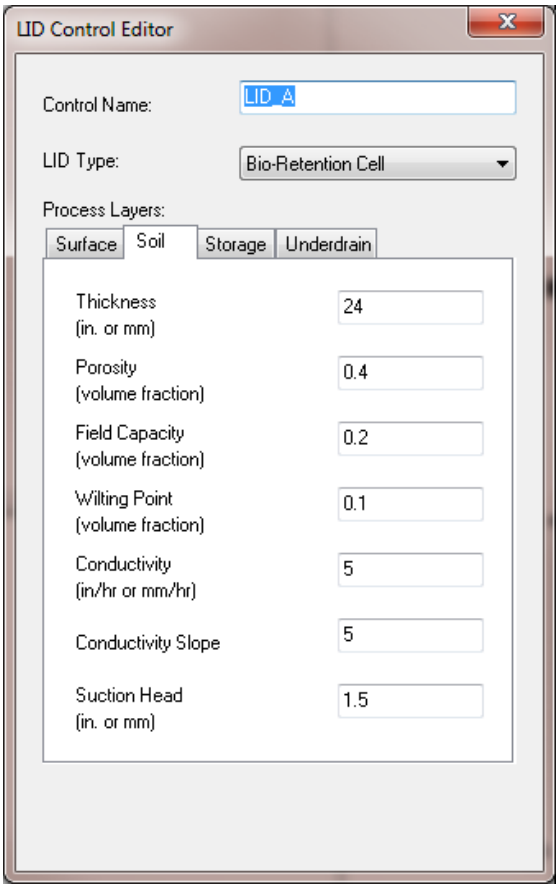
Process Layers: Surface | Soil | Storage | Underdrain

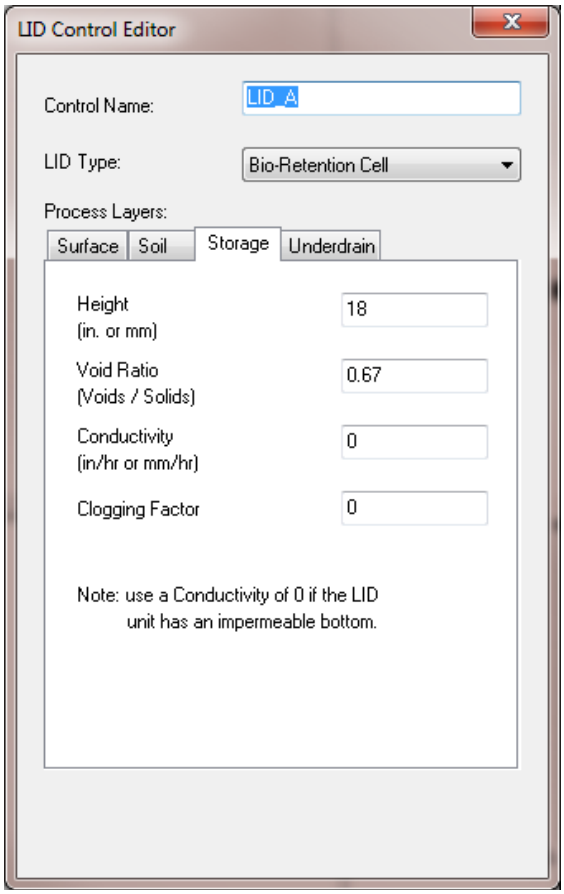
Drain Coefficient (in/hr or mm/hr)	0.2930
Drain Exponent	0.5
Drain Offset Height (in. or mm)	0

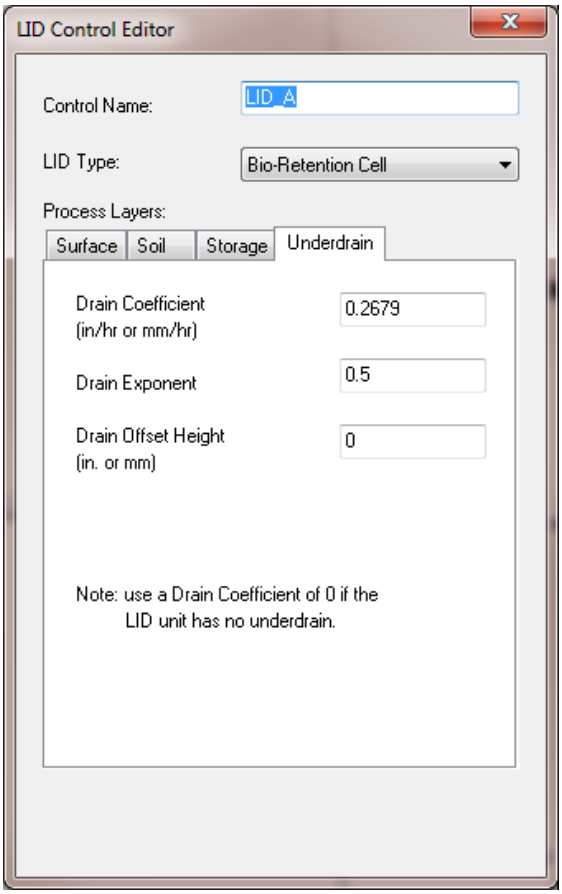
Note: use a Drain Coefficient of 0 if the LID unit has no underdrain.

OK


LID Control Editor
Control Name:
LID_A
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Storage Depth (in. or mm)
7.11
Vegetation Volume Fraction
0.05
Surface Roughness (Mannings n)
0.0
Surface Slope (percent)
0.0


LID Control Editor
Control Name:
LID_A
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Thickness (in. or mm)
24
Porosity (volume fraction)
0.4
Field Capacity (volume fraction)
0.2
Wilting Point (volume fraction)
0.1
Conductivity (in/hr or mm/hr)
5
Conductivity Slope
5
Suction Head (in. or mm)
1.5


LID Control Editor
Control Name:
LID_A
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Height (in. or mm)
18
Void Ratio (Voids / Solids)
0.67
Conductivity (in/hr or mm/hr)
0
Clogging Factor
0
Note: use a Conductivity of 0 if the LID unit has an impermeable bottom.


LID Control Editor
Control Name:
LID_A
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Drain Coefficient (in/hr or mm/hr)
0.2679
Drain Exponent
0.5
Drain Offset Height (in. or mm)
0
Note: use a Drain Coefficient of 0 if the LID unit has no underdrain.

LID Control Editor: Explanation of Significant Variables

Storage Depth:

The storage depth variable within the SWMM model is representative of the storage volume provided beneath the surface riser outlet and the surface of the bio filtration facility.

In those cases where the surface storage has a variable area that is also different to the area of the gravel and amended soil, the SWMM model needs to be calibrated as the LID module will use the storage depth multiplied by the BMP area as the amount of volume stored at the surface.

Let A_{BMP} be the area of the BMP (area of amended soil and area of gravel). The proper value of the storage depth S_D to be included in the LID module can be calculated by using geometric properties of the surface volume. Let A_0 be the surface area at the bottom of the surface pond, and let A_i be the surface area at the elevation of the invert of the first row of orifices (or at the invert of the riser if not surface orifices are included). Finally, let h_i be the difference in elevation between A_0 and A_i. By volumetric definition:

$$A_{BMP} \cdot S_D = \frac{(A_0 + A_i)}{2} h_i \qquad (1)$$

Equation (1) allows the determination of S_D to be included as Storage Depth in the LID module.

Porosity: A porosity value of 0.4 has been selected for the model. The amended soil is to be highly sandy in content in order to have a saturated hydraulic conductivity of approximately 5 in/hr.

REC considers such a value to be slightly high; however, in order to comply with the HMP Permit, the value recommended by the Copermittees for the porosity of amended soil is 0.4, per Appendix A of the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. Such porosity is equal to the porosity of the gravel per the same document.

Void Ratio: The ratio of the void volume divided by the soil volume is directly related to porosity as n/(1-n). As the underdrain layer is composed of gravel, a porosity value of 0.4 has been selected (also per Appendix A of the Final HMP document), which results in a void ratio of 0.4/(1-0.4) = 0.67 for the gravel detention layer.

Conductivity: Due to the soil type C underlying the BMPs (see Attachment 8), no infiltration was possible on the project site. As such, the LID's have been modeled with zero infiltration.

Clogging factor: A clogging factor was not used (0 indicates that there is no clogging assumed within the model). The reason for this is related to the fairness of a comparison with the SDHM model and the HMP sizing tables: a clogging factor was not considered, and instead, a conservative value of infiltration was recommended.

Drain (Flow) coefficient: The flow coefficient C in the SWMM Model is the coefficient needed to transform the orifice equation into a general power law equation of the form:

$$q = C(H - H_D)^n \tag{2}$$

where q is the peak flow in in/hr, n is the exponent (typically 0.5 for orifice equation), H_D is the elevation of the centroid of the orifice in inches (assumed equal to the invert of the orifice for small orifices and in our design equal to 0) and H is the depth of the water in inches.

The general orifice equation can be expressed as:

$$Q = \frac{\pi}{4} c_g \frac{D^2}{144} \sqrt{2g \frac{(H - H_D)}{12}} \tag{3}$$

where Q is the peak flow in cfs, D is the diameter in inches, c_g is the typical discharge coefficient for orifices (0.61-0.63 for thin walls and around 0.75-0.8 for thick walls), g is the acceleration of gravity in ft/s^2, and H and H_D are defined above and are also used in inches in Equation (3).

It is clear that:

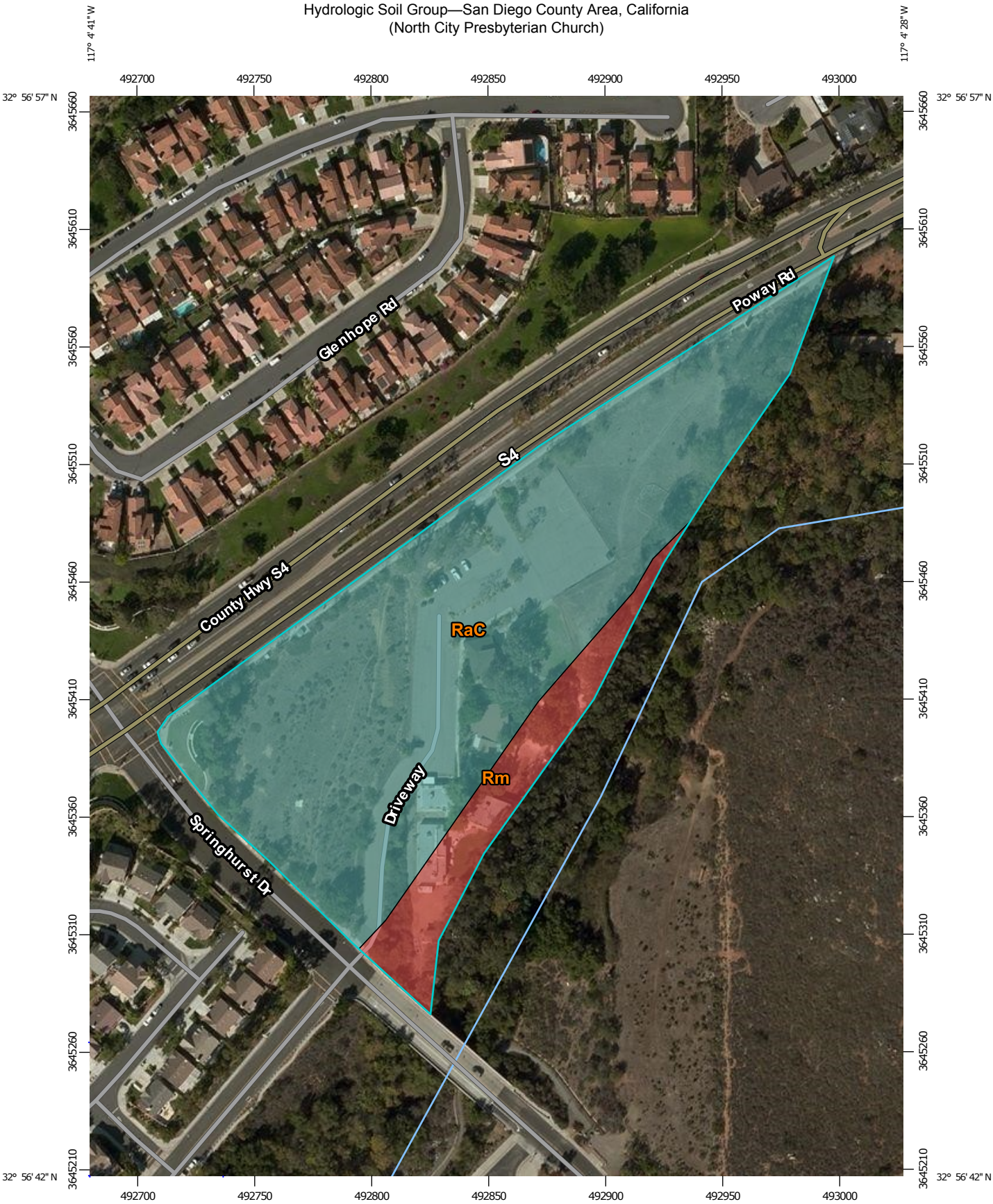
$$q \left(\frac{in}{hr}\right) X \frac{A_{BMP}}{12 \; X \; 3600} = Q \; (cfs) \tag{4}$$

Cut-Off Flow: Q (cfs) and q (in/hr) are also the cutoff flow. For numerical reasons to insure the LID is full, the model uses cut-off = 1.01 Q.

ATTACHMENT 8

Geotechnical Soils Survey

Hydrologic Soil Group—San Diego County Area, California
(North City Presbyterian Church)



Map Scale: 1:2,240 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil 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: http://websoilsurvey.nrcs.usda.gov
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 9, Sep 17, 2015

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

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

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.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
RaC	Ramona sandy loam, 5 to 9 percent slopes	C	6.5	87.3%
Rm	Riverwash	D	0.9	12.7%
Totals for Area of Interest			**7.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

ATTACHMENT 9

Summary Files from the SWMM Model

PRE_DEV

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
  --------------------------------------------------------------


  *********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  *********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CFS
  Process Models:
    Rainfall/Runoff ........ YES
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Starting Date ............ OCT-05-1962 00:00:00
  Ending Date .............. OCT-05-2007 23:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 01:00:00
  Wet Time Step ............ 00:15:00
  Dry Time Step ............ 04:00:00


  **************************        Volume         Depth
  Runoff Quantity Continuity     acre-feet        inches
  **************************     ---------       -------
  Total Precipitation ......       180.113       547.150
  Evaporation Loss .........         2.449         7.440
  Infiltration Loss ........       167.271       508.140
  Surface Runoff ...........        11.661        35.425
  Final Surface Storage ....         0.000         0.000
  Continuity Error (%) .....        -0.705


  **************************        Volume        Volume
  Flow Routing Continuity        acre-feet      10^6 gal
  **************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......        11.661         3.800
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         0.000         0.000
  External Outflow .........        11.661         3.800
  Internal Outflow .........         0.000         0.000
  Storage Losses ...........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......         0.000         0.000
  Continuity Error (%) .....         0.000


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------
--
                            Total      Total      Total      Total      Total       Total     Peak
Runoff
                           Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff
Coeff
  Subcatchment                 in         in         in         in         in    10^6 gal      CFS
  ---------------------------------------------------------------------------------------------------
--
```

```
  DMA-1-1                  547.15       0.00       7.48     508.90      34.50        2.46     1.82
0.063
  DMA-1-2                  547.15       0.00       7.36     506.64      37.26        1.34     0.96
0.068


  Analysis begun on:  Tue May 31 16:44:12 2016
  Analysis ended on:  Tue May 31 16:44:23 2016
  Total elapsed time: 00:00:11
```

POST_DEV

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------

*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ OCT-05-1962 00:00:00
Ending Date .............. OCT-05-2007 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


WARNING 04: minimum elevation drop used for Conduit BYPASS_A

WARNING 04: minimum elevation drop used for Conduit BYPASS_B

WARNING 04: minimum elevation drop used for Conduit UDRAIN_B

WARNING 04: minimum elevation drop used for Conduit UDRAIN_A

**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......       180.115       547.150
Evaporation Loss .........        25.706        78.088
Infiltration Loss ........        58.652       178.172
Surface Runoff ...........        98.144       298.140
Final Surface Storage ....         0.000         0.000
Continuity Error (%) .....        -1.325


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        98.144        31.982
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        98.123        31.975
Internal Outflow .........         0.000         0.000
Storage Losses ...........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.021


********************************
Highest Flow Instability Indexes
********************************
```

POST_DEV

```
  All links are stable.


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :    60.00 sec
  Average Time Step           :    60.00 sec
  Maximum Time Step           :    60.00 sec
  Percent in Steady State     :     0.00
  Average Iterations per Step :     1.00


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------
--
                            Total      Total      Total      Total      Total       Total     Peak
Runoff
                           Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff
Coeff
  Subcatchment                 in         in         in         in         in    10^6 gal      CFS
  ---------------------------------------------------------------------------------------------------
--
  DMA-A                    547.15       0.00      57.91     206.53     288.32       10.26     1.01
0.527
  DMA_B                    547.15       0.00      65.97     168.88     317.17       22.09     1.99
0.580
  LID_A                    547.15   23548.70     877.49       0.00   23369.01       10.18     1.01
0.970
  LID_B                    547.15   13858.26     839.70       0.00   13674.78       21.80     2.00
0.949


  ***********************
  LID Performance Summary
  ***********************

  ---------------------------------------------------------------------------------------------------
------------
                                          Total      Evap     Infil   Surface    Drain      Init.
Final     Pcnt.
                                         Inflow      Loss      Loss   Outflow   Outflow   Storage
Storage     Error
  Subcatchment      LID Control             in        in        in        in        in        in
in
  ---------------------------------------------------------------------------------------------------
------------
  LID_A             LID_A             24095.85    877.54      0.00   7187.72  16182.39      0.00
0.00     -0.63
  LID_B             LID_B             14405.41    839.73      0.00   1886.98  11788.38      0.00
0.00     -0.76

  ******************
  Node Depth Summary
  ******************

  --------------------------------------------------------------------
                                  Average  Maximum  Maximum  Time of Max
                                    Depth    Depth      HGL   Occurrence
  Node                 Type         Feet     Feet     Feet  days hr:min
  --------------------------------------------------------------------
  POC-2                OUTFALL      0.00     0.00     0.00     0  00:00
  POC-1                OUTFALL      0.00     0.00     0.00     0  00:00
  DIV_A                DIVIDER      0.00     0.00     0.00     0  00:00
  DIV_B                DIVIDER      0.00     0.00     0.00     0  00:00
  BASIN_A              STORAGE      0.01     1.09     1.09  6348  00:15
  BASIN_B              STORAGE      0.00     0.67     0.67  6348  00:19
```

POST_DEV

```
*******************
Node Inflow Summary
*******************

-------------------------------------------------------------------------------------
                                 Maximum  Maximum                  Lateral       Total
                                 Lateral    Total  Time of Max      Inflow      Inflow
                                  Inflow   Inflow   Occurrence      Volume      Volume
Node                 Type           CFS      CFS  days hr:min    10^6 gal    10^6 gal
-------------------------------------------------------------------------------------
POC-2                OUTFALL       0.00     1.01  6348  00:15       0.000      10.180
POC-1                OUTFALL       0.00     1.84  6348  00:19       0.000      21.793
DIV_A                DIVIDER       1.01     1.01  6348  00:15      10.183      10.183
DIV_B                DIVIDER       2.00     2.00  6348  00:15      21.797      21.797
BASIN_A              STORAGE       0.00     0.99  6348  00:15       0.000       3.113
BASIN_B              STORAGE       0.00     1.93  6348  00:15       0.000       3.074


**********************
Node Surcharge Summary
**********************

Surcharging occurs when water rises above the top of the highest conduit.
-----------------------------------------------------------------------
                                            Max. Height   Min. Depth
                                 Hours      Above Crown    Below Rim
Node                 Type      Surcharged         Feet         Feet
-----------------------------------------------------------------------
DIV_A                DIVIDER    394487.02        0.000        0.000
DIV_B                DIVIDER    394487.02        0.000        0.000
BASIN_A              STORAGE    394487.02        1.087        0.413
BASIN_B              STORAGE    394487.02        0.667        0.833


*********************
Node Flooding Summary
*********************

No nodes were flooded.


**********************
Storage Volume Summary
**********************

-----------------------------------------------------------------------------------------------
                       Average     Avg   E&I       Maximum     Max    Time of Max    Maximum
                        Volume    Pcnt  Pcnt        Volume    Pcnt     Occurrence    Outflow
Storage Unit          1000 ft3    Full  Loss      1000 ft3    Full    days hr:min        CFS
-----------------------------------------------------------------------------------------------
BASIN_A                  0.006       0     0         1.372      66    6348  00:15       0.99
BASIN_B                  0.009       0     0         2.062      41    6348  00:18       1.77


***********************
Outfall Loading Summary
***********************

-----------------------------------------------------------
                      Flow       Avg.      Max.       Total
                      Freq.      Flow      Flow      Volume
Outfall Node          Pcnt.       CFS       CFS    10^6 gal
-----------------------------------------------------------
POC-2                  5.52      0.02      1.01      10.180
POC-1                  5.09      0.04      1.84      21.793
-----------------------------------------------------------
System                 5.31      0.06      2.84      31.973


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

POST_DEV

Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
BYPASS_A	DUMMY	0.99	6348	00:15			
BYPASS_B	DUMMY	1.93	6348	00:15			
UDRAIN_B	DUMMY	0.07	163	01:53			
UDRAIN_A	DUMMY	0.02	163	02:00			
OUTLET_A	DUMMY	0.99	6348	00:15			
OUTLET_B	DUMMY	1.77	6348	00:19			

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
BYPASS_A	0.01	0.01	0.01	394487.02	0.01
BYPASS_B	0.01	0.01	0.01	394487.02	0.01
UDRAIN_B	0.01	0.01	0.01	394487.02	0.01
UDRAIN_A	0.01	0.01	0.01	394487.02	0.01

Analysis begun on: Tue May 31 13:11:54 2016
Analysis ended on: Tue May 31 13:12:26 2016
Total elapsed time: 00:00:32

Construction Testing & Engineering, Inc.
Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

June 8, 2016 CTE Job No. 10-13128G

C/O: Kenneth D. Smith Architect & Associates, Inc.
Attention: Mr. Ken Smith
500 Fesler Street, Suite 102
El Cajon, California 92020
Telephone: (619) 444-2182 Via Email: KSmith@kdsarch.com

Subject: Preliminary Percolation Test Results and Update Geotechnical Recommendations
Proposed Improvements at North City Presbyterian Church
1280 Springhurst Drive
Poway, California

References: Preliminary Geotechnical Investigation
Proposed Improvements at North City Presbyterian, Phases 1 and 2
11717 Poway Road, San Diego, California
Prepared by CTE, Job No. 10-9617G, dated September 5, 2008.

Mr. Smith:

As requested, Construction Testing and Engineering, Inc. (CTE) provides the following update geotechnical recommendations and percolation test results for the proposed development at the subject site. Update recommendations are based on prior site documentation (CTE, 2008), new and/or updated regulatory requirements, review of the current site conditions, and the scope of work we agreed to perform at this time.

Based on the project improvement plans provided, the proposed construction is to include two new structures, parking lots, two biofiltration basins, flatwork, landscaping, and utilities.

The recent field investigation consisted of four percolation tests and three additional geotechnical borings. The excavations were advanced utilizing a track-mounted limited-access drill rig. The geotechnical borings were performed to collect laboratory samples for the proposed parking lot and to provide additional coverage for the Phase II structure. The limited-access rig was able to mobilize to areas the truck-mounted rig could not reach during the previous investigation.

Based on document review, it appears that the referenced report was prepared in general accordance with standard geotechnical engineering practice, and that site conditions have remained generally consistent to those described in the original report. Therefore, the referenced report is considered to be suitable for the proposed development from a geotechnical standpoint provided the updated information herein is included in the design and construction of the proposed improvements. However, we anticipate issuing a complete update report once pending laboratory results are available and final engineering analyses are complete.

1.0 PERCOLATION TESTING

As requested, four percolation tests were performed within the bioretention basins in general accordance with the County of San Diego Department of Environmental Health (SD DEH) procedures. The percolation test holes were excavated with a limited-access drill rig on June 6, 2016 to depths ranging from approximately 4.0 to 6.5 feet below existing grade. The percolation tests were performed in accordance with SD DEH Case III method, which is performed when all the presoak water infiltrates through the hole overnight. The approximate percolation test locations are presented on Figure 1. The percolation test results are presented in the table below.

TABLE 3.3
PERCOLATION TEST RESULTS

TEST DESIGNATION	DEPTH (feet)	GEOLOGIC UNIT	PERCOLATION RATE (minutes/inch)
P-1	6.5	Kgd	480
P-2	6.0	Kgd	480
P-3	4.0	Qal	160
P-4	5.0	Qal	30

Test location/hole P-4 and associated percolation results appear to be an anomaly that could have resulted from localized disturbance at the test hole depth.

2.0 GRADING

The site should be cleared of any existing debris and deleterious materials. Objectionable materials, such as existing foundations, construction debris, and vegetation are not suitable for structural backfill and should be properly disposed of offsite. Overexcavation in structure areas should extend a minimum of three feet below bottom of proposed foundations, to a minimum depth equal to 1/3 of the maximum fill depth beneath the proposed structure, or to the depth of dense native soil materials, whichever is deepest. Overexcavations should extend at least five feet laterally beyond the limits of the proposed building structure or the distance resulting from a 1:1 (horizontal: vertical) extending from the outer edge of the footings to suitable material, whichever is greater and where feasible.

Due to the anticipated depth of the bottom level of the proposed structure, the recommended overexcavations could be difficult or uneconomical along the northern/northwestern limits of the proposed building. Therefore, in order to reduce preparatory grading and if desired, the building could be founded upon deep foundations such as drilled piers or similar extended a minimum three feet into competent dense granitic materials, which would be anticipated to be on the order of 10 to 20 feet maximum beneath the southern portion of the proposed building. If deep foundations are selected for building support, overexcavation should extend to competent native

materials and to a minimum two feet below proposed rough building pad elevations, whichever is deeper, prior to placement of compacted fill to construct the building pad.

Overexcavations in proposed pavement, flatwork, or other minor improvement areas should be conducted to a minimum depth of two feet below proposed or existing grades, or to suitable underlying materials, whichever depth is greatest.

Suitability of the bottom of all overexcavations should be verified by the CTE geotechnical representative during grading. Once approved, excavation bottoms are to be scarified, where feasible, to a depth of eight inches prior to fill placement/compaction. Overexcavation should extend a minimum of five feet laterally beyond the limits of the proposed improvements. Where overexcavation is required to depths greater than five feet below adjacent grade, lateral removals beyond the limits of proposed building improvements shall be as recommended by CTE personnel based on actual conditions encountered.

Upon approval of the excavation bottoms and subsequent scarification, soils should be brought to a minimum two percent above optimum moisture content and compacted to a minimum of 90 percent relative compaction (per ASTM D-1557). Minimum relative compaction of 95 percent (per ASTM D-1557) should be conducted in the upper 12 inches of subgrade beneath proposed pavement and drive areas, and any fills to be located more than four feet below proposed rough grade (excluding retaining wall backfill).

Existing below-ground utilities should be redirected around the proposed structures. Existing utilities at an elevation to extend through the proposed footings should generally be sleeved and caulked to minimize the potential for moisture migration below the building slabs. Abandoned pipes exposed by grading should be securely capped to prevent moisture from migrating beneath foundation and slab soils or should be filled with minimum two-sack cement/sand slurry.

3.0 FOUNDATIONS AND SLAB RECOMMENDATIONS

The following recommendations are for preliminary design purposes only. These recommendations should be reviewed after completion of earthwork to document that conditions exposed are as anticipated and that the recommended structure design parameters are appropriate.

3.1 Foundations

Following the recommended preparatory grading, continuous and isolated spread footings or deepened pier footings are anticipated to be suitable for use at this site. It is anticipated that standard building footings would be founded entirely in properly compacted fill with very low to low expansion potential placed as recommended herein. Footings should not span cut/fill transitions.

If deep foundation such as drilled piers are selected in order to reduce preparatory grading per Section 2.0, spread foundations could be used in areas where they can be deepened to reach competent granitic materials. If deep foundations are used and extend

to granitic materials, any and all spread foundations for the building should also bear in competent granitic materials.

Foundation dimensions and reinforcement should be based on an allowable bearing value of 2,500 pounds per square foot for footings founded entirely upon properly placed compacted fill materials embedded a minimum of 18 inches below the lowest adjacent subgrade elevation. If utilized, continuous footings should be at least 15 inches wide; isolated footings should be at least 24 inches in least dimension. If deepened spread or pier footings are proposed, the bearing value may be increased by 500 psf for each additional 12 inches of embedment up to a maximum static value of 3,500 psf. The bearing pressure for miscellaneous site retaining walls and other at grade improvements should be limited to 3,000 psf. The above bearing values may also be increased by one third for short duration loading which includes the effects of wind or seismic forces.

Minimum reinforcement for continuous footings should consist of four No. 5 reinforcing bars; two placed near the top and two placed near the bottom or as per the project structural engineer. The structural engineer should design isolated footing reinforcement. Footing excavations should generally be maintained above optimum moisture content until concrete placement.

If drilled pier foundations are utilized, we recommend they measure a minimum 18-inches in diameter and bear a minimum of three feet into competent granitic materials, with a minimum distance to daylight of 12 feet. Drilled piers may utilize an allowable bearing value of 6,000 psf, plus a 1/3 increase for short duration loadings, and an additional 500 psf skin friction for the portion of the piers in competent granitic materials.

3.2 Foundation Settlement

The maximum total static settlement is expected to be on the order of one inch and the maximum differential static settlement is expected to be on the order of 1/2 inch over a distance of approximately 50 feet. Due to the absence of a shallow groundwater table and the dense nature of underlying materials, dynamic settlement is not expected to adversely affect the proposed improvements.

3.3 Foundation Setback

Footings for structures should be designed such that the horizontal distance from the face of adjacent slopes to the outer edge of the footing is at least 12 feet. In addition, footings should bear beneath a 1:1 plane extended up from the nearest bottom edge of adjacent trenches and/or excavations. Deepening of affected footings may be a suitable means of attaining the prescribed setbacks.

3.4 Interior Concrete Slabs

Lightly loaded concrete slabs should be a minimum of 4.5 inches in thickness. Minimum slab reinforcement should consist of #3 reinforcing bars placed on 18-inch centers each way, at above mid-slab height, but with proper concrete cover. Subgrade materials should generally be maintained near or above optimum moisture content until slab underlayment and concrete are placed.

Slabs subjected to heavier loads may require thicker slab sections and/or increased reinforcement. A 120-pci subgrade modulus is considered suitable for elastic design of minimally embedded improvements such as slabs-on-grade.

In moisture-sensitive floor areas, a suitable vapor retarder of at least 15-mil thickness (with all laps or penetrations sealed or taped) overlying a four-inch layer of consolidated crushed aggregate or gravel (with SE of 30 or more) should be installed, as per the 2013 CBC/Green Building Code. An optional maximum two-inch layer of similar material may be placed above the vapor retarder to help protect the membrane during steel and concrete placement. This recommended protection is generally considered typical in the industry. If proposed floor areas or coverings are considered especially sensitive to moisture emissions, additional recommendations from a specialty consultant could be obtained. CTE is not an expert at preventing moisture penetration through slabs. A qualified architect or other experienced professional should be contacted if moisture penetration is a more significant concern.

4.0 SEISMIC DESIGN CRITERIA

The seismic ground motion values listed in the table below were derived in accordance with the ASCE 7-10 Standard and 2013 CBC. This was accomplished by establishing the Site Class based on the soil properties at the site, and then calculating the site coefficients and parameters using the United States Geological Survey Seismic Design Maps application using the site coordinates of 32.9471 degrees latitude and -117.0764 degrees longitude. These values are intended for the design of structures to resist the effects of earthquake ground motions.

TABLE 4.0 SEISMIC GROUND MOTION VALUES		
PARAMETER	VALUE	CBC REFERENCE (2013)
Site Class	D	ASCE 7, Chapter 20
Mapped Spectral Response Acceleration Parameter, S_S	0.904	Figure 1613.3.1 (1)
Mapped Spectral Response Acceleration Parameter, S_1	0.353	Figure 1613.3.1 (2)
Seismic Coefficient, F_a	1.138	Table 1613.3.3 (1)
Seismic Coefficient, F_v	1.694	Table 1613.3.3 (2)
MCE Spectral Response Acceleration Parameter, S_{MS}	1.029	Section 1613.3.3
MCE Spectral Response Acceleration Parameter, S_{M1}	0.598	Section 1613.3.3
Design Spectral Response Acceleration, Parameter S_{DS}	0.686	Section 1613.3.4
Design Spectral Response Acceleration, Parameter S_{D1}	0.399	Section 1613.3.4
Peak Ground Acceleration PGA_M	0.393	ASCE 7, Section 11.8.3

5.0 PAVEMENTS

If proposed at near grade elevations, pavement sections provided are based on preliminary Resistance "R"-Value results, estimated traffic indices, and the assumption that the upper foot of compacted fill subgrade and overlying aggregate base materials are properly compacted to a minimum 95% relative compaction at a minimum of two percent above optimum moisture content (as per ASTM D 1557).

TABLE 5.0
RECOMMENDED AC OR PCC PAVEMENT SECTION THICKNESSES

Traffic Area	Assumed Traffic Index	Preliminary Subgrade "R"-Value	Asphalt Pavements		Portland Cement Concrete Pavements On Subgrade (INCHES)
			AC Thickness (INCHES)	CalTrans Class II or Crushed Miscellaneous Aggregate Base Thickness (INCHES)	
Auto Parking and Light Drive Areas	5.0	25+	3.0	6.0	6.0
Moderate to Heavy Drive Areas	6.0	25+	3.0	9.0	7.0

Asphalt paved areas should be designed, constructed, and maintained in accordance with, for example, the recommendations of the Asphalt Institute, or other widely recognized authority. Concrete paved areas should be designed and constructed in accordance with the recommendations of the American Concrete Institute or other widely recognized authority, particularly with regard to thickened edges, joints, and drainage. The Standard Specifications for Public Works construction ("Greenbook") or Caltrans Standard Specifications may be referenced for pavement materials specifications.

6.0 WALLS BELOW GRADE

If retaining walls are to be constructed in association with the proposed development, the following parameters are considered to be applicable. For the design of subterranean walls where the surface of the backfill is level, it may be assumed that the soils will exert a lateral pressure equal to that developed by a fluid with a density of 35 pcf. The active pressure should be used for walls free to yield at the top at least 0.2 percent of the wall height. For walls restrained so that such movement is not permitted, an equivalent fluid pressure of 65 pcf should be used, based on at-rest soil conditions. The recommended equivalent fluid pressures should be increased by 20 pcf for walls retaining soils inclined at 2:1 (horizontal: vertical). Walls below the water level are not anticipated for the subject site.

In addition to the recommended earth pressure, subterranean structure walls adjacent to traffic loads should be designed to resist a uniform lateral pressure of 100 psf. This is the result of an assumed 300-psf surcharge behind the walls due to normal street traffic. If the traffic is kept back at least 10 feet or a distance equal to the retained soil height from the subject walls, whichever is less, the traffic surcharge may be neglected. The project architect or structural engineer should determine the necessity of waterproofing retaining walls to reduce moisture infiltration.

Retaining wall backfill located within a 45-degree wedge extending up from the heel of the wall should consist of soil having an Expansion Index of 30 or less (ASTM D 4829) with less than 30 percent passing the No. 200 sieve. Some onsite soils are not anticipated to be suitable for use as wall backfill and, therefore, import of granular backfill materials may be required. The upper 12 to 18 inches of wall backfill should consist of lower permeability soils, in order to reduce surface water infiltration behind walls. The project structural engineer and/or architect should detail proper wall backdrains, including gravel drain zones, fills, filter fabric and perforated drain pipes.

Lateral pressures on cantilever retaining walls (yielding walls) due to earthquake motions may be calculated based on work by Seed and Whitman (1970). The total lateral thrust against a properly drained and backfilled cantilever retaining wall above the groundwater level can be expressed as:

$$P_{AE} = P_A + \Delta P_{AE}$$

For non-yielding (or "restrained') such walls, the total lateral thrust may be similarly calculated based on work by Wood (1973):

$$P_{KE} = P_K + \Delta P_{KE}$$

Where:

P_A = Static Active Thrust
P_K = Static Restrained Wall Thrust
ΔP_{AE} = Dynamic Active Thrust Increment = $(3/8)\ k_h\ \gamma H^2$
ΔP_{KE} = Dynamic Restrained Thrust Increment = $k_h\ \gamma H^2$
k_h = 2/3 Peak Ground Acceleration = $2/3(PGA_M)$
H = Total Height of the Wall
γ = Total Unit Weight of Soil ≈ 130 pounds per cubic foot

The increment of dynamic thrust in both cases should be distributed triangularly, with a line of action located at H/3 above the bottom of the wall.

7.0 LIMITATIONS

The updated recommendations herein are based on our review of available documents and, where applicable, supersede recommendations in the referenced previous geotechnical reports. Variations may exist and conditions not observed or described in this, and previous, reports may be encountered during grading and excavation. However, a complete update geotechnical report will be issued once laboratory testing and final engineering analyses have been completed.

The recommendations presented herein have been developed in order to reduce the potential adverse effects of hillside grading and differential fill thickness. However, even with the design and construction precautions provided, some post-construction movement and associated distress may occur.

CTE should review any updated project foundation and grading plans before commencement of earthwork to identify potential conflicts with the intent of the recommendations provided.

We appreciate the opportunity to be of service on this project. Should you have any questions or need further information please do not hesitate to contact this office.

Respectfully submitted,

CONSTRUCTION TESTING & ENGINEERING, INC.

Dan T. Math, GE #2665
Principal Engineer

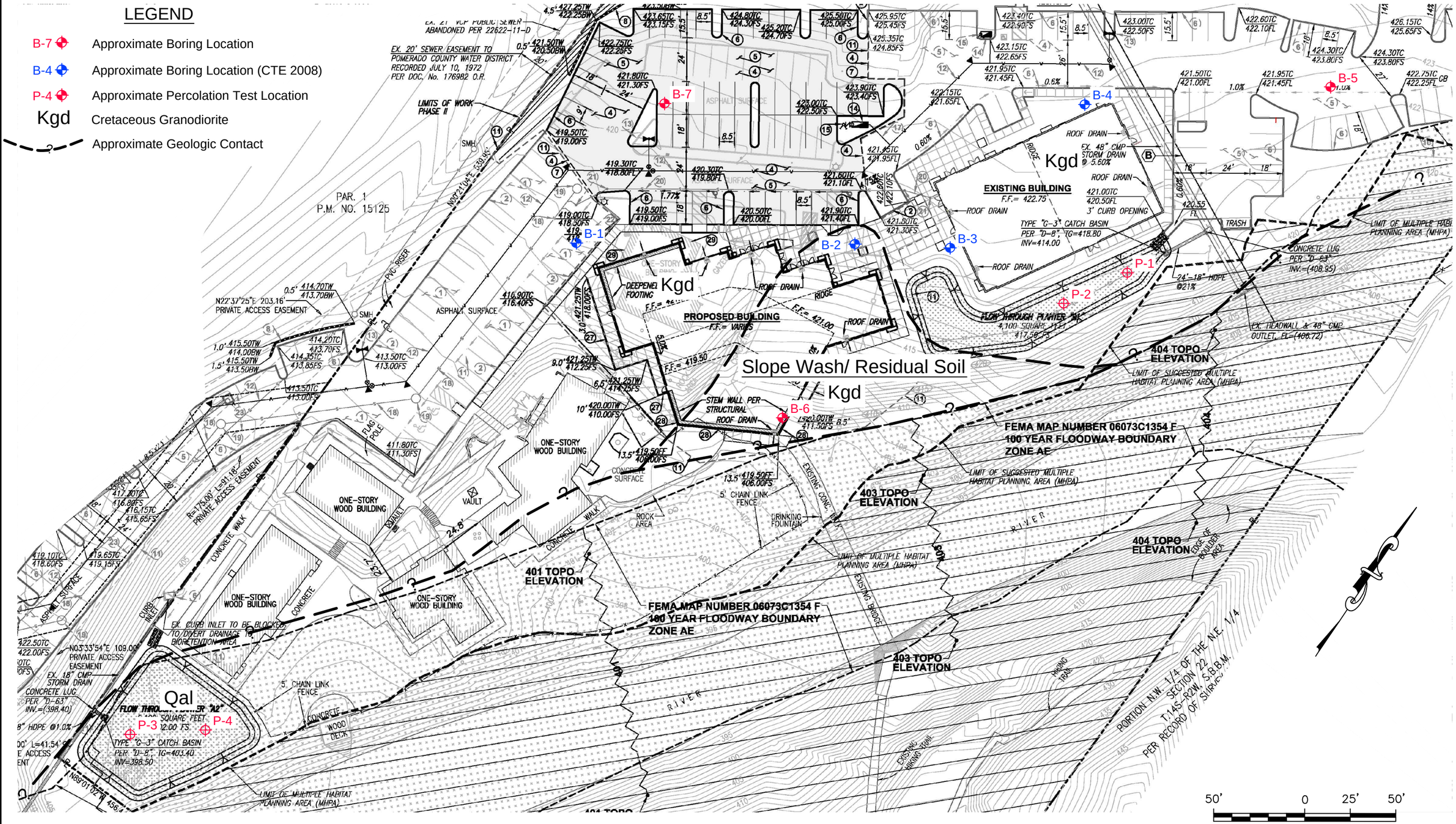
Jay F. Lynch, CEG #1890
Principal Engineering Geologist

Aaron J. Beeby, CEG #2603
Certified Engineering Geologist

AJB/JFL/DTM:nri

Attachments:

Figure 1 Geologic/Exploration Location Map
Boring Logs



CTE INC. Construction Testing & Engineering, Inc.
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GEOLOGIC/EXPLORATION LOCATION MAP
PROPOSED NORTH CITY PRESBYTERIAN CHURCH IMPROVEMENTS
17717 POWAY ROAD
POWAY, CALIFORNIA

CTE JOB NO:	10-13128G
SCALE:	1" = 50'
DATE: 6/16	FIGURE: 1

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DEFINITION OF TERMS

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

GRAIN SIZES

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

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

CLEAR SQUARE SIEVE OPENING U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed

PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded

PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

FIGURE: BL1

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PROJECT:	DRILLER:	SHEET: of
CTE JOB NO:	DRILL METHOD:	DRILLING DATE:
LOGGED BY:	SAMPLE METHOD:	ELEVATION:

BORING LEGEND

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

FIGURE: BL2

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PROJECT:	N. COUNTY PRESBYTERIAN CHURCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13128G	DRILL METHOD:	HOLLOW-STEM AUGER (LAR)	DRILLING DATE:	6/6/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~423 FEET

BORING: B-5

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**RESIDUAL SOIL:** Medium dense, moist, brown to reddish brown, clayey fine to medium grained SAND.	
						"SC"		**CRETACEOUS GRANODIORITE:** Very dense, slightly moist, reddish gray granodiorite that excavates to clayey fine to medium grained SAND, oxidized, severely weathered.	RV
5			50/5"						
								Total Depth: 5.5' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	N. COUNTY PRESBYTERIAN CHURCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13128G	DRILL METHOD:	HOLLOW-STEM AUGER (LAR)	DRILLING DATE:	6/6/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~406 FEET

BORING: B-6

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					CL		**RESIDUAL SOIL:** Stiff, moist, dark brown, fine grained sandy CLAY.	EI
5		/	14 34 40			"SC"		**CRETACEOUS GRANODIORITE:** Very dense, slightly moist, reddish gray granodiorite that excavates to clayey fine to medium grained SAND, oxidized, severely weathered.	DS
								Total Depth: 7.0' (Refusal in dense granodiorite) No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	N. COUNTY PRESBYTERIAN CHURCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13128G	DRILL METHOD:	HOLLOW-STEM AUGER (LAR)	DRILLING DATE:	6/6/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~421 FEET

BORING: B-7

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		Asphalt: 0-3" **RESIDUAL SOIL:** Medium dense, moist, brown to reddish brown, clayey fine to medium grained SAND.	RV
	X					"SC"		**CRETACEOUS GRANODIORITE:** Very dense, slightly moist, reddish gray granodiorite that excavates to clayey fine to medium grained SAND, oxidized, severely weathered.	
5								Total Depth: 5.0' No Groundwater Encountered	
10									
15									
20									
25									

Environmental Noise Assessment

North City Presbyterian Church

Poway, California (City of San Diego)

BAC Job # 2012-004

Prepared For:

Kenneth D. Smith Architect & Associates, Inc.

Attn: Mr. Ken Smith
500 Fesler Street, Suite 102
El Cajon, California 9020

Prepared By:

Bollard Acoustical Consultants, Inc.

Paul Bollard, President

April 21, 2016

BOLLARD
Acoustical Consultants

3551 Bankhead Road • Loomis, CA 95650 • Phone: (916) 663-0500 • Fax: (916) 663-0501 • BACNOISE.COM

Executive Summary

The existing 7.65-acre North City Presbyterian Church is located at 11717 Poway Road in the City of San Diego, California. The church is planning for the construction of two new sanctuaries over the course of approximately twenty (20) years since they have outgrown their present one built in 1982. The project consists of the construction of a 7,309 sq. ft., one story, 414 seat sanctuary (Phase 1), with a final two story 16,083 sq. ft., 516 seat sanctuary that will be constructed while the Phase 1 sanctuary building reverts to a multi-purpose recreation building (Phase 2). In an effort to assess existing and predicted noise levels of the proposed project and surrounding area, Bollard Acoustical Consultants, Inc. (BAC) was contracted by Foothill Associates to complete an environmental noise analysis regarding the proposed project. Specifically, the following report provides a comprehensive assessment of the existing project site noise environment, predicted noise environment based on the proposed project and existing surrounding uses, and associated noise impacts and mitigation measures relative to the City of San Diego General Plan and Municipal Code significance noise criteria.

The project site contains existing developed areas with church and school buildings, outdoor playground and landscaping, and areas of natural vegetation. The surrounding land uses include undeveloped open space, institutional utilities development, and residential development. Based off the existing and predicted project site and surround area uses, BAC determined that the only potentially significant noise-producing activities identified for the project consist of increases in off-site traffic, noise generated by construction-related activities, parking lot activity, and on-site activities (daycare play areas). To quantify the existing ambient noise environments in the project vicinity, a long-term (continuous) noise measurement survey was conducted at the project site on February 10-11, 2012. To quantify predicted noise environments as a result of the project, a combination of BAC field data and Federal Highway Administration (FHWA) traffic data was utilized in analysis.

In the assessment of changes related to existing off-site traffic noise levels, it was determined that the proposed project is expected to result in traffic noise level increases of 1 dB or less over existing no-project traffic noise levels, resulting in a less than significant project impact. Similarly, in the assessment of changes related to future (cumulative) off-site traffic noise levels, a less than significant project impact was determined (traffic noise level increases of 1 dB or less). In the analysis of parking lot vehicular noise levels related to the proposed addition of parking spaces, results indicated that the project impact at the nearest residential areas and wetlands is less than significant (in compliance with City of San Diego noise standards). However, in the assessment of noise related to the construction phases of the project, it was determined that noise from construction activities would add to the noise environment in the immediate project vicinity. Therefore, this impact is considered potentially significant impact in need of mitigation (PSM). As a result, mitigation measures to reduce construction generated noise levels to a state of compliance with the City of San Diego noise standards are included in this report.

Introduction

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and thus are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz). For analysis purposes, the frequency of traffic noise is commonly considered to be 550 Hz.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. As a result, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by the A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessments. All noise levels reported herein are in terms of A-weighted levels. Table 1 shows typical noise levels associated with common activities. Appendix A provides acoustical terminology.

Figure 1

North City Presbyterian Church - San Diego, CA

Project Vicinity & Continuous Noise Measurement Location

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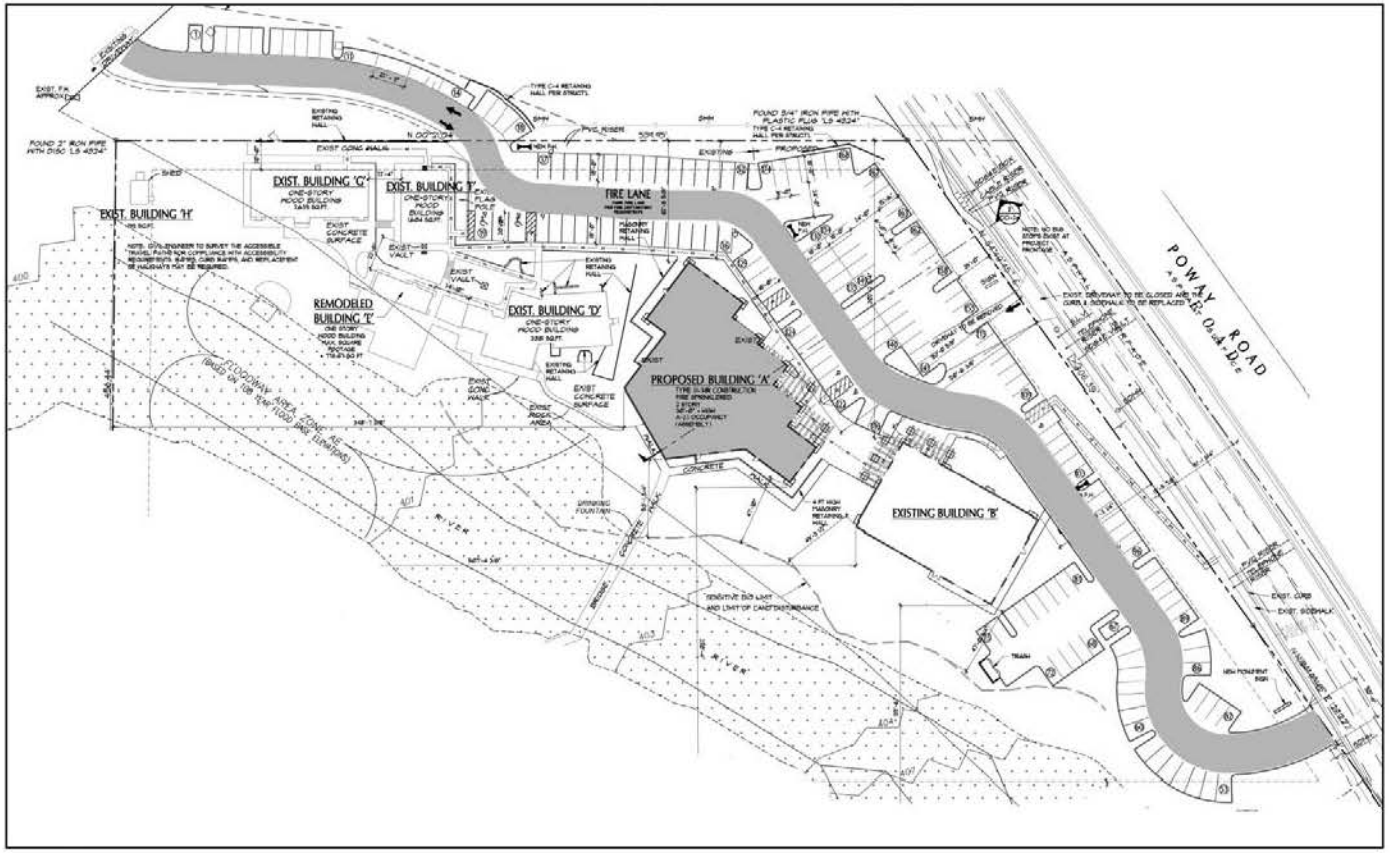
Acoustical Consultants

Scale (feet)
0 80 160

Figure 2
North City Presbyterian Church - San Diego, CA
Phase 2 Site Plan



BOLLARD
Acoustical Consultants

Table 1
Typical A-Weighted Sound Levels of Common Noise Sources

Loudness Ratio	dBA	Description
128	130	Threshold of pain
64	120	Jet aircraft take-off at 100 feet
32	110	Riveting machine at operators position
16	100	Shotgun at 200 feet
8	90	Bulldozer at 50 feet
4	80	Diesel locomotive at 300 feet
2	70	Commercial jet aircraft interior during flight
1	60	Normal conversation speech at 5-10 feet
1/2	50	Open office background level
1/4	40	Background level within a residence
1/8	30	Soft whisper at 2 feet
1/16	20	Interior of recording studio

Community noise is commonly described in terms of the “ambient” noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state, A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually 1-hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn} or CNEL, and shows very good correlation with community response to noise.

The Day-Night Average Level (L_{dn}) is based on the average noise level over a 24-hour day, with a +10 decibel weighting applied to noise occurring during nighttime hours (10 p.m.-7 a.m.). The nighttime penalty is based on the assumption that people react to nighttime noise exposures as though they are twice as loud as daytime exposures. Because the L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. The Community Noise Equivalent Level (CNEL) is very similar to L_{dn} (typically within a couple tenths of each other), but includes an additional +5 decibel weighting applied to noise occurring during evening hours (7 p.m.-10 p.m.). For the purposes of this report, L_{dn} and CNEL are used interchangeably.

Criteria for Acceptable Noise Levels

City of San Diego General Plan Noise Criteria

The City of San Diego Noise Element of the General Plan establishes acceptable noise level limits for a variety of land use designations. Specifically, Table NE-3 of that document specifies the exterior noise exposure limits considered compatible, conditionally compatible, and incompatible, for a variety of land use designations. Refer to Table 2 for these guidelines.

Table 2 - Noise Compatibility Guidelines
City of San Diego General Plan

Land Use Category	Exterior Noise Exposure (dBA CNEL) 60	65	70	75	
Open Space and Parks and Recreational					
Community & Neighborhood Parks; Passive Recreation					
Regional Parks; Outdoor Spectator Sports, Golf Courses; Athletic Fields; Outdoor Spectator Sports, Water Recreational Facilities; Horse Stables; Park Maint. Facilities					
Agricultural					
Crop Raising & Farming; Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables					
Residential					
Single Units; Mobile Homes; Senior Housing		45			
Multiple Units; Mixed-Use Commercial/Residential; Live Work; Group Living Accommodations **For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.*		45	45*		
Institutional					
Hospitals; Nursing Facilities; Intermediate Care Facilities; Kindergarten through Grade 12 Educational Facilities; Libraries; Museums; Places of Worship; Child Care Facilities		45			
Vocational or Professional Educational Facilities; Higher Education Institution Facilities (Community or Junior Colleges, Colleges, or Universities)		45	45		
Cemeteries					
Sales					
Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries, Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories			50	50	
Commercial Services					
Building Services; Business Support; Eating & Drinking; Financial Institutions; Assembly & Entertainment; Radio & Television Studios; Golf Course Support			50	50	
Visitor Accommodations		45	45	45	
Offices					
Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters			50	50	
Vehicle and Vehicular Equipment Sales and Services Use					
Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking					
Wholesale, Distribution, Storage Use Category					
Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution					
Industrial					
Heavy Manufacturing; Light Manufacturing; Marine Industry; Trucking & Transportation Terminals; Mining & Extractive Industries					
Research & Development				50	

	Compatible	Indoor Uses	Standard construction methods should attenuate exterior noise to an acceptable indoor noise level. Refer to Section I.
		Outdoor Uses	Activities associated with the land use may be carried out.
	Conditionally Compatible	Indoor Uses	Building structure must attenuate exterior noise to the indoor noise level indicated by the number for occupied areas. Refer to Section I.
		Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated t make the outdoor activities acceptable. Refer to Section I.
	Incompatible	Indoor Uses	New construction should not be undertaken.
		Outdoor Uses	Severe noise interference makes outdoor activities unacceptable.

City of San Diego Municipal Code Standards for Construction Noise and Sound Level Limits

§59.5.0401 Sound Level Limits

(a) It shall be unlawful for any person to cause noise by any means to the extent that the one–hour average sound level exceeds the applicable limit given in the following table, at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is that part of the total noise at the specified location that is due solely to the action of said person.

Table of Acceptable Limits

Land Use	Time of Day	One-Hour Average Sound Level (decibels)
Single Family Residential	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45 40
Multi-Family Residential (Up to a maximum density of 1/2000)	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50 45
All other Residential	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55 50
Commercial	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m.	65 60 60
Industrial or Agricultural	Any time	75

(b) The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts.

(c) Fixed–location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of Part A. of this section, measured at or beyond six feet from the boundary of the easement upon which the equipment is located.

(d) This section does not apply to firework displays authorized by permit from the Fire Department.

(e) This section does not apply to noise generated by helicopters at heliports or helistops authorized by a conditional use permit, nor to any roller coaster operated on City–owned parkland.

§59.5.0404 Construction Noise

(a) It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator. In granting such permit, the Administrator shall consider whether the construction noise in the vicinity of the proposed work site would be less objectionable at night than during the daytime because of different population densities or different neighboring activities; whether obstruction and interference with traffic particularly on streets of major importance, would be less objectionable at night than during the daytime; whether the type of work to be performed emits noises at such a low level as to not cause significant disturbances in the vicinity of the work site; the character and nature of the neighborhood of the proposed work site; whether great economic hardship would occur if the work were spread over a longer time; whether proposed night work is in the general public interest; and he shall prescribe such conditions, working times, types of construction equipment to be used, and permissible noise levels as he deems to be required in the public interest.

(b) Except as provided in subsection C. hereof, it shall be unlawful for any person, including The City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12– hour period from 7:00 a.m. to 7:00 p.m.

(c) The provisions of subsection B. of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

Standards of Significance Applied to this Project

The following standards of significance, which are based on the California Environmental Quality Act Guidelines (State CEQA Guidelines) in conjunction with adopted local noise policy and appropriate noise standards as described above, are applied to this project:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan, municipal code, or applicable standards of other agencies.

For transportation noise sources affecting existing noise-sensitive land uses outside the project site, the noise standards of Table 2 are applied.

For construction generated noise sources affecting existing noise sensitive land uses outside the project site, the 75 dB L_{eq} Municipal Code noise standards applicable to construction noise was applied (section b. of §59.5.0404, Construction Noise).

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

The sensitive areas of the project site are is not appreciably affected by existing vibration sources, nor does the project propose appreciable sources of vibration. As a result, an analysis of vibration impacts associated with this project is not warranted.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

The following criteria are used to assess the significance of project-related traffic noise level increases:

1. Where existing traffic noise levels are less than 60 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +5 dB Ldn increase in noise levels due to roadway improvement projects will be considered significant; and

2. Where existing traffic noise levels range between 60 and 65 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +3 dB Ldn increase in noise levels due to roadway improvement projects will be considered significant; and

3. Where existing traffic noise levels are greater than 65 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +1.5 dB Ldn increase in noise levels due to roadway improvement projects will be considered significant.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above level existing without the project.

A substantial temporary increase in noise levels is defined using the criteria shown above in threshold C.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project to excessive noise levels.

The project site is located over 2 miles away from the nearest airport, Montgomery Field Airport. Evaluation of aircraft noise impacts with Montgomery Field Airport is not warranted for this project.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project site to excessive noise levels.

No private airstrips were identified in the project vicinity so an evaluation of aircraft noise impacts associated with such facilities is not warranted for this project.

Environmental (Baseline) Noise Environment

Existing Land Uses in the Project Vicinity

The project site contains some previously developed areas with church and school buildings, outdoor playground and landscaping, and areas of natural vegetation. The surrounding land uses include undeveloped open space, institutional utilities development, and residential development. The nearest residences are located to the north and west; approximately 370 and 510 feet from the project site, respectively.

Existing General Ambient Noise Environment in the Project Vicinity

The ambient noise environment in the immediate project vicinity is defined primarily by local traffic on Poway Road and, to a lesser extent, by traffic on Springhurst Drive. In general, the ambient noise environment in the residential areas located nearest to the project site depends on the proximity of those residences to those roadways.

To quantify the existing ambient noise environment in the project vicinity, a continuous noise measurement survey was conducted at the project site on February 10-11, 2012. The noise measurement site represents the general ambient noise conditions in the project vicinity.

A Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter was used for the noise level measurement survey. The meter was calibrated before and after use with an LDL Model CA200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

The noise level meter was programmed to record the maximum, average, median (50th percentile) and background (90th percentile) values for each one hour period during the ambient noise survey. The maximum value, denoted L_{max}, represents the highest noise level measured at any time during the one-hour period. The average value, denoted L_{eq}, represents the energy

average of all of the noise received by the sound level meter microphone over the one-hour period. The median value, denoted L_{50}, is the noise level that is exceeded 50% of the time. In other words, 50% of the hour it was louder than the recorded L_{50} and 50% of the time it was quieter than the L_{50}. The background level, denoted L_{90}, is the level exceeded 90% of the hour.

A summary of the continuous noise level measurement results is provided in Table 3. The Table 3 data represent the mean daytime noise level for each of the descriptors monitored. The existing ambient noise survey data provided below focuses on daytime levels since the Church grounds will not typically be used during nighttime hours (10 p.m. to 7 a.m.). The Table 3 data indicate that existing traffic noise levels in the project vicinity were elevated during the noise measurement survey. Full 24-hour measurement results are provided in Appendices B and C.

Table 3
Summary of Continuous Noise Measurement Results
North City Presbyterian Church – February 10-11, 2012

Site	Description	L_{dn}/CNEL	Mean Daytime (7 a.m. to 10 p.m.) Levels			
			L_{eq}	L_{max}	L_{50}	L_{90}
1	West of Project Site	65	56	68	58	52

Source: Bollard Acoustical Consultants, Inc. 2012.

See Figure 1 for exact location of noise measurement site.

Existing Traffic Noise Environment in the Project Vicinity

To describe existing traffic noise levels, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. Table 4 shows the existing traffic noise levels. The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn}/CNEL, it is necessary to adjust the input volume to account for the day/night distribution of traffic. A listing of the FHWA Model input data for existing (baseline) conditions is provided in Appendix D.

Table 4
Existing Traffic Noise Levels
North City Presbyterian Church Project Area Roadways

Road	Segment	L_{dn}/CNEL (dB) @ 100 Feet	
		Weekday	Sunday
Poway Road	Entrance to Springhurst Dr	68	66
Poway Road	Springhurst Dr to Springbrook Dr	67	64
Springhurst Drive	Springside Rd to Poway Rd	46	47
Springhurst Drive	Poway Rd to Sabre Springs Pkwy	55	53
Springhurst Drive	Sabre Springs Pkwy to Bridge	54	52
Sabre Springs Parkway	Crestbrook Pl to Springhurst Dr	46	46

Sources: Bollard Acoustical Consultants, Inc., FHWA RD-77-108

Impacts and Mitigation Measures

For this project, noise impacts due to the proposed North City Presbyterian Church project are assessed. Noise impacts due to (resulting from), the proposed project would occur if project-generated traffic causes a substantial increase in traffic noise levels at existing, off-site, noise-sensitive land uses in the immediate project vicinity, or if noise generated by on-site activities exceeded the City of San Diego General Plan or Municipal Code noise criteria at neighboring residential uses or wetlands.

The following sections separately evaluate noise impacts due to and upon the project development.

Methodology

The only identified potentially significant noise-producing activities identified for the Project consist of increases in off-site traffic, noise generated by construction-related activities, parking lot activity, and on-site activities (daycare play areas). Because of the elevated ambient noise environment associated with existing Poway Avenue traffic noise and the setbacks and orientation of the outdoor play areas relative to the nearest residences, impacts associated with children on the site playground is not anticipated to result in adverse noise impacts. Furthermore, the project does not propose any appreciable sources of vibration, so an assessment of vibration impacts is similarly unwarranted. In addition, the project is not located in the vicinity of an airport or private airstrip, so an evaluation of potential aircraft noise impacts on this project is also unnecessary.

A combination of use of existing literature, noise level measurement data, and application of accepted noise prediction and sound propagation algorithms, were used to predict project-related off-site traffic noise level increases, on-site construction noise levels, and parking lot activity noise levels. Potential noise impacts of each of the project-related noise sources are described below.

Off-Site Traffic Noise Impact Assessment

To assess the potential noise impacts associated with project generated traffic, a comparison of church-generated traffic noise, both existing and future, project and no-project, was evaluated. Traffic data used in this assessment was obtained from a study prepared for this project by Federhart & Associates (Report dated September 20th, 2010).

To assess noise impacts due to project-related traffic increases on the local roadway network, traffic noise levels are predicted at a representative distance for both existing and future, project and no-project conditions. Noise impacts are identified at existing noise-sensitive areas if the noise level increases which result from the project exceed the significance thresholds shown in Table 2.

To describe existing and projected noise levels due to traffic, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn}/CNEL, it is necessary to adjust the input volume to account for the day/night distribution of traffic. A listing of the FHWA Model input data for existing and future conditions is provided in Appendix D-F.

Tables 5 and 6 show the predicted traffic noise levels on the local roadway network for Phase 1 (2016) and Phase 2 (2030) conditions, respectively, with and without the project. These Tables are provided in terms of L_{dn}/CNEL at a reference distance of 100 feet from the centerlines of the project-area roadways.

Table 5
Predicted Existing Traffic and Project-Related Traffic Noise Level Increases
North City Presbyterian Church – Poway, California

Road	Segment	L_{dn}/CNEL (dB) @ 100 Feet				Change (dB)
		Existing Weekday	Existing Sunday	Exist Week + Proj	Exist Sun + Proj	
Poway Road	Entrance to Springhurst Dr	68	66	68	66	0 / 0
Poway Road	Springhurst Dr to Springbrook Dr	67	64	67	64	0 / 0
Springhurst Drive	Springside Rd to Poway Rd	46	47	46	47	0 / 0
Springhurst Drive	Poway Rd to Sabre Springs Pkwy	55	53	55	54	0 / 1
Springhurst Drive	Sabre Springs Pkwy to Bridge	54	52	54	52	0 / 0
Sabre Springs Parkway	Crestbrook Pl to Springhurst Dr	46	46	46	47	0 / 1

Sources: Bollard Acoustical Consultants, Inc., FHWA RD-77-108

Table 6
Predicted 2030 Traffic and Project-Related Traffic Noise Level Increases
North City Presbyterian Church – Poway, California

Road	Segment	L_{dn}/CNEL (dB) @ 100 Feet				Change (dB)
		2030 Weekday	2030 Sunday	2030 Week + Proj	2030 Sun + Proj	
Poway Road	Entrance to Springhurst Dr	69	67	69	67	0 / 0
Poway Road	Springhurst Dr to Springbrook Dr	67	64	67	65	0 / 1
Springhurst Drive	Springside Rd to Poway Rd	46	48	46	48	0 / 0
Springhurst Drive	Poway Rd to Sabre Springs Pkwy	57	54	57	54	0 / 0
Springhurst Drive	Sabre Springs Pkwy to Bridge	55	53	55	53	0 / 0
Sabre Springs Parkway	Crestbrook Pl to Springhurst Dr	47	47	47	48	0 / 1

Sources: Bollard Acoustical Consultants, Inc., FHWA RD-77-108

Construction Noise Assessment Methodology

During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in construction would generate maximum noise levels, as indicated in Table 7, ranging from 85 to 90 dB at a distance of 50 feet. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

Table 7
Construction Equipment Noise

Type of Equipment	Maximum Level, dB at 50 feet
Bulldozers	87
Heavy Trucks	88
Backhoe	85
Pneumatic Tools	85

Source: Environmental Noise Pollution, Patrick R. Cunniff 1977

Parking Lot Vehicular Noise Assessment Methodology

As a means of determining potential noise exposure due to project parking lot activities, Bollard Acoustical Consultants, Inc. utilized noise level data collected for previous parking lot noise studies. A typical sound exposure level (SEL) due to automobile arrivals/departures, including car doors slamming and people conversing, is approximately 70 dB at a distance of 50 feet. The approximate distance between the center of the nearest proposed parking lot areas and the closest residential areas to the south, residential areas to the north, and wetlands to the east are 400, 290, and 120 feet, respectively.

The parking lots nearest to the residential sites and wetlands vary in size and therefore also vary in capacity. Given this variation, it was assumed that between 48 and 119 cars could enter or leave the parking lots adjacent to the nearest residential and wetland areas bordering the proposed project site within a worst-case hour. Parking lot noise exposure was determined using the following equation.

$$\text{Peak Hour } L_{eq} = 70+10*\log(N) - 35.6$$

Where 70 is the SEL for a single automobile parking operation, N is the number of parking lot operations in a peak hour, and 35.6 is 10 times the logarithm of the number of seconds in an hour. The results of this analysis are summarized in Table 8.

Table 8
Predicted Parking Lot Noise Levels
North City Presbyterian Church – Poway, California

Location	Distance (Feet)	# of Operations	Predicted Hourly L_{eq} (dB)
Residences to the south	400	48	33
Residences to the north	290	119	36
Edge of the wetlands	120	119	41

Source: Bollard Acoustical Consultants, Inc.

Specific Project-Related Noise Impacts

Changes in Existing Off-Site Traffic Noise Levels

Impact 1: **The Church expansion project is expected to result in traffic noise level increases of 1 dB or less over existing no-project traffic noise levels. Therefore, this impact is considered less than significant.**

A perceptible increase in traffic noise levels is typically defined as 3 dB. Because the predicted project-related traffic noise level increase on the existing roads would be less than 1 dB as a result of the project, this impact is considered to be less than significant according to the criteria cited in Table 2.

Mitigation for Impact 1: None Required.

Changes in Future (Cumulative) Off-Site Traffic Noise Levels

Impact 2: **The Church expansion project is expected to result in traffic noise level increases of 1 dB or less over future (cumulative) no-project traffic noise levels. Therefore, this impact is considered less than significant.**

A perceptible increase in traffic noise levels is typically defined as 3 dB. Because the predicted project-related traffic noise level increase on the existing roads would be less than 1 dB as a result of the project, this impact is considered to be less than significant according to the criteria cited in Table 2.

Mitigation for Impact 2: None Required.

Construction Noise

Impact 3: **During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Therefore, this impact is considered potentially significant in need of mitigation [PSM].**

Activities involved in construction would typically generate maximum noise levels ranging from 85 to 90 dB at a distance of 50 feet. Average noise levels associated with construction are considerably lower than maximum noise levels. As indicated in Figure 2, the distance from the proposed construction areas to the sensitive biological area is approximately 50 feet. At that distance, it is possible that construction activities could temporarily exceed the 75 dB L_{eq} City of San Diego Municipal Code standard (section b. of §59.5.0404, Construction Noise).

Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. Nonetheless, because construction activities would result in short-term periods of elevated noise levels, and because project Cycle Issue # 141 specifically states that any temporary construction noise which exceeds the 75 dB L_{eq} at a sensitive receptor (adjacent sensitive biological area), would be considered significant, this impact is considered potentially significant.

Mitigation for Impact 3:

MM 3a: **Construction activities, including the arrival or departure of trucks, should occur during daytime hours.**

AND

MM 3b: **Construction equipment utilizing internal combustion engines shall be muffled with the equipment manufacturer's muffler or with one providing similar sound suppression.**

AND

MM 3c: **Construction staging areas should be located as far as practical from the sensitive biological area to the south.**

AND

MM 3d: **Temporary barriers or suspension of mobile acoustic curtains should be utilized to provide screening of the sensitive biological area during construction activities which are determined to exceed the 75 dB L_{eq} criteria.**

Significance after mitigation: Less than significant.

Parking Lot Vehicular Noise Levels

Impact 4: **The Church expansion project proposes to add additional parking lot spaces resulting in a potential for an increased level of parking lot activity. Parking lot activity noise levels at the nearest residential areas and wetlands were determined to be in compliance with the City's standards. Therefore, this impact is considered less than significant.**

Proposed parking lot activity is expected to produce a noise exposure level of approximately 33-41 dB Peak Hour L_{eq} at the closest residential property lines and wetlands. Therefore, noise exposure is expected to comply with the 50 dB L_{eq} daytime (7 a.m.-7 p.m.) standard for residential land uses applied to this project, and is not expected to be a significant impact on the closest residents.

Mitigation for Impact 4: None Required.

Appendix A

Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
Loudness	A subjective term for the sensation of the magnitude of sound.
Masking	The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the Maximum level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
SEL	A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.

Appendix B

North City Presbyterian Church
24hr Continuous Noise Monitoring at Site 1
February 10-11, 2012

Hour	Leq	Lmax	L50	L90
14:00	59	72	57	51
15:00	60	68	59	53
16:00	60	69	59	53
17:00	60	66	59	53
18:00	60	66	59	55
19:00	59	67	57	52
20:00	58	67	57	51
21:00	58	68	56	51
22:00	56	67	54	49
23:00	53	69	51	43
0:00	52	62	49	41
1:00	50	60	46	39
2:00	47	61	40	38
3:00	47	60	41	39
4:00	50	65	45	39
5:00	51	65	47	40
6:00	55	64	53	45
7:00	57	68	55	48
8:00	58	66	57	50
9:00	58	66	56	50
10:00	59	69	58	52
11:00	59	67	58	52
12:00	58	66	57	52
13:00	60	76	59	54

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	59.8	57.6	56.3	59.9	47.1	58.5
Lmax (Maximum)	71.6	65.9	67.8	75.9	60.0	65.6
L50 (Median)	59.1	56.3	57.8	58.7	40.1	51.6
L90 (Background)	54.8	50.7	52.4	54.2	38.3	45.7

Computed Ldn, dB	64.6
% Daytime Energy	50%
% Nighttime Energy	50%

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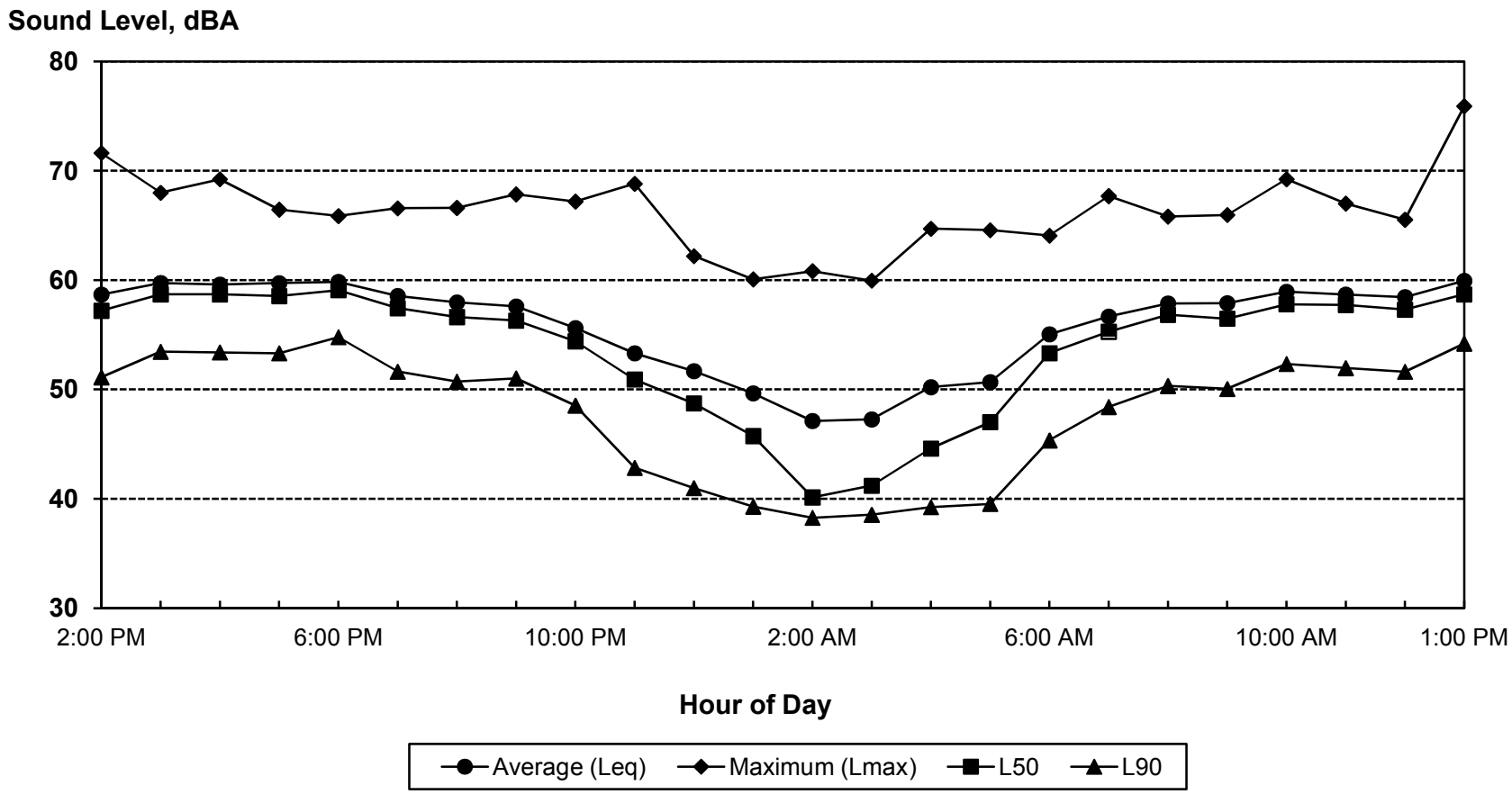
Appendix C
North City Presbyterian Church
24hr Continuous Noise Monitoring at Site 1
February 10-11, 2012



Ldn: 65 dB

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Appendix D-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Near Term Base Weekday
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description										
Segment	Roadway Name	From	To	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Poway Road	Church Parking Entrance	Springhurst Drive	35,692	75		25	2	2	35	100	
2	Poway Road	Springhurst Drive	Springbrook Drive	27,870	75		25	2	2	35	100	
3	Springhurst Drive	Springside Road	Poway Road	570	75		25	1	1	25	100	
4	Springhurst Drive	Poway Road	Sabre Springs Pa	4,288	75		25	1	1	25	100	
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	3,660	75		25	1	1	25	100	
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	570	75		25	1	1	25	100	

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Appendix D-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Near Term Base Weekday plus Phase 1
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description										Offset
Segment	Roadway Name	From	To	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	(dB)
1	Poway Road	Church Parking Entrance	Springhurst Drive	35,724	75		25	2	2	35	100	
2	Poway Road	Springhurst Drive	Springbrook Drive	27,600	75		25	2	2	35	100	
3	Springhurst Drive	Springside Road	Poway Road	570	75		25	1	1	25	100	
4	Springhurst Drive	Poway Road	Sabre Springs Pa	4,327	75		25	1	1	25	100	
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	3,670	75		25	1	1	25	100	
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	580	75		25	1	1	25	100	

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Appendix D-3

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Sunday Near Term Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description						% Med.	% Hvy.			Offset
Segment	Roadway Name	From	To	ADT	Day %	Eve %	Night %	Trucks	Trucks	Speed	Distance	(dB)
1	Poway Road	Church Parking Entrance	Springhurst Drive	25,792	75		25	2	2	35	100	
2	Poway Road	Springhurst Drive	Springbrook Drive	13,830	75		25	2	2	35	100	
3	Springhurst Drive	Springside Road	Poway Road	740	75		25	1	1	25	100	
4	Springhurst Drive	Poway Road	Sabre Springs Pa	3,072	75		25	1	1	25	100	
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	2,240	75		25	1	1	25	100	
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	560	75		25	1	1	25	100	

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Appendix D-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Sunday Near Term Base Plus Phase 1
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description										Offset
Segment	Roadway Name	From	To	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	(dB)
1	Poway Road	Church Parking Entrance	Springhurst Drive	25,948	75		25	2	2	35	100	
2	Poway Road	Springhurst Drive	Springbrook Drive	14,300	75		25	2	2	35	100	
3	Springhurst Drive	Springside Road	Poway Road	740	75		25	1	1	25	100	
4	Springhurst Drive	Poway Road	Sabre Springs Pa	3,230	75		25	1	1	25	100	
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	2,380	75		25	1	1	25	100	
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	710	75		25	1	1	25	100	

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Appendix D-5

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Weekday Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description										
Segment	Roadway Name	From	To	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Poway Road	Church Parking Entrance	Springhurst Drive	42,300	75		25	2	2	35	100	
2	Poway Road	Springhurst Drive	Springbrook Drive	32,010	75		25	2	2	35	100	
3	Springhurst Drive	Springside Road	Poway Road	550	75		25	1	1	25	100	
4	Springhurst Drive	Poway Road	Sabre Springs Pa	6,300	75		25	1	1	25	100	
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	4,250	75		25	1	1	25	100	
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	670	75		25	1	1	25	100	

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Appendix D-6

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Weekday Base Plus Phase 2
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description										
Segment	Roadway Name	From	To	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Poway Road	Church Parking Entrance	Springhurst Drive	42,371	75		25	2	2	35	100	
2	Poway Road	Springhurst Drive	Springbrook Drive	32,050	75		25	2	2	35	100	
3	Springhurst Drive	Springside Road	Poway Road	550	75		25	1	1	25	100	
4	Springhurst Drive	Poway Road	Sabre Springs Pa	6,371	75		25	1	1	25	100	
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	4,260	75		25	1	1	25	100	
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	680	75		25	1	1	25	100	

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Appendix D-7

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Sunday Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description From	Segment Description To	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Poway Road	Church Parking Entrance	Springhurst Drive	30,008	75		25	2	2	35	100	
2	Poway Road	Springhurst Drive	Springbrook Drive	16,110	75		25	2	2	35	100	
3	Springhurst Drive	Springside Road	Poway Road	870	75		25	1	1	25	100	
4	Springhurst Drive	Poway Road	Sabre Springs Pa	3,574	75		25	1	1	25	100	
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	2,620	75		25	1	1	25	100	
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	670	75		25	1	1	25	100	

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Appendix D-8

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Sunday Base Plus Phase 2
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description										
Segment	Roadway Name	From	To	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Poway Road	Church Parking Entrance	Springhurst Drive	30,287	75		25	2	2	35	100	
2	Poway Road	Springhurst Drive	Springbrook Drive	16,950	75		25	2	2	35	100	
3	Springhurst Drive	Springside Road	Poway Road	870	75		25	1	1	25	100	
4	Springhurst Drive	Poway Road	Sabre Springs Pa	3,853	75		25	1	1	25	100	
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	2,880	75		25	1	1	25	100	
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	788	75		25	1	1	25	100	

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Appendix E-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Near Term Base Weekday
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description			Medium	Heavy	
Segment	Roadway Name	From	To	Autos	Trucks	Trucks	Total
1	Poway Road	Church Parking Entrance	Springhurst Drive	65.2	58.1	63.3	68
2	Poway Road	Springhurst Drive	Springbrook Drive	64.2	57.0	62.2	67
3	Springhurst Drive	Springside Road	Poway Road	43.1	34.8	42.5	46
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	51.9	43.6	51.2	55
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	51.2	42.9	50.6	54
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	43.1	34.8	42.5	46

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Appendix E-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Near Term Base Weekday plus Phase 1
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description From	Segment Description To	Autos	Medium Trucks	Heavy Trucks	Total
1	Poway Road	Church Parking Entrance	Springhurst Drive	65.2	58.1	63.3	68
2	Poway Road	Springhurst Drive	Springbrook Drive	64.1	57.0	62.2	67
3	Springhurst Drive	Springside Road	Poway Road	43.1	34.8	42.5	46
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	51.9	43.6	51.3	55
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	51.2	42.9	50.6	54
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	43.2	34.9	42.6	46

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Appendix E-3

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Sunday Near Term Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description From	Segment Description To	Autos	Medium Trucks	Heavy Trucks	Total
1	Poway Road	Church Parking Entrance	Springhurst Drive	63.8	56.7	61.9	66
2	Poway Road	Springhurst Drive	Springbrook Drive	61.1	54.0	59.2	64
3	Springhurst Drive	Springside Road	Poway Road	44.3	36.0	43.6	47
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	50.5	42.2	49.8	53
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	49.1	40.8	48.4	52
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	43.1	34.8	42.4	46

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Appendix E-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Sunday Near Term Base Plus Phase 1
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description From	Segment Description To	Autos	Medium Trucks	Heavy Trucks	Total
1	Poway Road	Church Parking Entrance	Springhurst Drive	63.8	56.7	61.9	66
2	Poway Road	Springhurst Drive	Springbrook Drive	61.3	54.1	59.3	64
3	Springhurst Drive	Springside Road	Poway Road	44.3	36.0	43.6	47
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	50.7	42.4	50.0	54
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	49.3	41.1	48.7	52
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	44.1	35.8	43.4	47

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Appendix E-5

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Weekday Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description From	Segment Description To	Autos	Medium Trucks	Heavy Trucks	Total
1	Poway Road	Church Parking Entrance	Springhurst Drive	66.0	58.8	64.0	69
2	Poway Road	Springhurst Drive	Springbrook Drive	64.8	57.6	62.8	67
3	Springhurst Drive	Springside Road	Poway Road	43.0	34.7	42.3	46
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	53.6	45.3	52.9	57
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	51.9	43.6	51.2	55
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	43.8	35.5	43.2	47

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Appendix E-6

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Weekday Base Plus Phase 2
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description From	Segment Description To	Autos	Medium Trucks	Heavy Trucks	Total
1	Poway Road	Church Parking Entrance	Springhurst Drive	66.0	58.8	64.0	69
2	Poway Road	Springhurst Drive	Springbrook Drive	64.8	57.6	62.8	67
3	Springhurst Drive	Springside Road	Poway Road	43.0	34.7	42.3	46
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	53.6	45.3	53.0	57
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	51.9	43.6	51.2	55
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	43.9	35.6	43.2	47

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Appendix E-7

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Sunday Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description From	Segment Description To	Autos	Medium Trucks	Heavy Trucks	Total
1	Poway Road	Church Parking Entrance	Springhurst Drive	64.5	57.4	62.5	67
2	Poway Road	Springhurst Drive	Springbrook Drive	61.8	54.6	59.8	64
3	Springhurst Drive	Springside Road	Poway Road	45.0	36.7	44.3	48
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	51.1	42.8	50.5	54
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	49.8	41.5	49.1	53
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	43.8	35.5	43.2	47

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Appendix E-8

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Sunday Base Plus Phase 2
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description From	Segment Description To	Autos	Medium Trucks	Heavy Trucks	Total
1	Poway Road	Church Parking Entrance	Springhurst Drive	64.5	57.4	62.6	67
2	Poway Road	Springhurst Drive	Springbrook Drive	62.0	54.9	60.1	65
3	Springhurst Drive	Springside Road	Poway Road	45.0	36.7	44.3	48
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	51.4	43.1	50.8	54
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	50.2	41.9	49.5	53
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	44.5	36.3	43.9	48

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Appendix F-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Near Term Base Weekday
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description		------ Distances to Traffic Noise Contours ------				
Segment	Roadway Name	From	To	75	70	65	60	55
1	Poway Road	Church Parking Entrance	Springhurst Drive	33	72	155	334	720
2	Poway Road	Springhurst Drive	Springbrook Drive	28	61	132	284	611
3	Springhurst Drive	Springside Road	Poway Road	1	3	6	12	26
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	5	10	21	46	99
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	4	9	19	41	89
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	1	3	6	12	26

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Appendix F-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Near Term Base Weekday plus Phase 1
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description		------ Distances to Traffic Noise Contours ------				
Segment	Roadway Name	From	To	75	70	65	60	55
1	Poway Road	Church Parking Entrance	Springhurst Drive	33	72	155	335	721
2	Poway Road	Springhurst Drive	Springbrook Drive	28	61	131	282	607
3	Springhurst Drive	Springside Road	Poway Road	1	3	6	12	26
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	5	10	21	46	100
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	4	9	19	41	89
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	1	3	6	12	26

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Appendix F-3

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Sunday Near Term Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description		------ Distances to Traffic Noise Contours ------				
Segment	Roadway Name	From	To	75	70	65	60	55
1	Poway Road	Church Parking Entrance	Springhurst Drive	27	58	125	269	580
2	Poway Road	Springhurst Drive	Springbrook Drive	18	38	82	178	383
3	Springhurst Drive	Springside Road	Poway Road	1	3	7	14	31
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	4	8	17	37	79
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	3	6	14	30	64
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	1	3	5	12	25

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Appendix F-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-004 North City Presbyterian Church
Description: 2012 Sunday Near Term Base Plus Phase 1
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description		------ Distances to Traffic Noise Contours ------				
Segment	Roadway Name	From	To	75	70	65	60	55
1	Poway Road	Church Parking Entrance	Springhurst Drive	27	58	125	270	582
2	Poway Road	Springhurst Drive	Springbrook Drive	18	39	84	182	392
3	Springhurst Drive	Springside Road	Poway Road	1	3	7	14	31
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	4	8	18	38	82
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	3	7	14	31	67
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	1	3	6	14	30

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Appendix F-5

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Weekday Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description		------ Distances to Traffic Noise Contours ------				
Segment	Roadway Name	From	To	75	70	65	60	55
1	Poway Road	Church Parking Entrance	Springhurst Drive	37	81	174	374	807
2	Poway Road	Springhurst Drive	Springbrook Drive	31	67	144	311	670
3	Springhurst Drive	Springside Road	Poway Road	1	3	5	12	25
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	6	13	28	59	128
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	5	10	21	46	98
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	1	3	6	13	29

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Appendix F-6

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Weekday Base Plus Phase 2
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description		------ Distances to Traffic Noise Contours ------				
Segment	Roadway Name	From	To	75	70	65	60	55
1	Poway Road	Church Parking Entrance	Springhurst Drive	37	81	174	375	808
2	Poway Road	Springhurst Drive	Springbrook Drive	31	67	144	311	671
3	Springhurst Drive	Springside Road	Poway Road	1	3	5	12	25
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	6	13	28	60	129
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	5	10	21	46	98
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	1	3	6	13	29

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Appendix F-7

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Sunday Base
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description		------ Distances to Traffic Noise Contours ------				
Segment	Roadway Name	From	To	75	70	65	60	55
1	Poway Road	Church Parking Entrance	Springhurst Drive	30	64	138	298	642
2	Poway Road	Springhurst Drive	Springbrook Drive	20	42	91	197	424
3	Springhurst Drive	Springside Road	Poway Road	2	3	7	16	34
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	4	9	19	41	88
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	3	7	15	33	71
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	1	3	6	13	29

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Appendix F-8

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2012-004 North City Presbyterian Church
Description: 2030 Sunday Base Plus Phase 2
Ldn/CNEL: Ldn
Hard/Soft: Soft

		Segment Description		------ Distances to Traffic Noise Contours ------				
Segment	Roadway Name	From	To	75	70	65	60	55
1	Poway Road	Church Parking Entrance	Springhurst Drive	30	65	139	300	646
2	Poway Road	Springhurst Drive	Springbrook Drive	20	44	94	204	439
3	Springhurst Drive	Springside Road	Poway Road	2	3	7	16	34
4	Springhurst Drive	Poway Road	Sabre Springs Parkway	4	9	20	43	92
5	Springhurst Drive	Sabre Springs Parkway	Over Bridge	4	8	16	35	76
6	Sabre Springs Parkway	Crestbrook Place	Springhurst Drive	1	3	7	15	32

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The City of San Diego

PRIORITY DEVELOPMENT PROJECT (PDP) STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) FOR

North City Presbyterian Church Project
Project No. 150585

ENGINEER OF WORK:

REGISTERED PROFESSIONAL ENGINEER
DANNY ABADA
No. 45381
CIVIL
STATE OF CALIFORNIA

Danny Abada, P.E.

PREPARED FOR:

North City Presbyterian Church
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Attention: Bill Parkhurst
Email: bill@northcitychurch.com
Phone: 858-748-4642

PREPARED BY:

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DATE:
8/25/16

Approved by: City of San Diego Date

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ACRONYMS

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

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CERTIFICATION PAGE

Project Name: North City Presbyterian Church Project
Project Number: 150585

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the Storm Water Standards, which is based on the requirements of SDRWQCB 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 Storm Water Standards. 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 source control and site design 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

Danny Abada, P.E. 45381, Expires 9/30/16
Print Name

Spear & Associates Inc.
Company

8/25/16
Date

Engineer's Stamp

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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 last column indicate changes that have been made or indicate if response to plan check comments is included. When applicable, insert response to plan check comments.

Submittal Number	Date	Project Status	Changes
1		☐ Preliminary Design/Planning/CEQA ☐ Final Design	Initial Submittal
2		☐ Preliminary Design/Planning/CEQA ☐ Final Design	
3		☐ Preliminary Design/Planning/CEQA ☐ Final Design	
4		☐ Preliminary Design/Planning/CEQA ☐ Final Design	

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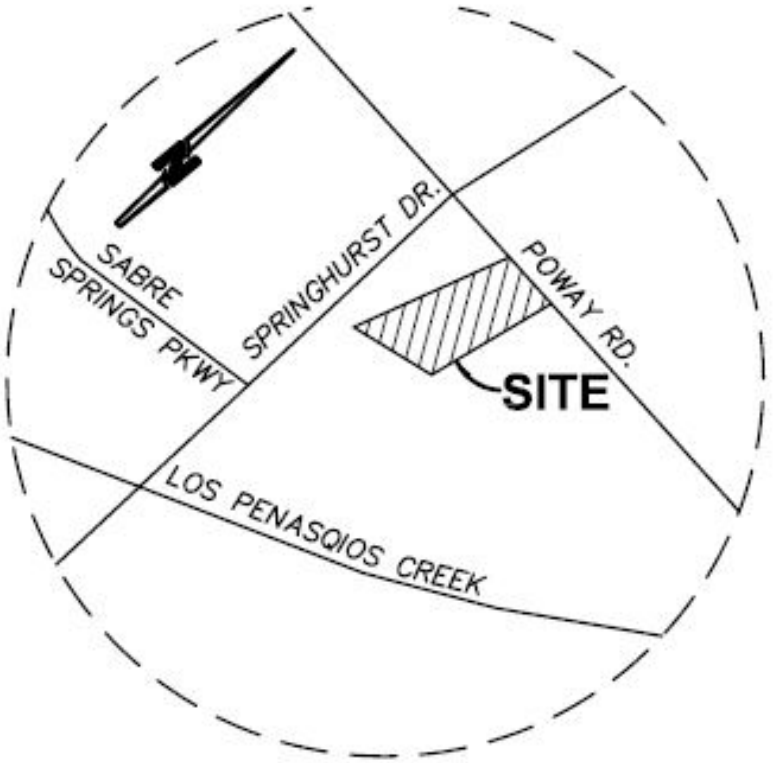
PROJECT VICINITY MAP

Project Name: North City Presbyterian Church Project
Project Number: 421176



VICINITY MAP

NO SCALE

PER S.D. CO. THOMAS GUIDE
PAGE 1190, A-6

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STORM WATER REQUIREMENTS APPLICABILITY CHECKLIST

Complete and attach DS-560 Form included in Appendix A.1

THE CITY OF SAN DIEGO	City of San Diego **Development Services** 1222 First Ave., MD-302 San Diego, CA 92101 (619) 446-5000	**Storm Water Requirements Applicability Checklist**	FORM **DS-560** February 2016

Project Address: 11717 Poway Road, San Diego, CA 92064	Project Number *(for the City Use Only)*: 10T

SECTION 1. Construction Storm Water BMP Requirements:
All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1], which is administrated by the State Water Resources Control Board.

For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with construction activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

   ◉ Yes; SWPPP required, 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 any other activity that results in ground disturbance and contact with storm water runoff?

   ◉ Yes; WPCP required, skip questions 3-4 ○ No; next question

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (projects such as pipeline/utility replacement)

   ◉ Yes; WPCP required, skip questions 4 ○ No; next question

4. Does the project only include the following Permit types listed below?
   - Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
   - Individual Right of Way Permits that exclusively include one of the following activities and associated curb/ sidewalk repair: water services, sewer lateral, storm drain lateral, or dry utility service.
   - Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, curb and gutter replacement, and retaining wall encroachments.

   ☐ Yes; no document required

Check one of the boxes to the right, and continue to PART B:

☒ If you checked "Yes" for question 1,
a SWPPP is REQUIRED. Continue to PART B

☐ If you checked "No" for question 1, and checked "Yes" for question 2 or 3,
a WPCP is REQUIRED. If the project processes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. **Continue to PART B.**

☐ If you checked "No" for all question 1-3, and checked "Yes" for question 4
PART B **does not apply and no document is required. Continue to Section 2.**

More information on the City's construction BMP requirements as well as CGP requirements can be found at: www.sandiego.gov/stormwater/regulations/swguide/constructing.shtml

PART B: Determine Construction Site Priority.

This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk. Determination approach of the Stat e Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. **NOTE:** The construction priority does **NOT** change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☒ ASBS

a. Projects located in the ASBS watershed. A map of the ASBS watershed can he found here *http://www.waterboards.ca.gov/water_issues/programs/ocean/asbs_areas.shtml*

2. ☐ High Priority

a. Projects 1 acre or more determined to be Risk Level 2 or Risk Level 3 per the Construction General Permit and not located in the ASBS watershed.

b. Projects 1 acre or more determined to be LUP Type 2 or LUP Type 3 per the Construction General Permit and not located in the ASBS watershed.

3. ☐ Medium Priority

a. Projects 1 acre or more but not subject to an ASBS or high priority designation.

b. Projects determined to be Risk Level 1 or LUP Type 1 per the Construction General Permit and not located in the ASBS watershed.

4. ☐ Low Priority

a. Projects not subject to ASBS, high or medium priority designation.

SECTION 2. Permanent Storm Water BMP Requirements.

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

PART C: Determine if Not Subject to Permanent Storm Water Requirements.

Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

1.	Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	○ Yes ◉ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	○ Yes ◉ No
3.	Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	○ Yes ◉ No

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."
If "no" was checked for all questions in Part D, continue to Part E.

1. Does the project ONLY include new or retrofit sidewalks, bicycle lanes, 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 and roads? Or;
   • Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?

   ○ Yes; PDP exempt requirements apply ◉ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

   ○ Yes; PDP exempt requirements apply ◉ No; PDP not exempt. PDP requirements apply.

PART E: Determine if Project is a Priority Development Project (PDP). Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".
If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Project".

1.	**New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	◉ Yes ○ No
2.	**Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces 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
3.	**New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	○ Yes ◉ No
4.	**New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	○ Yes ◉ No

5. **New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).**	◉ Yes ○ No
6. **New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	◉ Yes ○ No
7. **New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges 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
8. **New development or redevelopment projects of a retail gasoline outlet that creates and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic of 100 or more vehicles per day.	○ Yes ◉ No
9. **New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	○ Yes ◉ No
10. **Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces.	○ Yes ◉ No

PART F: Select the appropriate category based on the outcomes of PART C through PART E.

1. The project is **NOT SUBJECT TO STORM WATER REQUIREMENTS**.	☐
2. The project is a **STANDARD PROJECT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
3. The project is **PDP EXEMPT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
4. The project is a **PRIORITY DEVELOPMENT PROJECT**. Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires hydromodification management.	☒

Name of Owner or Agent *(Please Print):*	Title:
Signature:	Date:

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Applicability of Permanent, Post-Construction Storm Water BMP Requirements	Form I-1

Project Identification	
Project Name: North City Presbyterian Church Project	
Permit Application Number: 150585	Date: 8/25/16

Determination of Requirements

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

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". Refer to Part 1 of Storm Water Standards sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	X Yes	Go to Step 2.
	☐ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.

Discussion / justification if the project is not a "development project" (e.g., the project includes only interior remodels within an existing building):

Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual (Part 1 of Storm Water Standards) in its entirety for guidance, AND complete Storm Water Requirements Applicability Checklist.	☐ Standard Project	Stop. Standard Project requirements apply.
	X PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	☐ PDP Exempt	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.

Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:

Form I-1 Page 2		
Step	Answer	Progression
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	X No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (<u>not required if prior lawful approval does not apply</u>):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	X Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	☐ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do <u>not</u> apply:		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	X Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	☐ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply:		

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	North City Presbyterian Church Project
Project Address	11717 Poway Road, San Diego, CA 92064
Assessor's Parcel Number(s) (APN(s))	316-040-36
Permit Application Number	150585
Project Watershed	Select One: ☐ San Dieguito River X Penasquitos ☐ Mission Bay ☐ San Diego River ☐ San Diego Bay ☐ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal places (9XX.XX)	Los Penasquitos Canyon Creek 906.1
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	7.37 Acres
Area to be disturbed by the project (Project Footprint)	2.85 Acres
Project Proposed Impervious Area (subset of Project Footprint)	1.86 Acres
Project Proposed Pervious Area (subset of Project Footprint)	0.99 Acres
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	16.3 % Increase

Form I-3B Page 2 of 11
Description of Existing Site Condition and Drainage Patterns
Current Status of the Site (select all that apply): X Existing development ☐ Previously graded but not built out ☐ Agricultural or other non-impervious use ☐ Vacant, undeveloped/natural Description / Additional Information: The site was previously developed and currently includes several buildings, driveways and parking lots.
Existing Land Cover Includes (select all that apply): X Vegetative Cover X Non-Vegetated Pervious Areas X Impervious Areas Description / Additional Information:
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐ NRCS Type A ☐ NRCS Type B X NRCS Type C ☐ NRCS Type D
Approximate Depth to Groundwater (GW): ☐ GW Depth < 5 feet ☐ 5 feet < GW Depth < 10 feet X 10 feet < GW Depth < 20 feet ☐ GW Depth > 20 feet
Existing Natural Hydrologic Features (select all that apply): ☐ Watercourses ☐ Seeps ☐ Springs X Wetlands ☐ None Description / Additional Information: Please refer to Biological Resources Technical Report prepared by Foothill Associates.

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. If runoff from offsite is conveyed through the site? If yes, quantification of 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 storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels;
4. Identify all discharge locations from the existing project along with a summary of the 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:

The existing drainage conveyance is urban and the watershed includes 0.47 acres of offsite drainage. The existing project site area (2.85 acres re-development portion) was previously developed and currently includes several buildings, driveways and parking lots. The northern portion of the site has a 48" RCP crossing in an easterly direction and discharging its flow into Penasquitos River. The adjacent river area downstream from the project is an environmentally sensitive area. The southwest portion of the site drains to an existing 18" RCP that also discharges its flow into the Penasquitos River. The flow continues approximately 10 miles west to the Pacific Ocean.

Summary flow rates (Refer to Hydrology Report for Detailed Information)

	Storm Event 2-year (cfs)	***Storm Event 10-year (cfs)***	***Storm Event 50-year (cfs)***
Pre-Development Total	5.0	7.7	10.6
Post-Dev. Total	5.0	7.7	10.6
Pre-Development A	2.6	4.0	5.6
Post-Dev. A	1.9	2.9	4.0
Pre-Development B1	2.4	3.7	5.1
Post-Dev. B1	2.6	4.0	5.5

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The project consists of constructing two new buildings for the North City Presbyterian Church , also the removal of one existing building and the removal and replacement of parking areas and driveways. All other existing buildings will remain.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

Impervious development will include buildings, parking lots and hardscape.

List/describe proposed pervious features of the project (e.g., landscape areas):

Proposed pervious surfaces include landscaping and biofiltration basins for stormwater treatment.

Does the project include grading and changes to site topography?

X Yes

☐ No

Description / Additional Information:

The development area will be minimally graded to accommodate the new buildings and parking lot in order to direct their flow to desilting basins. The project will significantly maintain the existing slope patterns of the site.

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?
X Yes
☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and 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.

Description / Additional Information:

The project will add 0.47 acres of offsite parking areas draining to the site. The northeastern portion of the development will drain into a new biofiltration basin and its flow will be tied into the existing 48" RCP. The southwestern portion will drain into another new biofiltration basin and its flow will be directed into the existing 18" RCP. The proposed drainage will maintain the existing flow characteristics of the site draining towards Penasquitos River and the Pacific Ocean approximately 10 miles west.

Summary flow rates (Refer to Hydrology Report for Detailed Information)

	Storm Event 2-year (cfs)	***Storm Event 10-year (cfs)***	***Storm Event 50-year (cfs)***
Pre-Development Total	5.0	7.7	10.6
Post-Dev. Total	5.0	7.7	10.6
Pre-Development A	2.6	4.0	5.6
Post-Dev. A	1.9	2.9	4.0
Pre-Development B1	2.4	3.7	5.1
Post-Dev. B1	2.6	4.0	5.5

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

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

Description / Additional Information:

Form I-3B Page 7 of 11

Identification and Narrative of Receiving Water

Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable)

The drainage is directed to an existing Caltrans 24" ACP located on the southwest corner of the site. Then draining towards an existing drainage swale adjacent to Otay Mesa Fwy 905, then continues west to Spring Canyon, Tijuana River at approximately 3.5 miles, Tijuana River Estuary and the Pacific Ocean at approximately 8.4 miles west.

Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations.

	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Inland Surface Waters																
Los Penasquitos Creek	906.1		●	●					O	●		●		●		
Ground Water																
Los Penasquitos Creek	906.1	●	●	●												

	Hydrologic Unit Basin Number	IND	NAV	REC1	REC 2	COMM	BIOL	EST	WILD	RARE	MAR	AQUA	MIGR	SPWN	WARM	SHELL
Coastal Waters																
Los Penasquitos Lagoon	906.1			●	●		●	●	●	●	●		●	●		

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

+ Excepted from Municipal **● Existing Beneficial Use** **o Potential Beneficial Use**

Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations. There were no ASBS areas found.
Provide distance from project outfall location to impaired or sensitive receiving waters. Approximately 200' to Los Penasquitos Creek
Summarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands The proposed project site contains 3.58 acres within the City of San Diego's Multi-Habitat Planning Area. Please refer to Biological Resources Technical Report prepared by Foothill Associates for detailed information.

Form I-3B Page 8 of 11		
Identification of Receiving Water Pollutants of Concern		
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
Los Penasquitos Creek	Enterococcus, Fecal Coliform, Selenium, Total Dissolved Solids, Total Nitrogen as N, Toxicity	Hydromodification, Siltation/Sedimentation; Freshwater Discharges; and Indicator Bacteria.
Los Penasquitos Lagoon	Sedimentation/Siltation	
Pacific Ocean Shoreline @ Los Penasquitos River mouth	Total Coliform	

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 (Part 1 of Storm Water Standards) Appendix B.6):			
Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment		X Potential	
Nutrients		X Potential	
Heavy Metals		X	
Organic Compounds		X Potential	
Trash & Debris		X	
Oxygen Demanding Substances		X Potential	
Oil & Grease		X	
Bacteria & Viruses		X Potential	
Pesticides		X Potential	

Hydromodification Management Requirements

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

X 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):

Critical Coarse Sediment Yield Areas*

*This Section only required if hydromodification management requirements apply

Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream area draining through the project footprint?

X Yes

☐No

Discussion / Additional Information:

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.

Point of Compliance 1 off biofiltration basin 1 @ the east portion of the site. Point of Compliance off biofiltration basin 2 @ the southwest portion of the site. Los Penasquitos Creek is the receiving water

Has a geomorphic assessment been performed for the receiving channel(s)?

X No, the low flow threshold is 0.1Q2 (default low flow threshold)

☐ Yes, the result is the low flow threshold is 0.1Q2

☐ Yes, the result is the low flow threshold is 0.3Q2

☐ Yes, the result is the low flow threshold is 0.5Q2

If a geomorphic assessment has been performed, provide title, date, and preparer:

Discussion / Additional Information: (optional)

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. The watershed includes an offsite area of 0.47 acres currently draining into the project site. The project site contains 3.58 acres within the City of San Diego's Multi-Habitat Planning Area and is adjacent to sensitive biologic areas. Please refer to Biological Resources Technical Report prepared by Foothill Associates for detailed information.
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.

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Source Control BMP Checklist for All Development Projects	Form I-4

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 BMP Design Manual (Part 1 of the Storm Water Standards) 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 BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	X Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	X Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	X N/A
Discussion / justification if SC-3 not implemented: None proposed			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	X N/A
Discussion / justification if SC-4 not implemented: None proposed			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	X Yes	☐ No	☐ N/A
Discussion / justification if SC-5 not implemented:			

Form I-4 Page 2 of 2			
Source Control Requirement	Applied?		
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
On-site storm drain inlets	X Yes	☐ No	☐ N/A
Interior floor drains and elevator shaft sump pumps	☐ Yes	☐ No	X N/A
Interior parking garages	☐ Yes	☐ No	X N/A
Need for future indoor & structural pest control	☐ Yes	☐ No	X N/A
Landscape/Outdoor Pesticide Use	X Yes	☐ No	☐ N/A
Pools, spas, ponds, decorative fountains, and other water features	☐ Yes	☐ No	X N/A
Food service	☐ Yes	☐ No	X N/A
Refuse areas	X Yes	☐ No	☐ N/A
Industrial processes	☐ Yes	☐ No	X N/A
Outdoor storage of equipment or materials	☐ Yes	☐ No	X N/A
Vehicle/Equipment Repair and Maintenance	☐ Yes	☐ No	X N/A
Fuel Dispensing Areas	☐ Yes	☐ No	X N/A
Loading Docks	☐ Yes	☐ No	X N/A
Fire Sprinkler Test Water	X Yes	☐ No	☐ N/A
Miscellaneous Drain or Wash Water	☐ Yes	☐ No	X N/A
Plazas, sidewalks, and parking lots	X Yes	☐ No	☐ N/A
SC-6A: Large Trash Generating Facilities	☐ Yes	☐ No	X N/A
SC-6B: Animal Facilities	☐ Yes	☐ No	X N/A
SC-6C: Plant Nurseries and Garden Centers	☐ Yes	☐ No	X N/A
SC-6D: Automotive-related Uses	☐ Yes	☐ No	X N/A
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.			

Site Design BMP Checklist for All Development Projects	Form I-5

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 BMP Design Manual (Part 1 of Storm Water Standards) 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 BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

A site map with implemented site design BMPs must be included at the end of this checklist.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	X Yes	☐ No	☐ N/A
Discussion / justification if SD-1 not implemented:			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	X Yes	☐ No	
1-2 Are trees implemented? If yes, are they shown on the site map?	☐ Yes	☐ No	X
1-3 Implemented trees meet the design criteria in SD-1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	☐ Yes	☐ No	X
1-4 Is tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	☐ Yes	☐ No	X
SD-2 Have natural areas, soils and vegetation been conserved?	X Yes	☐ No	☐ N/A
Discussion / justification if SD-2 not implemented:			

Form I-5 Page 2 of 4

Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	X Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	X Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	X Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented: Dispersion is implemented within landscaped areas and biofiltration basins			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	X Yes	☐ No	
5-2 Does the pervious area satisfy the design criteria in SD-5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	☐ Yes	X No	
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	☐ Yes	X No	

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	X Yes	☐ No	☐ N/A
Discussion / justification if SD-6 not implemented:			
6a-1 Are green roofs implemented in accordance with design criteria in SD-6A Fact Sheet? If yes, are they shown on the site map?	☐ Yes	X No	
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	☐ Yes	X No	
6b-1 Are permeable pavements implemented in accordance with design criteria in SD-6B Fact Sheet? If yes, are they shown on the site map?	☐ Yes	X No	
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	☐ Yes	X No	
SD-7 Landscaping with Native or Drought Tolerant Species	X Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	X No	☐ N/A
Discussion / justification if SD-8 not implemented: Harvesting was unfeasible. Please refer to feasibility calculations on worksheet B.3-1 in attachment 1			
8-1 Are rain barrels implemented in accordance with design criteria in SD-8 Fact Sheet? If yes, are they shown on the site map?	☐ Yes	X No	
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	☐ Yes	X No	

Form I-5 Page 4 of 4
Insert Site Map with all site design BMPs identified:

Summary of PDP Structural BMPs	Form I-6

PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

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

Harvest and use was found unfeasible. Please refer to feasibility calculations on worksheet B.3-1 in attachment 1. Infiltration BMPs are not feasible according to geotechnical engineer's recommendations. The selected BMPs with hydromodification were sized adequately to accommodate the design capture volume.

Biofiltration was selected as the most efficient BMP to treat the project's anticipated and expected pollutants. Biofiltration is used for treatment and hydromodification.

Form I-6 Page 2 of X
(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
Structural BMP ID No. DMA A
Construction Plan Sheet No. BMP Map
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) X Biofiltration (BF-1) ○ 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 ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)
Purpose: O Pollutant control only ○ Hydromodification control only X 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 form DS-563	North City Presbyterian Church 11717 Poway Road, San Diego, CA 92064 Attention: Bill Parkhurst Email: bill@northcitychurch.com
Who will be the final owner of this BMP?	Same as above
Who will maintain this BMP into perpetuity?	Same as above.
What is the funding mechanism for maintenance?	Same as above

Structural BMP Summary Information

Structural BMP ID No. DMA B

Construction Plan Sheet No. BMP Map

Type of structural BMP:

O Retention by harvest and use (HU-1)

O Retention by infiltration basin (TNF-1)

O Retention by bioretention (INF-2)

O Retention by permeable pavement (INF-3)

O Partial Retention by infiltration with partial retention (PR-1)

X Biofiltration (BF-1)

O Flow thru treatment control with prior lawful approval to meet earlier PDP requirements (Provide. *(BMP* type/description in discussion section below)

O 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 DMP it selves in discussion section below)

O Flow-thn1 treatment control with alterna tive compliance (provide BMP type/description in

O Detention pond or vault for hydromodification management

O Other (describe in discussion section below)

Purpose:

O Pollutant control only

O Hydromodification control only

X Combined pollutant control and hydromodification control

O Pre-treatment/forebay for another structural BMP

O 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 form DS-563	North City Presbyterian Church 11717 Poway Road, San Diego, CA 92064 Attention: Bill Parkhurst Email: bill@northcitychurch.com
Who will be the final owner of this BMP?	Same as above
Who will maintain this BMP into perpetuity?	Same as above.
What is the funding mechanism for maintenance?	Same as above

City of San Diego **Development Services** 1222 First Ave. MD 202 San Diego, CA 92101 (619) 446-5000 THE CITY OF SAN DIEGO	**Permanent BMP Construction** **Self Certification Form**	FORM DS-563 February 2016

Date Prepared:	Project No.:
Project Applicant:	Phone:
Project Address:	
Project Engineer:	Phone:

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Quality Management Plan (SWQMP) documents and drawings.

This form must be completed by the engineer and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of San Diego.

CERTIFICATION:

As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and structural BMP's required per the approved SWQMP and Construction Permit No. _____; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 of the San Diego Regional Water Quality Control Board.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: _____

Date of Signature: _____

Printed Name: _____

Title: _____

Phone No. _____

Engineer's Stamp

DS-563 (01-16)

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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:

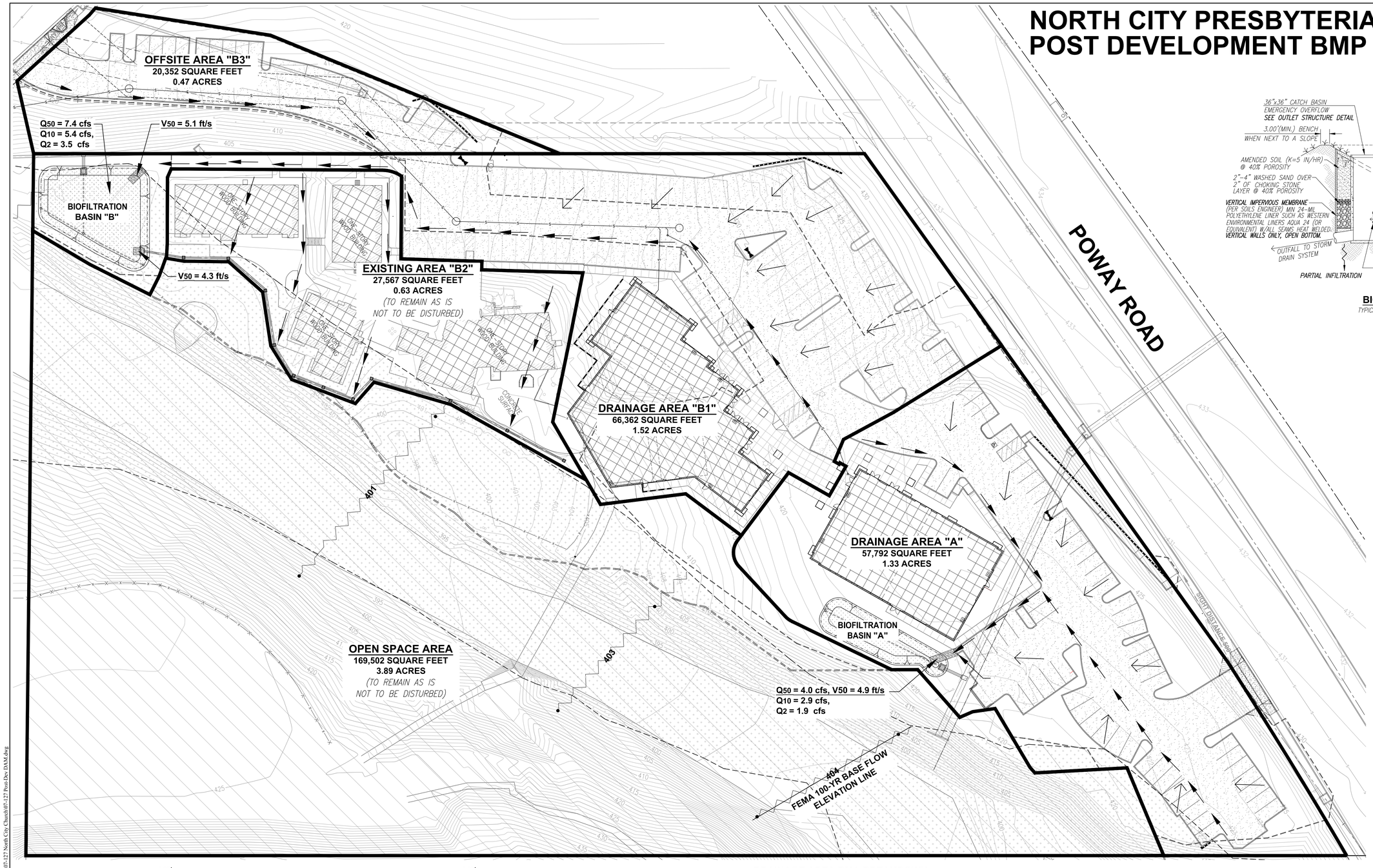
Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	X Included
Attachment 1b	Tabular Summary of DMAs Showing DA ID matching DMA Exhibit, DMA Area, and DMA Type (Requred)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	X Included on DMA Exhibit in Attachment 1a Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	X Included Not included because the entire project will use infiltration BMPs
Attachment 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	◉ 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 and site design credit calculations	X Included

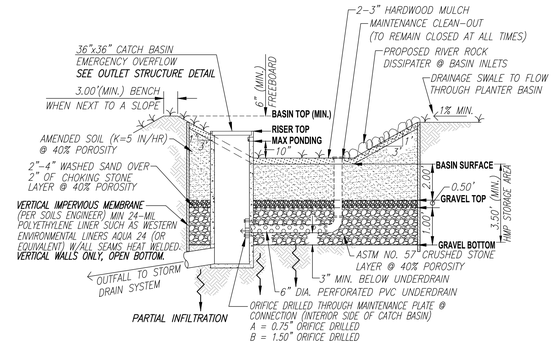
Use this checklist to ensure the required information has been included on the DMA Exhibit:

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 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)

NORTH CITY PRESBYTERIAN CHURCH
POST DEVELOPMENT BMP OVERVIEW MAP





BIOFILTRATION BASIN

TYPICAL SECTION & OUTLET CONNECTION
NOT-TO-SCALE

BIOFILTRATION BASIN MEDIA

PER COUNTY OF SAN DIEGO 2014 LID HANDBOOK, APPENDIX C FACT SHEETS.

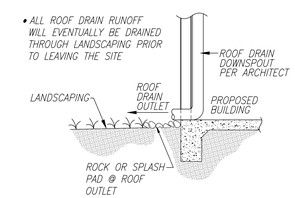
24" AMENDED SOIL LAYER
COMPOSITION AND TEXTURE:
65% SAND, 20% SANDY LOAM, & 15% COMPOST (FROM VEGETATION-BASED FEEDSTOCK). ANIMAL WASTES OR BY-PRODUCTS SHOULD NOT BE APPLIED.

PERMEABILITY:
5 IN/HR INFILTRATION RATE FOR THE FLOW-BASED SUSMP METHOD (1-6IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION).

CHEMICAL COMPOSITION: TOTAL PHOSPHORUS < 15 PARTS PER MILLION (PPM); PH 6-8; CATION EXCHANGE CAPACITY > 5 MILLIEQUIVALENTS PER 100 GRAMS (MEQ/100 G) OF SOIL; ORGANIC MATTER CONTENT < 5 PERCENT BY WEIGHT.

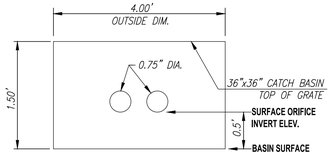
18" DRAINAGE LAYER
SEPARATE SOIL MEDIA FROM UNDERDRAIN LAYER WITH 2 TO 4 INCHES OF WASHED SAND, FOLLOWED BY 2 INCHES OF CHOKING STONE (ASTM NO. 8) OVER 1.0-FOOT OF ASTM NO. 57 STONE.

SURFACE VEGETATION
AS SPECIFIED BY THE LANDSCAPE ARCHITECT PLANS.



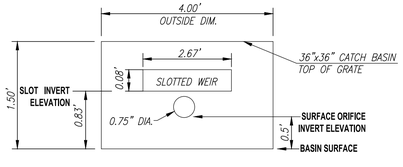
ROOF DRAIN OUTLET

TYPICAL ROOF DRAIN OUTLET AT LANDSCAPED AREAS
NO SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN A

36" CATCH BASIN'S OUTSIDE WALL,
(2) ORIFICES TO BE INSTALLED ON SOUTH WALL
NOT-TO-SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN B

36" CATCH BASIN'S OUTSIDE WALL,
(3) SLOTTED WEIR TO BE INSTALLED ON NORTH, EAST, AND SOUTH WALLS
NOT-TO-SCALE

DRAINAGE AREA DMA BREAKDOWN

SYMBOL	DRAINAGE AREA SURFACE	SOIL TYPE	'A' (EAST SIDE)	'B1' (WEST SIDE)	EXISTING AREA 'B2' (TO REMAIN AS IS & UNDISTURBED)	OPEN SPACE (TO REMAIN AS IS & UNDISTURBED)	OFFSITE 'B3' PRIVATE ACCESS & PARKING EASEMENT
	BUILDING ROOFTOP	TYPE 'C'	7,310 SQ FT	10,498 SQ FT	9,392 SQ FT	0 SQ FT	0 SQ FT
	PARKING/DRIVE AISLE IMPERVIOUS AREA	TYPE 'C'	23,332 SQ FT	30,574 SQ FT	0 SQ FT	0 SQ FT	9,268 SQ FT
	HARDSCAPING/SIDEWALK	TYPE 'C'	3,162 SQ FT	6,290 SQ FT	8,548 SQ FT	0 SQ FT	0 SQ FT
	LANDSCAPING AREA	TYPE 'C'	23,988 SQ FT	19,000 SQ FT	9,627 SQ FT	169,502 SQ FT	11,084 SQ FT
	TOTAL =		57,792 SQ FT	66,362 SQ FT	27,567 SQ FT	169,502 SQ FT	20,352 SQ FT
	TOTAL LOT AREA = 321,223 SQ FT						

30 15 0 30 60 90

SCALE: 1" = 30'

LEGEND

EXISTING CONTOURS (380)
DRAINAGE AREA
FEMA MAP NO. 06073C1354-F 100 YR FLOODWAY BOUNDARY
DIRECTION OF DRAINAGE
SHEET FLOW

PLOT DATE: 10/26/2017 8:36 AM S:\AutoCad Projects\2007\07-127 North City Church\07-127 Post-Dev DAM.dwg

SPEAR & ASSOCIATES, INC. JOB NO. 07-127 NJD

Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

DMA A

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	1,614.00	cubic- feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0083	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0.2988	inches
5	Aggregate pore space	0.4	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0.747	inches
7	Assumed surface area of the biofiltration BMP	699.00	sq-ft
8	Media retained pore storage	0.2	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	297.01	cubic- feet
10	DCV that requires biofiltration [Line 1 – Line 9]	1,316.99	cubic- feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6.00	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	24.00	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	18.00	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	18	inches
19	Total Depth Treated [Line 17 + Line 18]	48	inches
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	1,975.49	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	493.87	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	987.75	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	658.50	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	57,792.00	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and	0.57	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative)	0.02	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	659	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	659	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.18	unitless
30	Minimum required fraction of DCV retained for partial infiltration	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing	☐ Yes ☐ No **X N/A**	

Note: Infiltration "Not Feasible" per Geotech's "Categorization of Infiltration Feasibility Condition Worksheet"

Worksheet B.5-2: Calculation of Alternative Minimum Footprint Sizing Factor AREA A

Alternative Minimum Footprint Sizing Factor			Worksheet B.5-2 (Page 1 of 2)	
1	Area draining to the BMP		57792	sq-ft
2	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)		0.57	
3	Load to Clog (See Table B.5-3 for guidance; L_c)		2.0	lb/sq-ft
4	Allowable Period to Accumulate Clogging Load (T_L)		10	years
Volume Weighted EMC Calculation				
Land Use	**Fraction of Total DCV**	**TSS EMC (mg/L)**	**Product**	
Single Family Residential		123		
Commercial (33,804/57,792)	0.58	128	74.9	
Industrial		125		
Education (Municipal)		132		
Transportation		78		
Multi-family Residential		40		
Roof Runoff		14		
Low Traffic Areas		50		
Open Space (23,988/57,792)	0.42	216	89.7	
Other, specify:				
Other, specify:				
Other, specify:				
5	Volume Weighted EMC (sum of all products)		164.5	mg/L
BMP Parameters				
6	If pretreatment measures are included in the design, apply an adjustment of 25%1 [Line 5 x (1-0.25)]		164.5	mg/L
7	Average Annual Precipitation		0.6	inches
8	Calculate the Average Annual Runoff (Line 7 x 43,560/12) x Line2		1241.46	cu-ft/yr
9	Calculate the Average Annual TSS Load (Line 8 x 62.4 x Line 6)/10^5		127.5	lb/yr
10	Calculate the BMP Footprint Needed (Line 9 x Line 4)/Line 3		637.3	sq-ft
11	Calculate the Alternative Minimum Footprint Sizing Factor [Line 10/ (Line 1 x Line 2)]		0.02	

1 A value of 25 percent is supported by Maniquiz-Redillas et al. (2014) study, which found a pretreatment sediment capture range of 15% - 35%. If using a value outside of this range, documentation of the selected value is required. A value of 50 percent can be claimed for a system with an active Washington State TAPE approval rating for "pre-treatment."

Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

DMA B w/Offsite

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	3,511.00	cubic- feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0083	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0.2988	inches
5	Aggregate pore space	0.4	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0.747	inches
7	Assumed surface area of the biofiltration BMP	2,557.00	sq-ft
8	Media retained pore storage	0.2	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	1,086.47	cubic- feet
10	DCV that requires biofiltration [Line 1 – Line 9]	2,424.53	cubic- feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6.00	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	24.00	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	18.00	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	18	inches
19	Total Depth Treated [Line 17 + Line 18]	48	inches
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	3,636.80	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	909.20	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	1,818.40	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	1,212.27	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	114,281.00	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and	0.57	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	1,954	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	1,954	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.31	unitless
30	Minimum required fraction of DCV retained for partial infiltration	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing	☐ Yes	☐ No **X N/A**

Note: Infiltration "Not Feasible" per Geotech's "Categorization of Infiltration Feasibility Condition Worksheet"

Runoff Factors

DMA A	s.f.	(A) acres	**(C) Runoff**	C x A
Roof	7,310.00	**0.168**	0.9	0.15
Pvmt	23,332.00	**0.536**	0.9	0.48
Hardscape	3,162.00	**0.073**	0.9	0.07
Landscape	23,988.00	**0.551**	0.1	0.06
total	57792	**1.327**		0.75
			Composite C	**0.57**

DMA B w/Offsite

	s.f.	(A) acres	**(C) Runoff**	C x A
Roof	19,890.00	**0.457**	0.9	0.41
Pvmt	39,842.00	**0.915**	0.9	0.82
Hardscape	14,838.00	**0.341**	0.9	0.31
Landscape	39,711.00	**0.912**	0.1	0.09
total	114281	**2.624**		1.63
			Composite C	**0.62**

Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods
Worksheet B.2-1 DCV

DMA A

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.6	inches
2	Area tributary to BMP (s)	A=	1.3	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.57	unitless
4	Trees Credit Volume	TCV=		cubic-feet
5	Rain barrels Credit Volume	RCV=		cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	1614	cubic-feet

DMA B w/Offsite

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.6	inches
2	Area tributary to BMP (s)	A=	2.6	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.62	unitless
4	Trees Credit Volume	TCV=		cubic-feet
5	Rain barrels Credit Volume	RCV=		cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	3511	cubic-feet

Worksheet B.3-1. Harvest and Use Feasibility Screening

Harvest and Use Feasibility Screening		Form I-7
1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season? ☒ Toilet and urinal flushing ☒ Landscape irrigation ☐ Other:_____		
2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2. Toilet & Urinal Flushing: 30 employees (36 hour total) = 66 c.f. Landscape Irrigation: Total Planted Area 52,615 s.f., w/drought tolerant low water use (36 hour total) = 42 c.f. Anticipated Total Use Over 36 hours = 108 c.f.		
3. Calculate the DCV using worksheet B-2.1. 5125 c.f. 0.25 DCV = 1,281 c.f.		
3a. Is the 36-hour demand greater than or equal to the DCV? Yes / X No ⇨ ⇩	3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV? Yes /X No ⇨ ⇩	3c. Is the 36-hour demand less than 0.25DCV? X Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible. X

Harvested Water Demand Calculation

Per City of San Diego Storm Water Standards, B.3.2

Landscape Irrigation Harvesting

Modified Estimated Total Water Usage

Modified ETWU = EToWet × [[Σ(PF x HA)/IE] + SLA] x 0.015

ET owet =	2.7	
PF =	0.2	Low (drought tolerant vegetation)
Landscaped Area =	52615.0	s.f.
Hydrozone =	390	(36 hr) gal/acre
Σ(PF x HA) =	94.21419	
IE =	0.9	
SLA	0	
Modified ETWU =	42	ft^3/36hr

Toilet & Urinal Flushing

Land Use Type =	Industrial	
# of Resident/emp=	30	
Total Use/person =	5.5	gal/day
Total Use =	66.2	ft^3/36hr

Total Estimated Demand = 108.6 ft^3/36hr

Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	1	0.25
		Predominant soil texture	0.25	2	0.5
		Site soil variability	0.25	2	0.5
		Depth to groundwater / impervious layer	0.25	2	0.5
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.75
B	Design	Level of pretreatment/ expected sediment loads	0.5	1	0.5
		Redundancy/resiliency	0.25	1	0.25
		Compaction during construction	0.25	2	0.5
		Design Safety Factor, $S_B = \Sigma p$			1.25
Combined Safety Factor, $S_{total} = S_A \times S_B$				3.0	
Observed Infiltration Rate, inch/hr, $K_{observed}$ (corrected for test-specific bias)				0.025	
Design Infiltration Rate, in/hr, $K_{design} = K_{observed} / S_{total}$				0.0083	
Supporting Data					
Briefly describe infiltration test and provide reference to test forms: Four total percolation tests were performed with two being performed within two basins at the anticipated discharge elevations. The lowest rate was used to determine the design infiltration for this worksheet.					

Worksheet I-8 : Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet I-8	
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: Two NRCS soils are mapped across the site with the upper portion of the site consisting of Type C (Ramona sandy loam) soils with high surface runoff and moderately high infiltration rates (0.2 to 0.57 inches/hour). The soils at lower elevations were mapped as Type D soils (Riverwash) with negligible surface runoff and high to very high infiltration rates (5.9 to 19.9 inches/hour). Based on the site explorations, four soil types were present in the area of the proposed basins. The proposed upper basin located adjacent to the proposed building is underlain by a minor amount of Residual Soil over Cretaceous Granodiorite. The proposed lower basin located adjacent to the existing structure consisted of minor amounts of Undocumented Fill over Quaternary Alluvium. High percentages of clay was present in all soil types encountered. Four percolation test were completed, with two tests performed within each of the proposed basins. The two tests performed in the upper basin were performed in native granodiorite and the two performed in the lower basin were performed in native alluvium. The calculated infiltration rates with a safety factor of two (2) applied ranged between 0.012 to 0.013 inches per minute for the upper basin and 0.04 to 1.33 for the lower basin. The rate of 1.33 in test hole P-4 appeared to be an anomaly likely resulting from localized disturbance at the test elevation. The obtained infiltration values, with the exception of the disturbed test hole, are well below the 0.5 inches per rate listed above. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		
Provide basis: See Part 2 Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

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

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

Worksheet I-8 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: As described above, the soil types present at the site have low infiltration rates due to the underlying geologic units consisting of granodiorite and dense clayey alluvium. As a result, site soils likely cannot accommodate any appreciable volume of water. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: Shallow low permeable granodiorite and clayey alluvium with unknown depth could result in groundwater mounding. The introduction of water to the subsurface will likely become perched, and has the potential to migrate laterally and intersect utility trenches and potentially cause distress to subgrade soils and overlying improvements. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			

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

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

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

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

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Indicate which Items are Included:

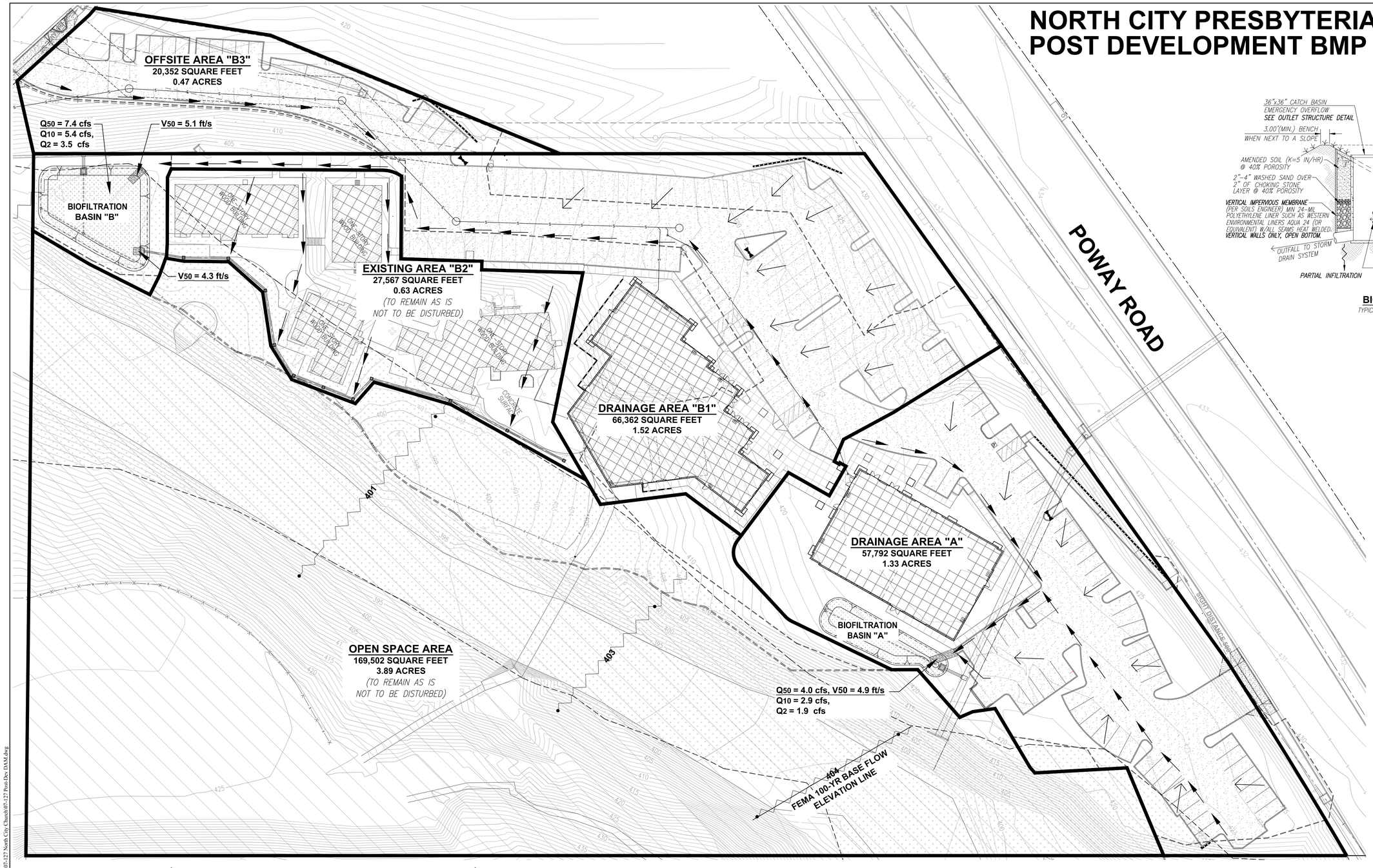
Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	XIncluded See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	X 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.	[X] Not Performed ○ Included ☐ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	[X] 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

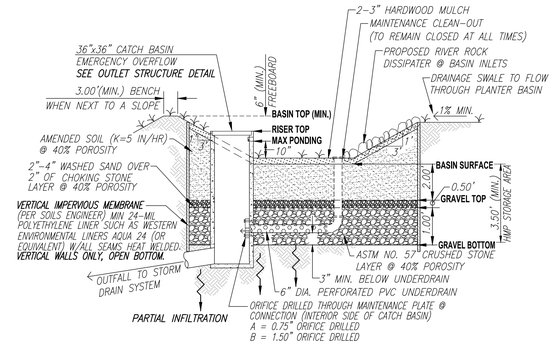
Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

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)

NORTH CITY PRESBYTERIAN CHURCH
POST DEVELOPMENT BMP OVERVIEW MAP





BIOFILTRATION BASIN

TYPICAL SECTION & OUTLET CONNECTION
NOT-TO-SCALE

BIOFILTRATION BASIN MEDIA

PER COUNTY OF SAN DIEGO 2014 LID HANDBOOK, APPENDIX C FACT SHEETS.

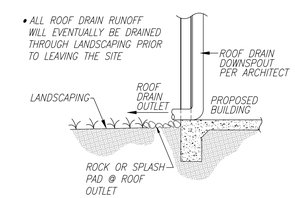
24" AMENDED SOIL LAYER
COMPOSITION AND TEXTURE:
65% SAND, 20% SANDY LOAM, & 15% COMPOST (FROM VEGETATION-BASED FEEDSTOCK). ANIMAL WASTES OR BY-PRODUCTS SHOULD NOT BE APPLIED.

PERMEABILITY:
5 IN/HR INFILTRATION RATE FOR THE FLOW-BASED SUSMP METHOD (1-6IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION).

CHEMICAL COMPOSITION: TOTAL PHOSPHORUS < 15 PARTS PER MILLION (PPM); PH 6-8; CATION EXCHANGE CAPACITY > 5 MILLIEQUIVALENTS PER 100 GRAMS (MEQ/100 G) OF SOIL; ORGANIC MATTER CONTENT < 5 PERCENT BY WEIGHT.

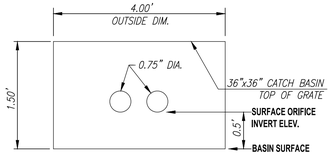
18" DRAINAGE LAYER
SEPARATE SOIL MEDIA FROM UNDERDRAIN LAYER WITH 2 TO 4 INCHES OF WASHED SAND, FOLLOWED BY 2 INCHES OF CHOKING STONE (ASTM NO. 8) OVER 1.0-FOOT OF ASTM NO. 57 STONE.

SURFACE VEGETATION
AS SPECIFIED BY THE LANDSCAPE ARCHITECT PLANS.



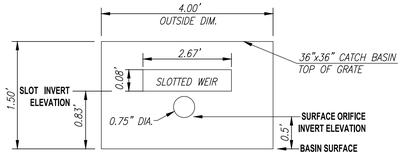
ROOF DRAIN OUTLET

TYPICAL ROOF DRAIN OUTLET AT LANDSCAPED AREAS
NO SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN A

36" CATCH BASIN'S OUTSIDE WALL,
(2) ORIFICES TO BE INSTALLED ON SOUTH WALL
NOT-TO-SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN B

36" CATCH BASIN'S OUTSIDE WALL,
(3) SLOTTED WEIR TO BE INSTALLED ON NORTH, EAST, AND SOUTH WALLS
NOT-TO-SCALE

DRAINAGE AREA DMA BREAKDOWN

SYMBOL	DRAINAGE AREA SURFACE	SOIL TYPE	'A' (EAST SIDE)	'B1' (WEST SIDE)	EXISTING AREA 'B2' (TO REMAIN AS IS & UNDISTURBED)	OPEN SPACE (TO REMAIN AS IS & UNDISTURBED)	OFFSITE 'B3' PRIVATE ACCESS & PARKING EASEMENT
	BUILDING ROOFTOP	TYPE 'C'	7,310 SQ FT	10,498 SQ FT	9,392 SQ FT	0 SQ FT	0 SQ FT
	PARKING/DRIVE AISLE IMPERVIOUS AREA	TYPE 'C'	23,332 SQ FT	30,574 SQ FT	0 SQ FT	0 SQ FT	9,268 SQ FT
	HARDSCAPING/SIDEWALK	TYPE 'C'	3,162 SQ FT	6,290 SQ FT	8,548 SQ FT	0 SQ FT	0 SQ FT
	LANDSCAPING AREA	TYPE 'C'	23,988 SQ FT	19,000 SQ FT	9,627 SQ FT	169,502 SQ FT	11,084 SQ FT
	TOTAL =		57,792 SQ FT	66,362 SQ FT	27,567 SQ FT	169,502 SQ FT	20,352 SQ FT
	TOTAL LOT AREA = 321,223 SQ FT						

30 15 0 30 60 90

SCALE: 1" = 30'

LEGEND

EXISTING CONTOURS (380)
DRAINAGE AREA
FEMA MAP NO. 06073C1354-F 100 YR FLOODWAY BOUNDARY
DIRECTION OF DRAINAGE
SHEET FLOW

PLOT DATE: 10/26/2017 8:36 AM S:\AutoCad Projects\2007\07-127 North City Church\07-127 Post-Dev DAM.dwg

SPEAR & ASSOCIATES, INC. JOB NO. 07-127 NJD

TECHNICAL MEMORANDUM:

SWMM Modeling for Hydromodification Compliance of:

North City Presbyterian Church

Prepared For:

Spear Engineering
June 6, 2016

Prepared by:

Luis Parra, PhD, CPSWQ, ToR, D.WRE.
R.C.E. 66377

REC Consultants
2442 Second Avenue
San Diego, CA 92101
Telephone: (619) 232-9200

TECHNICAL MEMORANDUM

TO: Spear Engineering

FROM: Luis Parra, PhD, PE, CPSWQ, ToR, D.WRE.
David Edwards, PE.

DATE: June 6, 2016

RE: Summary of SWMM Modeling for Hydromodification Compliance for the North City Presbyterian Church, City of San Diego, CA.

INTRODUCTION

This memorandum summarizes the approach used to model the proposed church /communal development project site in the City of San Diego using the Environmental Protection Agency (EPA) Storm Water Management Model 5.0 (SWMM). SWMM models were prepared for the pre and post-developed conditions at the site in order to determine if the proposed LID biofiltration facilities have sufficient volume to meet Order R9-2013-001 requirements of the California Regional Water Quality Control Board San Diego Region (SDRWQCB), as explained in the Final Hydromodification Management Plan (HMP), dated March 2011, prepared for the County of San Diego by Brown and Caldwell.

SWMM MODEL DEVELOPMENT

The North City Presbyterian Church project proposes the addition of a communal religious center building to the currently developed site, which will include an access road and a servicing parking lot. Two (2) SWMM models were prepared for this study: the first for the pre-development and the second for the post-developed conditions. The project site drains to two Points of Compliance (POC) located to the east of the project site in the adjacent Peñasquitos Creek.

The SWMM model was used since we have found it to be more comparable to San Diego area watersheds than the alternative San Diego Hydrology Model (SDHM) and also because it is a non-proprietary model approved by the HMP document. For both SWMM models, flow duration curves were prepared to determine if the proposed HMP facilities are sufficient to meet the current HMP requirements.

The inputs required to develop SWMM models include rainfall, watershed characteristics, and BMP configurations. The Poway Gage from the Project Clean Water website was used for this study, since it is the most representative of the project site precipitation due to elevation and proximity to the project site. Please see gauge location and project location map on attachment 5.

Per the California Irrigation Management Information System “Reference Evaporation Zones” (CIMIS ETo Zone Map), the project site is located within the Zone 6 Evapotranspiration Area. Thus evapotranspiration values for the site were modeled using Zone 6 average monthly values from Table G.1-1 from the City of San Diego 2016 BMP Design Manual. The site was modeled with Type C hydrologic soil as this is the existing soil determined from the site specific geotechnical investigation. Soils have been assumed to be compacted in the existing condition to represent the current development of the

site, while fully compacted in the post developed conditions. Other SWMM inputs for the subareas are discussed in the appendices to this document, where the selection of parameters is explained in detail.

HMP MODELING

PRE DEVELOPED CONDITIONS

In current existing conditions, runoff from the developed project site discharges via overland flow to two points of compliance located at the eastern boundary of the project site on the adjacent Peñasquitos Creek. Table 1 below illustrates the pre-developed areas and impervious percentage accordingly.

TABLE 1 – SUMMARY OF PRE-DEVELOPED CONDITIONS

DMA	Tributary Area, A (Ac)	Impervious Percentage(1), Ip	POC
DMA-1-1	2.62	0%	1
DMA-1-2	1.33	0%	2
Total	**3.95**	**n/a**	**n/a**

Notes: (1) – Per the 2013 RWQCB permit, existing conditions impervious surfaces, that will remain the same in developed conditions, cannot be accounted for in existing conditions analysis if they account for over 50% of the area.

DEVELOPED CONDITIONS

Runoff from the developed project site is drained to two (2) onsite receiving biofiltration LID BMPs. Once flows are routed via the proposed LID BMPs, all onsite flows are then conveyed via storm drain to its corresponding existing points of discharge. Table 2 summarizes the post-developed area and impervious percentage accordingly.

TABLE 2 – SUMMARY OF POST-DEVELOPED CONDITIONS

DMA	Tributary Area(1), A (Ac)	Impervious Percentage(1), Ip	BMP	POC
DMA-B	2.62	65.25%	B	1
DMA-A	1.33	58.49%	A	2
TOTAL	**3.95**	**n/a**	**n/a**	**n/a**

Notes: (1) Tributary area includes the area of the LID. Therefore, the impervious percentage shown is calculated based on the total area. The subcatchments DMA's impervious percentage shown on the SWMM model don't include the area of the LID therefore those percentages are slightly different.

Two (2) LID biofiltration basins are located within the project site and are responsible for handling hydromodification requirements for the project site. In developed conditions, the basins will have a surface depth and a riser spillway structure set to an elevation (see dimensions in Table 3). Flows will then discharge from the basins via a low flow orifice outlet within the gravel layer. The riser structure will act as a spillway such that peak flows can be safely discharged to the receiving storm drain system.

Beneath the basins' invert lies the proposed LID biofiltration portion of the drainage facilities. This portion of the basin is comprised of a 3-inch layer of mulch, a 24-inch layer of amended soil (a highly sandy, organic rich composite with an infiltration capacity of at least 5 inches/hr) and a 18-inch layer of gravel for additional detention and to accommodate the French drain system. These systems are to be

located beneath the biofiltration layers to intercept treated storm water and convey these flows to a small diameter lower outlet orifice. Once flows have been routed by the outlet structure, flows are then drained to the receiving storm drain system prior to discharging to the corresponding POC at the eastern project boundary.

The biofiltration basins, which are lined to prevent infiltration due to geotechnical concerns, were modeled using the biofiltration LID module within SWMM. The biofiltration module can model the underground gravel storage layer, underdrain with an orifice plate, amended soil layer, and a surface storage pond up to the elevation of the invert of the spillway. It should be noted that detailed outlet structure location and elevations will be shown on the construction plans based on the recommendations of this study.

Water Quality

It is assumed all storm water quality requirements for the project will be met by the biofiltration LID BMPs (as the minimum required treatment footprints are met by the proposed BMP design). However, detailed water quality requirements are not discussed within this technical memo. For further information in regards to storm water quality requirements for the project and drawdown calculations, please refer to the site specific Storm Water Quality Management Plan (SWQMP).

BMP MODELING FOR HMP PURPOSES

Modeling of dual purpose Water Quality/HMP BMPs

Two (2) LID BMP biofiltration basins are proposed for water quality treatment and hydromodification conformance for the project site. Table 3 & 4 illustrate the dimensions required for HMP compliance according to the SWMM model that was undertaken for the project.

TABLE 3 – SUMMARY OF DEVELOPED DUAL PURPOSE BMPS

BMP	Tributary Area (Ac)(7)	DIMENSIONS					
		BMP Area(1) (ft^2)	Gravel Depth(2) (in)	Lower Orif. D (in)(3)	Depth Riser Invert (in)(4)	Weir Perimeter Length(5) (ft)	Total Surface Depth(6) (in)
BMP B	2.56	2557	18	1.50	18	12	24
BMP A	1.31	699	18	0.75	18	12	24

Notes:
(1): Area of amended soil equal to area of gravel
(2): Gravel depth needed to comply with hydromodification purposes
(3): Diameter of orifice in gravel layer with invert at bottom of layer; tied with hydromod min threshold ($0.1 \cdot Q_2$).
(4): Depth of ponding beneath riser structure's surface spillway.
(5): Overflow length, the internal perimeter of the riser is 12 ft (3 ft x 3 ft internal dimensions).
(6): Total surface depth of BMP from top crest elevation to surface invert.
(7): Tributary area to basin not including area of BMP.

TABLE 4 – SUMMARY OF RISER DETAILS:

BMP	Low Orifices			Lower Slot		Top Riser	
	#	Dia. (ft)	Elev.[1] (ft)	BxH (ft)	Elev.[1] (ft)	Length[2] (ft)	Elev.[1] (ft)
BMP-B	1	0.75	0.5	8 x 0.083	0.83	12	1.50
BMP-A	2	0.75	0.5	n/a	n/a	12	1.50

Notes:
(1): Basin ground surface elevation assumed to be 0.00 ft elevation.
(2): Overflow length is the internal perimeter of the riser structure.

FLOW DURATION CURVE COMPARISON

The Flow Duration Curve (FDC) for the site was compared at each POC by exporting the hourly runoff time series results from SWMM to a spreadsheet.

Q_2 and Q_{10} were determined with a partial duration statistical analysis of the runoff time series in an Excel spreadsheet using the Cunnane plotting position method (which is the preferred plotting methodology in the HMP Permit). As the SWMM Model includes a statistical analysis based on the Weibull Plotting Position Method, the Weibull Method was also used within the spreadsheet to ensure that the results were similar to those obtained by the SWMM Model.

The range between 10% of Q_2 and Q_{10} was divided into 100 equal time intervals; the number of hours that each flow rate was exceeded was counted from the hourly series. Additionally, the intermediate peaks with a return period "i" were obtained (Q_i with i=3 to 9). For the purpose of the plot, the values were presented as percentage of time exceeded for each flow rate. FDC comparison at each POC is illustrated in Figures 1 and 2 in both normal and logarithmic scale. Attachment 5 provides a detailed drainage exhibit for the post-developed condition.

As can be seen in Figures 1 and 2, the FDC for the proposed condition with the HMP BMPs is within 110% of the curve for the existing condition in both peak flows and durations. The additional runoff volume generated from developing the site will be released to the existing point of discharge at a flow rate below the 10% Q_2 lower threshold for POC-1 and POC-2. Additionally, the project will also not increase peak flow rates between the Q_2 and the Q_{10}, as shown in the peak flow tables in Attachment 1.

SUMMARY

This study has demonstrated that the proposed HMP BMPs provided for the North City Presbyterian Church site is sufficient to meet the current HMP criteria for the Points of Compliance (POC), if the cross-section areas and volumes recommended within this technical memorandum, and the respective orifices and outlet structures are incorporated as specified within the proposed project site.

KEY ASSUMPTIONS

1. Type C Soil is representative of the existing condition site.

ATTACHMENTS

1. Q_2 to Q_{10} Comparison Tables
2. FDC Plots (log and natural "x" scale) and Flow Duration Table.
3. List of the "n" largest Peaks: Pre-Development and Post-Development Conditions
4. Elevations vs. Discharge Curves to be used in SWMM, Draw Down Calculations
5. Pre & Post Development Maps, Project plan and section sketches
6. SWMM Input Data in Input Format (Existing and Proposed Models)
7. SWMM Screens and Explanation of Significant Variables
8. Geotechnical Soil Survey
9. Summary files from the SWMM Model

REFERENCES

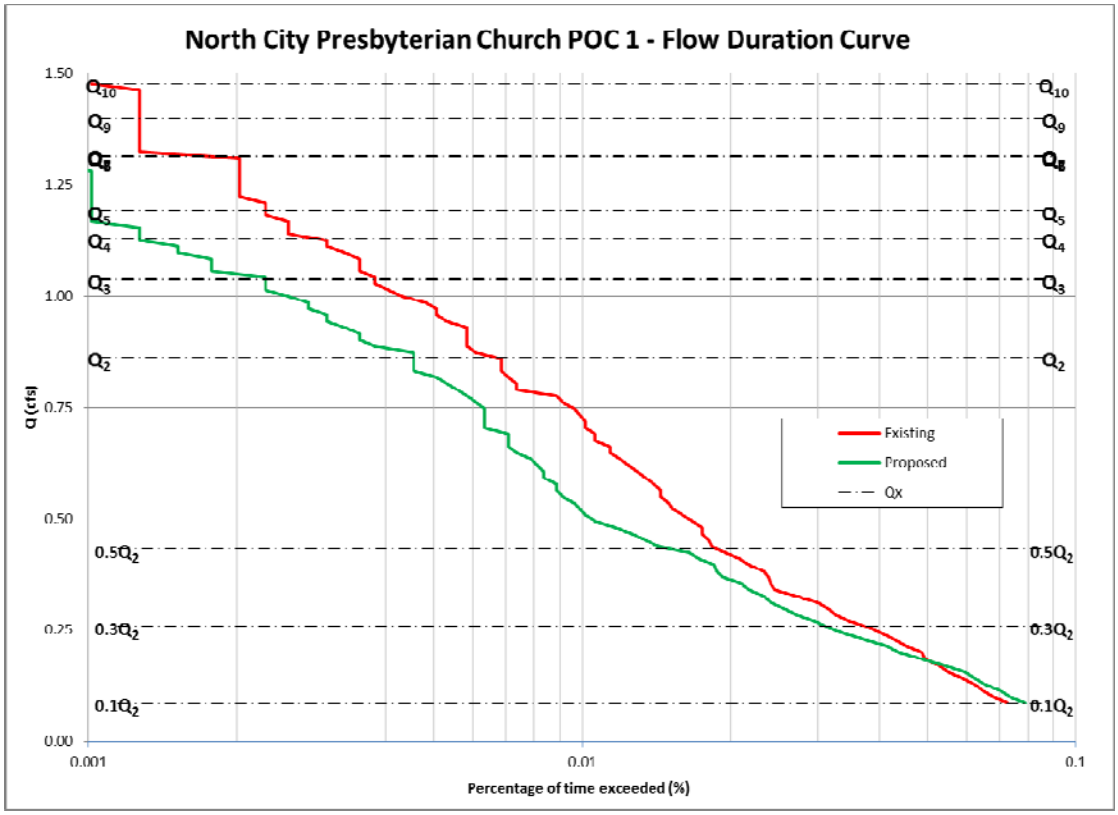
[1] – *"Review and Analysis of San Diego County Hydromodification Management Plan (HMP): Assumptions, Criteria, Methods, & Modeling Tools – Prepared for the Cities of San Marcos, Oceanside & Vista",* May 2012, TRW Engineering.

[2] – *"Final Hydromodification Management Plan (HMP) prepared for the County of San Diego",* March 2011, Brown and Caldwell.

[3] - Order R9-2007-001, California Regional Water Quality Control Board San Diego Region (SDRWQCB).

[4] – "*Handbook of Hydrology*", David R. Maidment, Editor in Chief. 1992, McGraw Hill.

[5] – "*City of San Diego BMP Design Manual*", February 2016.



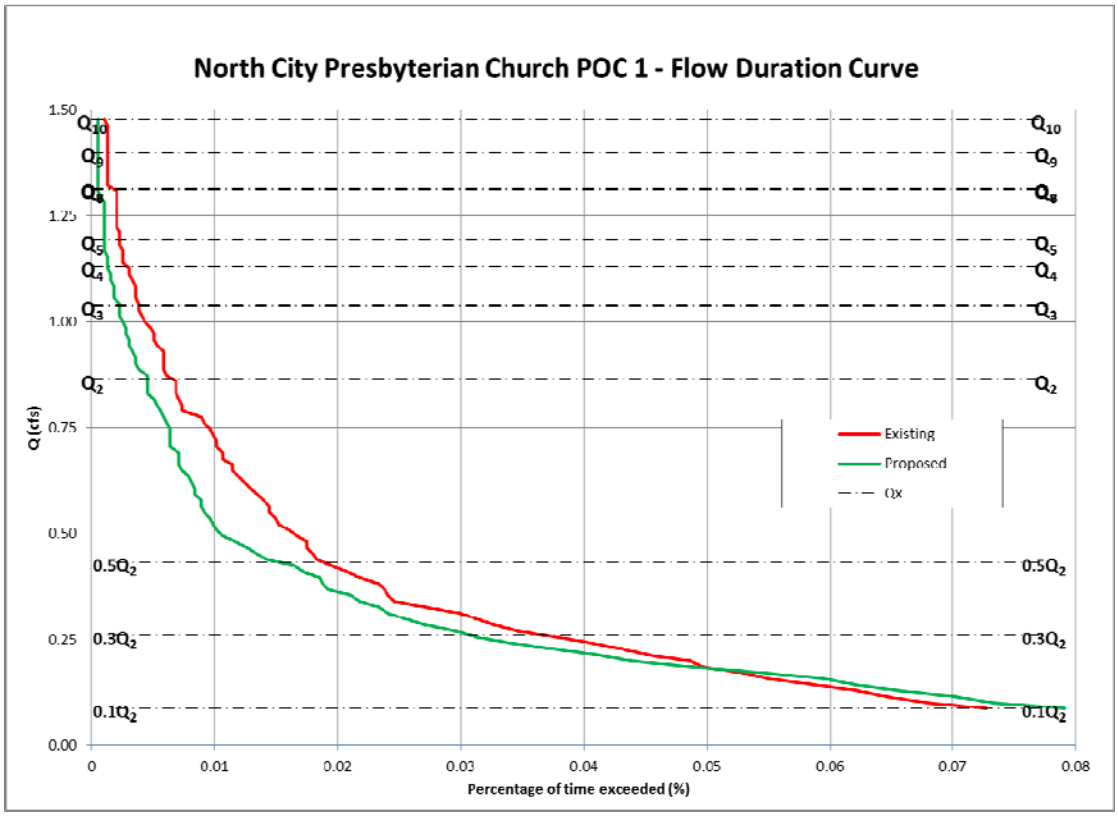
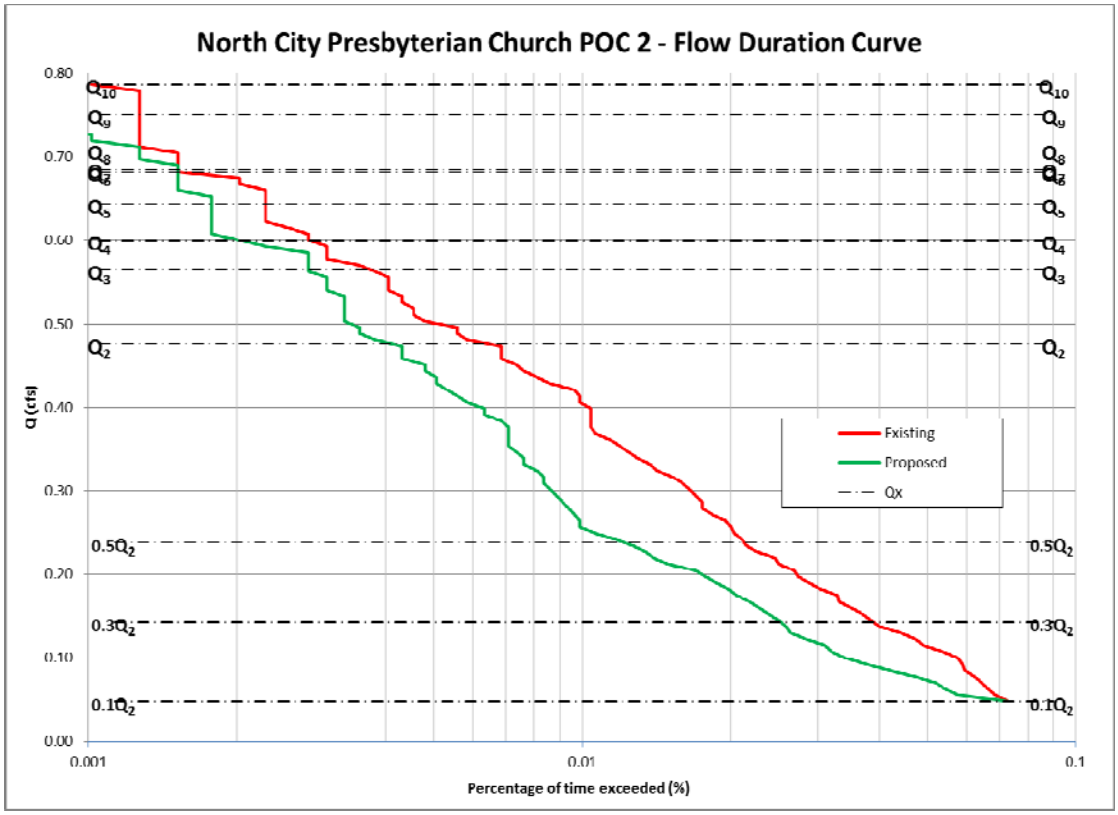


Figure 1a and 1b. Flow Duration Curve Comparison (logarithmic and normal "x" scale)



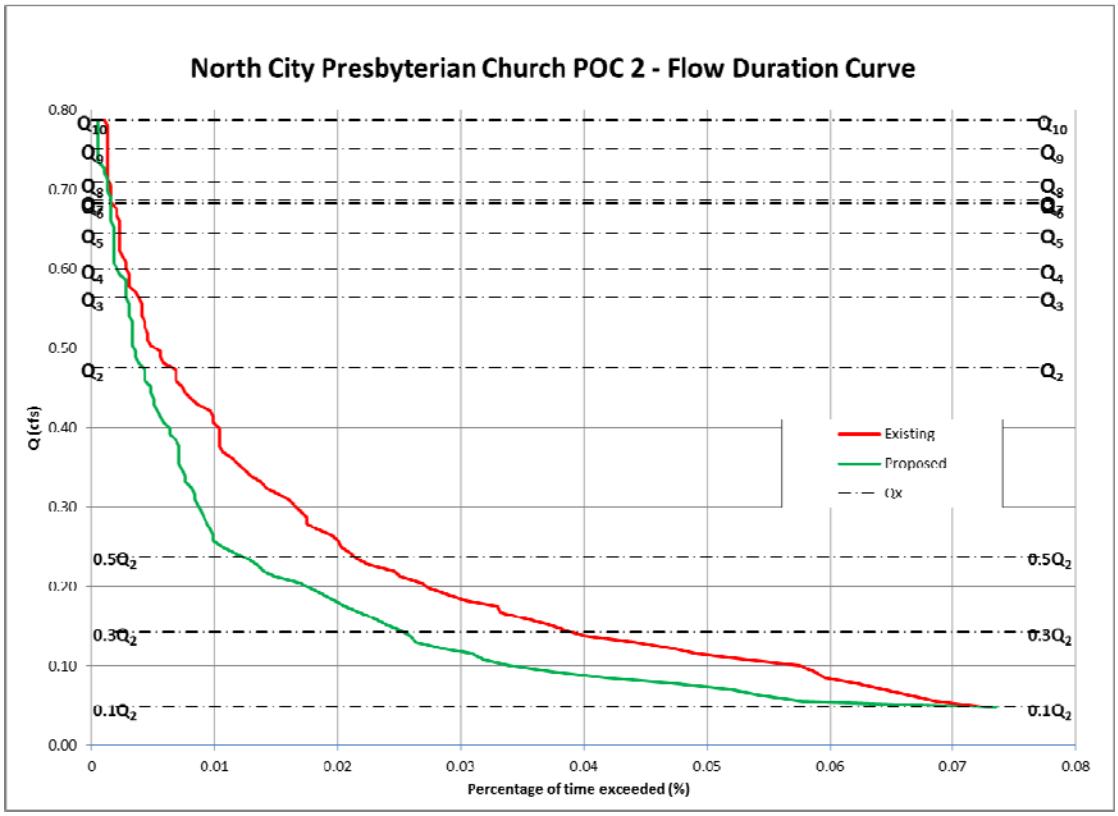


Figure 2a and 2b. Flow Duration Curve Comparison (logarithmic and normal "x" scale)

ATTACHMENT 1.

Q_2 to Q_{10} Comparison Table – POC 1

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
2-year	0.863	0.659	0.204
3-year	1.037	0.885	0.152
4-year	1.130	0.969	0.160
5-year	1.191	1.025	0.167
6-year	1.312	1.055	0.257
7-year	1.315	1.096	0.219
8-year	1.315	1.122	0.193
9-year	1.399	1.144	0.255
10-year	1.477	1.170	0.307

Q_2 to Q_{10} Comparison Table – POC 2

Return Period	Existing Condition (cfs)	Mitigated Condition (cfs)	Reduction, Exist - Mitigated (cfs)
2-year	0.476	0.386	0.090
3-year	0.565	0.481	0.084
4-year	0.600	0.567	0.032
5-year	0.644	0.593	0.051
6-year	0.682	0.609	0.073
7-year	0.685	0.663	0.022
8-year	0.708	0.691	0.017
9-year	0.751	0.704	0.047
10-year	0.787	0.714	0.073

ATTACHMENT 2

FLOW DURATION CURVE ANALYSIS

1) Flow duration curve shall not exceed the existing conditions by more than 10%, neither in peak flow nor duration.

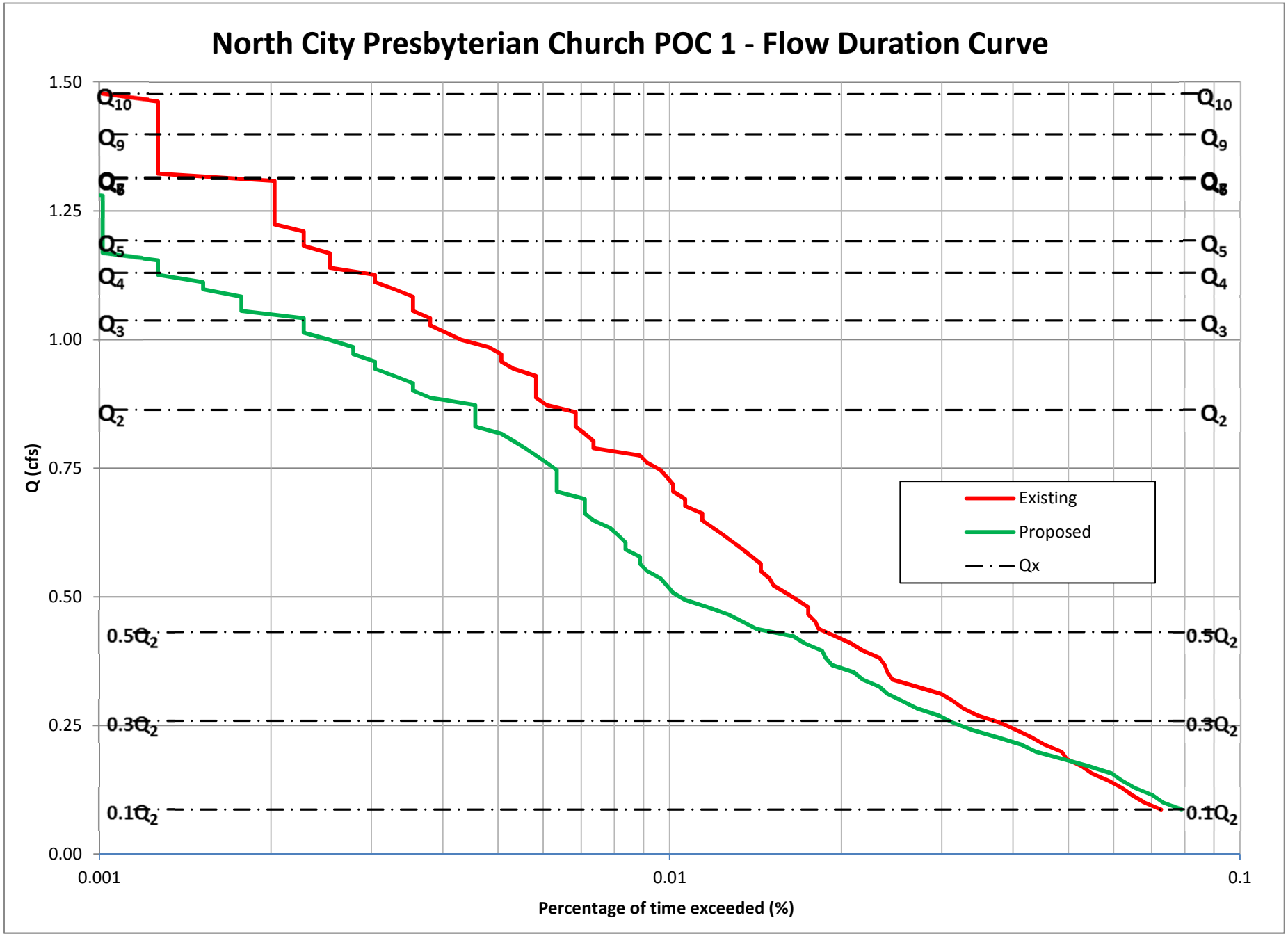
The figures on the following pages illustrate that the flow duration curve in post-development conditions after the proposed BMP is below the existing flow duration curve. The flow duration curve table following the curve shows that if the interval $0.10Q_2 – Q_{10}$ is divided in 100 sub-intervals, then a) the post development divided by pre-development durations are never larger than 110% (the permit allows up to 110%); and b) there are no more than 10 intervals in the range 101%-110% which would imply an excess over 10% of the length of the curve (the permit allows less than 10% of excesses measured as 101-110%).

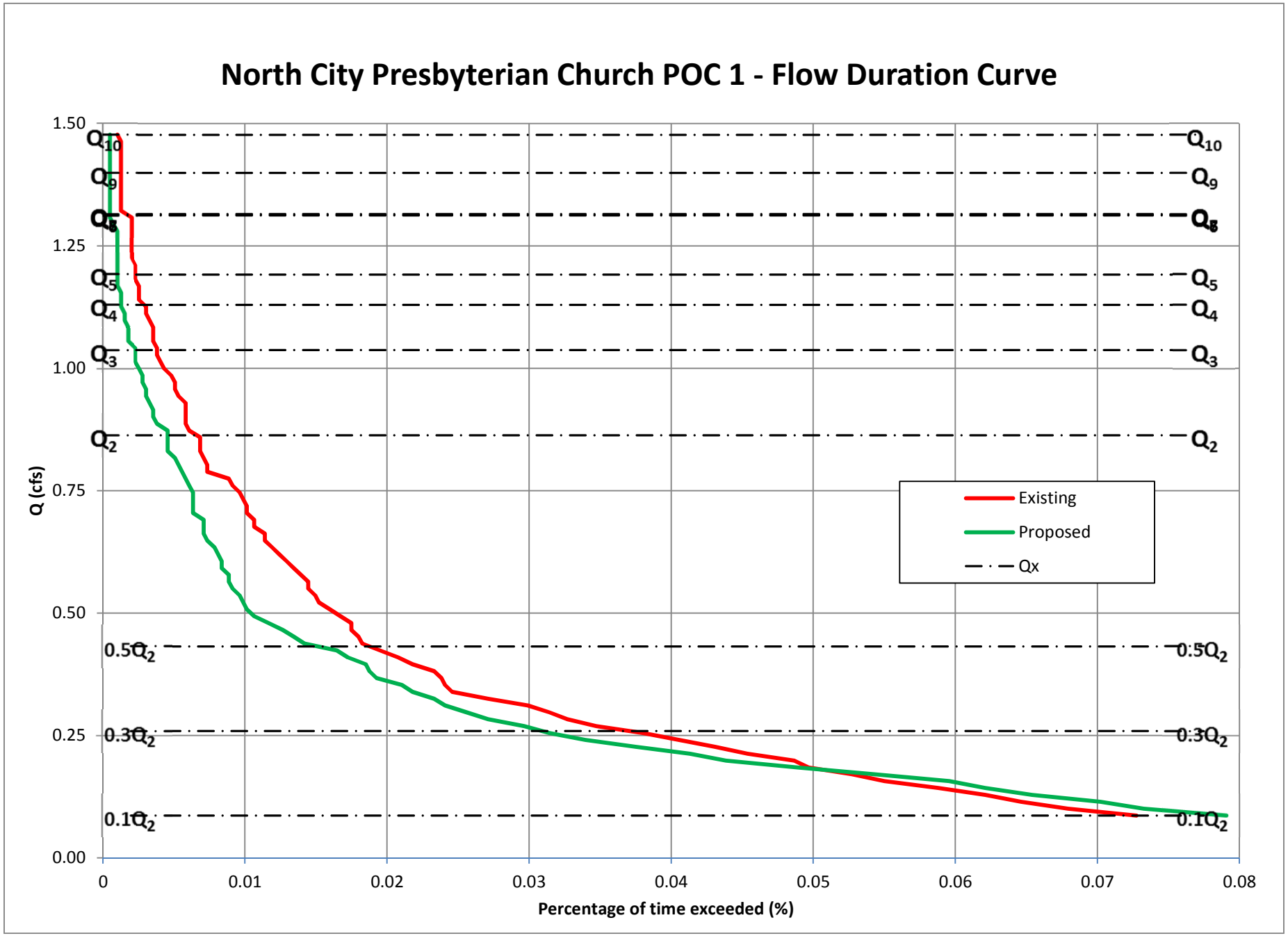
Consequently, the design passes the hydromodification test.

It is important to note that the flow duration curve can be expressed in the "x" axis as percentage of time, hours per year, total number of hours, or any other similar time variable. As those variables only differ by a multiplying constant, their plot in logarithmic scale is going to look exactly the same, and compliance can be observed regardless of the variable selected. However, in order to satisfy the City of San Diego HMP example, % of time exceeded is the variable of choice in the flow duration curve. The selection of a logarithmic scale in lieu of the normal scale is preferred, as differences between the pre-development and post-development curves can be seen more clearly in the entire range of analysis. Both graphics are presented just to prove the difference.

In terms of the "y" axis, the peak flow value is the variable of choice. As an additional analysis performed by REC, not only the range of analysis is clearly depicted (10% of Q_2 to Q_{10}) but also all intermediate flows are shown (Q_2, Q_3, Q_4, Q_5, Q_6, Q_7, Q_8 and Q_9) in order to demonstrate compliance at any range $Q_x – Q_{x+1}$. It must be pointed out that one of the limitations of both the SWMM and SDHM models is that the intermediate analysis is not performed (to obtain Q_i from i = 2 to 10). REC performed the analysis using the Cunnane Plotting position Method (the preferred method in the HMP permit) from the "n" largest independent peak flows obtained from the continuous time series.

The largest "n" peak flows are attached in this appendix, as well as the values of Q_i with a return period "i", from i=2 to 10. The Q_i values are also added into the flow-duration plot.


North City Presbyterian Church POC 1 - Flow Duration Curve
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Q (cfs)
0.001
0.01
0.1
Percentage of time exceeded (%)
Q10
Q9
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx


North City Presbyterian Church POC 1 - Flow Duration Curve
Q (cfs)
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
Percentage of time exceeded (%)
Q10
Q9
Q8
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx

Flow Duration Curve Data for North City Presbyterian Church POC 1 - Poway, CA

Q2 =	0.863	cfs	Fraction	10	%
Q10 =	1.48	cfs			
Step =	0.0140	cfs			
Count =	394487	hours			
	45.00	years			

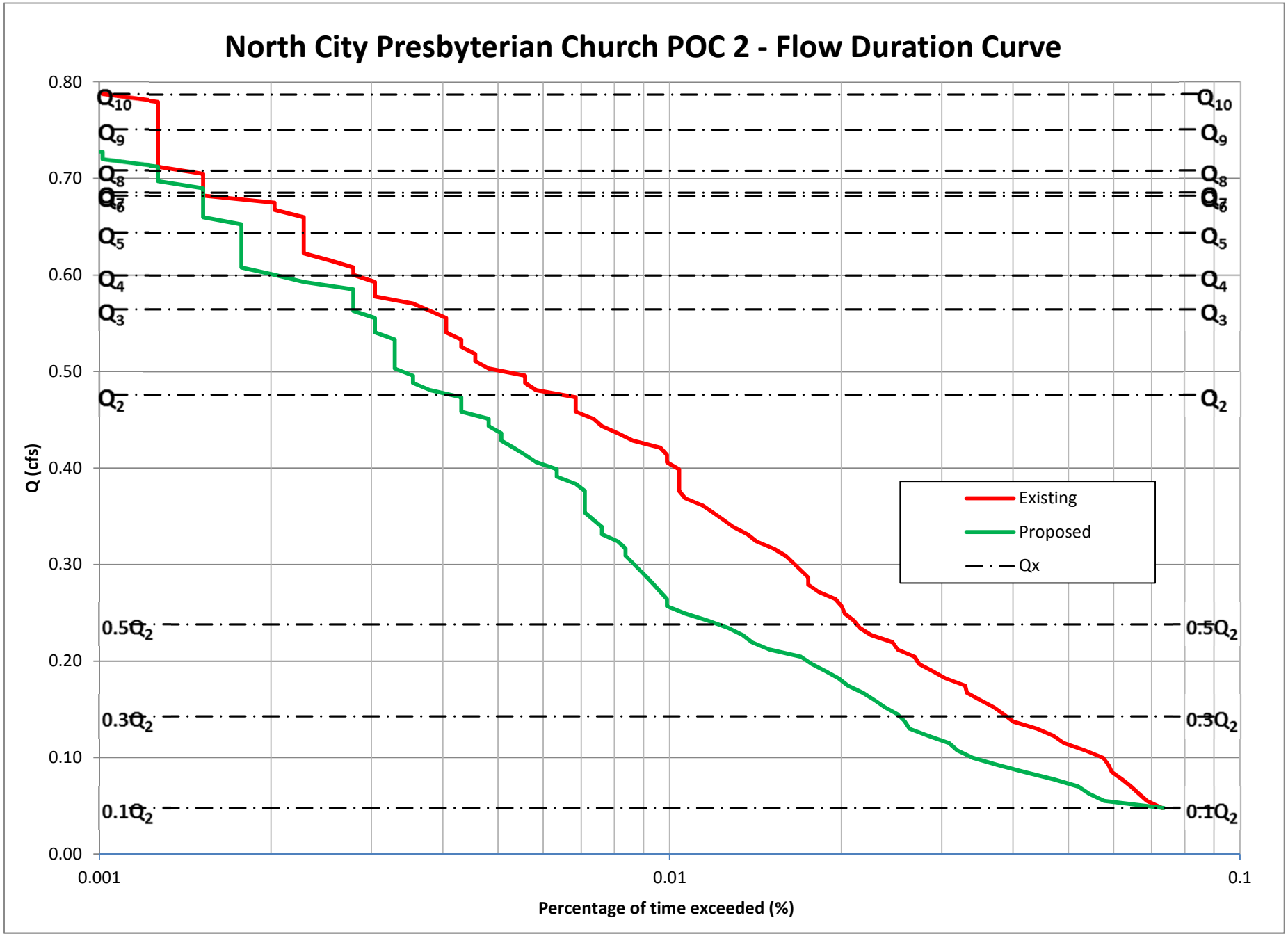
	Existing Condition			Detention Optimized			Pass or
Interval	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	Fail?
1	0.086	287	7.28E-02	312	7.91E-02	109%	Pass
2	0.100	268	6.79E-02	289	7.33E-02	108%	Pass
3	0.114	255	6.46E-02	277	7.02E-02	109%	Pass
4	0.128	245	6.21E-02	258	6.54E-02	105%	Pass
5	0.142	232	5.88E-02	245	6.21E-02	106%	Pass
6	0.157	217	5.50E-02	235	5.96E-02	108%	Pass
7	0.171	208	5.27E-02	214	5.42E-02	103%	Pass
8	0.185	196	4.97E-02	193	4.89E-02	98%	Pass
9	0.199	192	4.87E-02	173	4.39E-02	90%	Pass
10	0.213	179	4.54E-02	163	4.13E-02	91%	Pass
11	0.227	170	4.31E-02	148	3.75E-02	87%	Pass
12	0.241	160	4.06E-02	134	3.40E-02	84%	Pass
13	0.255	150	3.80E-02	124	3.14E-02	83%	Pass
14	0.269	137	3.47E-02	117	2.97E-02	85%	Pass
15	0.283	129	3.27E-02	107	2.71E-02	83%	Pass
16	0.297	124	3.14E-02	101	2.56E-02	81%	Pass
17	0.311	118	2.99E-02	95	2.41E-02	81%	Pass
18	0.325	107	2.71E-02	92	2.33E-02	86%	Pass
19	0.339	97	2.46E-02	86	2.18E-02	89%	Pass
20	0.353	95	2.41E-02	83	2.10E-02	87%	Pass
21	0.367	94	2.38E-02	76	1.93E-02	81%	Pass
22	0.381	92	2.33E-02	74	1.88E-02	80%	Pass
23	0.395	86	2.18E-02	73	1.85E-02	85%	Pass
24	0.409	82	2.08E-02	68	1.72E-02	83%	Pass
25	0.423	77	1.95E-02	65	1.65E-02	84%	Pass
26	0.437	72	1.83E-02	56	1.42E-02	78%	Pass
27	0.451	71	1.80E-02	53	1.34E-02	75%	Pass
28	0.466	69	1.75E-02	50	1.27E-02	72%	Pass
29	0.480	69	1.75E-02	46	1.17E-02	67%	Pass
30	0.494	66	1.67E-02	42	1.06E-02	64%	Pass
31	0.508	63	1.60E-02	40	1.01E-02	63%	Pass
32	0.522	60	1.52E-02	39	9.89E-03	65%	Pass
33	0.536	59	1.50E-02	38	9.63E-03	64%	Pass
34	0.550	57	1.44E-02	36	9.13E-03	63%	Pass
35	0.564	57	1.44E-02	35	8.87E-03	61%	Pass
36	0.578	55	1.39E-02	35	8.87E-03	64%	Pass

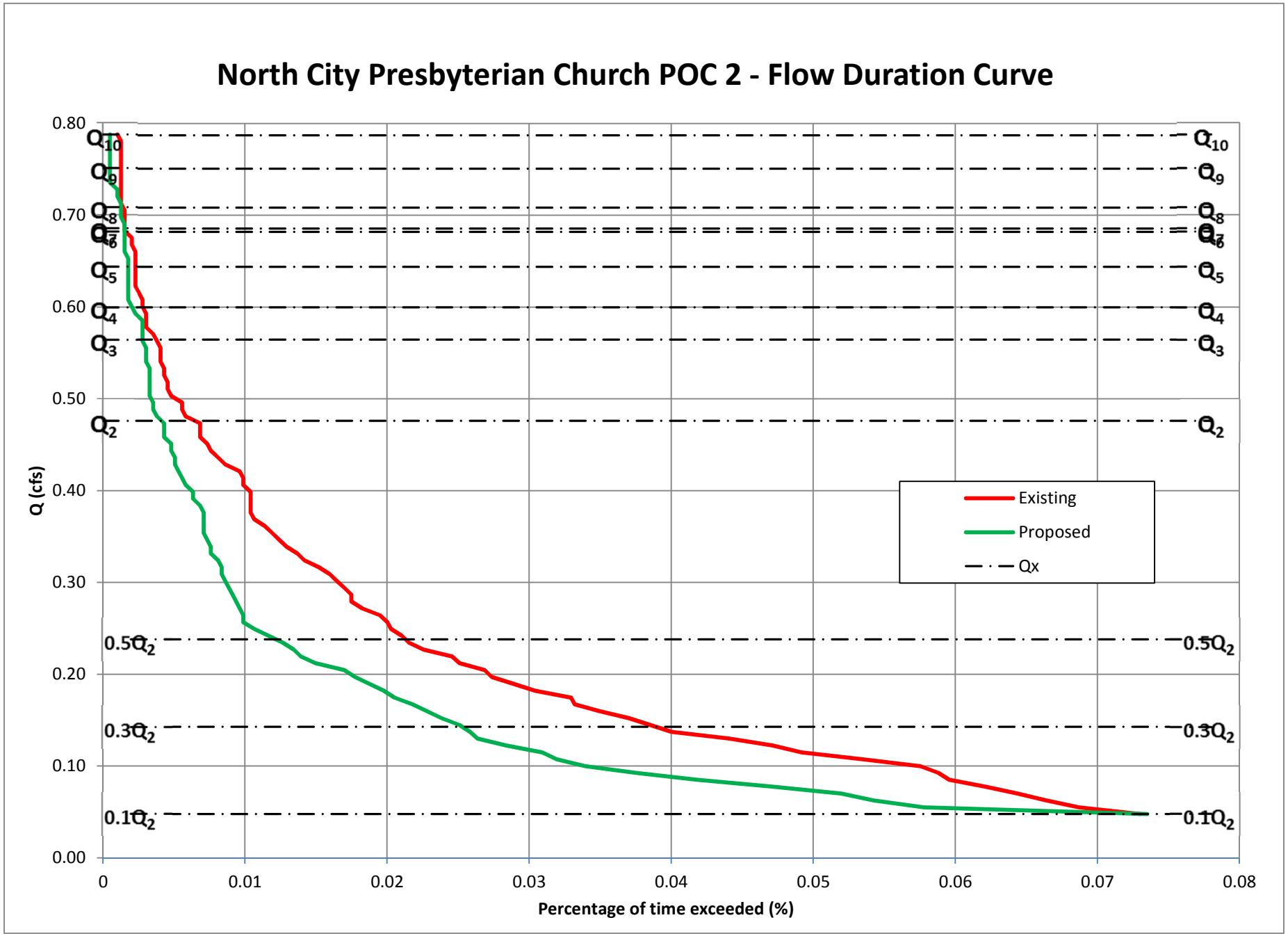
Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
37	0.592	53	1.34E-02	33	8.37E-03	62%	Pass
38	0.606	51	1.29E-02	33	8.37E-03	65%	Pass
39	0.620	49	1.24E-02	32	8.11E-03	65%	Pass
40	0.634	47	1.19E-02	31	7.86E-03	66%	Pass
41	0.648	45	1.14E-02	29	7.35E-03	64%	Pass
42	0.662	45	1.14E-02	28	7.10E-03	62%	Pass
43	0.676	42	1.06E-02	28	7.10E-03	67%	Pass
44	0.690	42	1.06E-02	28	7.10E-03	67%	Pass
45	0.704	40	1.01E-02	25	6.34E-03	63%	Pass
46	0.718	40	1.01E-02	25	6.34E-03	63%	Pass
47	0.732	39	9.89E-03	25	6.34E-03	64%	Pass
48	0.746	38	9.63E-03	25	6.34E-03	66%	Pass
49	0.760	36	9.13E-03	24	6.08E-03	67%	Pass
50	0.775	35	8.87E-03	23	5.83E-03	66%	Pass
51	0.789	29	7.35E-03	22	5.58E-03	76%	Pass
52	0.803	29	7.35E-03	21	5.32E-03	72%	Pass
53	0.817	28	7.10E-03	20	5.07E-03	71%	Pass
54	0.831	27	6.84E-03	18	4.56E-03	67%	Pass
55	0.845	27	6.84E-03	18	4.56E-03	67%	Pass
56	0.859	27	6.84E-03	18	4.56E-03	67%	Pass
57	0.873	24	6.08E-03	18	4.56E-03	75%	Pass
58	0.887	23	5.83E-03	15	3.80E-03	65%	Pass
59	0.901	23	5.83E-03	14	3.55E-03	61%	Pass
60	0.915	23	5.83E-03	14	3.55E-03	61%	Pass
61	0.929	23	5.83E-03	13	3.30E-03	57%	Pass
62	0.943	21	5.32E-03	12	3.04E-03	57%	Pass
63	0.957	20	5.07E-03	12	3.04E-03	60%	Pass
64	0.971	20	5.07E-03	11	2.79E-03	55%	Pass
65	0.985	19	4.82E-03	11	2.79E-03	58%	Pass
66	0.999	17	4.31E-03	10	2.53E-03	59%	Pass
67	1.013	16	4.06E-03	9	2.28E-03	56%	Pass
68	1.027	15	3.80E-03	9	2.28E-03	60%	Pass
69	1.041	15	3.80E-03	9	2.28E-03	60%	Pass
70	1.055	14	3.55E-03	7	1.77E-03	50%	Pass
71	1.069	14	3.55E-03	7	1.77E-03	50%	Pass
72	1.084	14	3.55E-03	7	1.77E-03	50%	Pass
73	1.098	13	3.30E-03	6	1.52E-03	46%	Pass
74	1.112	12	3.04E-03	6	1.52E-03	50%	Pass
75	1.126	12	3.04E-03	5	1.27E-03	42%	Pass
76	1.140	10	2.53E-03	5	1.27E-03	50%	Pass
77	1.154	10	2.53E-03	5	1.27E-03	50%	Pass
78	1.168	10	2.53E-03	4	1.01E-03	40%	Pass
79	1.182	9	2.28E-03	4	1.01E-03	44%	Pass
80	1.196	9	2.28E-03	4	1.01E-03	44%	Pass
81	1.210	9	2.28E-03	4	1.01E-03	44%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
82	1.224	8	2.03E-03	4	1.01E-03	50%	Pass
83	1.238	8	2.03E-03	4	1.01E-03	50%	Pass
84	1.252	8	2.03E-03	4	1.01E-03	50%	Pass
85	1.266	8	2.03E-03	4	1.01E-03	50%	Pass
86	1.280	8	2.03E-03	4	1.01E-03	50%	Pass
87	1.294	8	2.03E-03	3	7.60E-04	38%	Pass
88	1.308	8	2.03E-03	2	5.07E-04	25%	Pass
89	1.322	5	1.27E-03	2	5.07E-04	40%	Pass
90	1.336	5	1.27E-03	2	5.07E-04	40%	Pass
91	1.350	5	1.27E-03	2	5.07E-04	40%	Pass
92	1.364	5	1.27E-03	2	5.07E-04	40%	Pass
93	1.378	5	1.27E-03	2	5.07E-04	40%	Pass
94	1.393	5	1.27E-03	2	5.07E-04	40%	Pass
95	1.407	5	1.27E-03	2	5.07E-04	40%	Pass
96	1.421	5	1.27E-03	2	5.07E-04	40%	Pass
97	1.435	5	1.27E-03	2	5.07E-04	40%	Pass
98	1.449	5	1.27E-03	2	5.07E-04	40%	Pass
99	1.463	5	1.27E-03	2	5.07E-04	40%	Pass
100	1.477	4	1.01E-03	2	5.07E-04	50%	Pass

Peak Flows calculated with Cunnane Plotting Position

Return Period (years)	Pre-dev. Q (cfs)	Post-Dev. Q (cfs)	Reduction (cfs)
10	1.477	1.170	0.307
9	1.399	1.144	0.255
8	1.315	1.122	0.193
7	1.315	1.096	0.219
6	1.312	1.055	0.257
5	1.191	1.025	0.167
4	1.130	0.969	0.160
3	1.037	0.885	0.152
2	0.863	0.659	0.204


North City Presbyterian Church POC 2 - Flow Duration Curve
Q (cfs)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.001
0.01
0.1
Percentage of time exceeded (%)
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx


North City Presbyterian Church POC 2 - Flow Duration Curve
Q (cfs)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
Percentage of time exceeded (%)
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
0.5Q2
0.3Q2
0.1Q2
Existing
Proposed
Qx

Flow Duration Curve Data for North City Presbyterian Church POC 2 - Poway, CA

Q2 =	0.476	cfs	Fraction	10	%
Q10 =	0.79	cfs			
Step =	0.0075	cfs			
Count =	394487	hours			
	45.00	years			

	Existing Condition			Detention Optimized			Pass or
Interval	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	Fail?
1	0.048	288	7.30E-02	290	7.35E-02	101%	Pass
2	0.055	271	6.87E-02	228	5.78E-02	84%	Pass
3	0.063	262	6.64E-02	214	5.42E-02	82%	Pass
4	0.070	254	6.44E-02	205	5.20E-02	81%	Pass
5	0.077	245	6.21E-02	186	4.71E-02	76%	Pass
6	0.085	235	5.96E-02	165	4.18E-02	70%	Pass
7	0.092	232	5.88E-02	148	3.75E-02	64%	Pass
8	0.100	227	5.75E-02	134	3.40E-02	59%	Pass
9	0.107	211	5.35E-02	126	3.19E-02	60%	Pass
10	0.115	194	4.92E-02	122	3.09E-02	63%	Pass
11	0.122	186	4.71E-02	112	2.84E-02	60%	Pass
12	0.130	174	4.41E-02	104	2.64E-02	60%	Pass
13	0.137	158	4.01E-02	102	2.59E-02	65%	Pass
14	0.145	152	3.85E-02	99	2.51E-02	65%	Pass
15	0.152	146	3.70E-02	94	2.38E-02	64%	Pass
16	0.160	138	3.50E-02	90	2.28E-02	65%	Pass
17	0.167	131	3.32E-02	86	2.18E-02	66%	Pass
18	0.175	130	3.30E-02	81	2.05E-02	62%	Pass
19	0.182	120	3.04E-02	78	1.98E-02	65%	Pass
20	0.190	114	2.89E-02	74	1.88E-02	65%	Pass
21	0.197	108	2.74E-02	70	1.77E-02	65%	Pass
22	0.204	106	2.69E-02	67	1.70E-02	63%	Pass
23	0.212	99	2.51E-02	59	1.50E-02	60%	Pass
24	0.219	97	2.46E-02	55	1.39E-02	57%	Pass
25	0.227	89	2.26E-02	53	1.34E-02	60%	Pass
26	0.234	85	2.15E-02	50	1.27E-02	59%	Pass
27	0.242	83	2.10E-02	46	1.17E-02	55%	Pass
28	0.249	80	2.03E-02	42	1.06E-02	53%	Pass
29	0.257	79	2.00E-02	39	9.89E-03	49%	Pass
30	0.264	77	1.95E-02	39	9.89E-03	51%	Pass
31	0.272	72	1.83E-02	38	9.63E-03	53%	Pass
32	0.279	69	1.75E-02	37	9.38E-03	54%	Pass
33	0.287	69	1.75E-02	36	9.13E-03	52%	Pass
34	0.294	67	1.70E-02	35	8.87E-03	52%	Pass
35	0.302	65	1.65E-02	34	8.62E-03	52%	Pass
36	0.309	63	1.60E-02	33	8.37E-03	52%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
37	0.317	60	1.52E-02	33	8.37E-03	55%	Pass
38	0.324	56	1.42E-02	32	8.11E-03	57%	Pass
39	0.331	54	1.37E-02	30	7.60E-03	56%	Pass
40	0.339	51	1.29E-02	30	7.60E-03	59%	Pass
41	0.346	49	1.24E-02	29	7.35E-03	59%	Pass
42	0.354	47	1.19E-02	28	7.10E-03	60%	Pass
43	0.361	45	1.14E-02	28	7.10E-03	62%	Pass
44	0.369	42	1.06E-02	28	7.10E-03	67%	Pass
45	0.376	41	1.04E-02	28	7.10E-03	68%	Pass
46	0.384	41	1.04E-02	27	6.84E-03	66%	Pass
47	0.391	41	1.04E-02	25	6.34E-03	61%	Pass
48	0.399	41	1.04E-02	25	6.34E-03	61%	Pass
49	0.406	39	9.89E-03	23	5.83E-03	59%	Pass
50	0.414	39	9.89E-03	22	5.58E-03	56%	Pass
51	0.421	38	9.63E-03	21	5.32E-03	55%	Pass
52	0.429	34	8.62E-03	20	5.07E-03	59%	Pass
53	0.436	32	8.11E-03	20	5.07E-03	63%	Pass
54	0.444	30	7.60E-03	19	4.82E-03	63%	Pass
55	0.451	29	7.35E-03	19	4.82E-03	66%	Pass
56	0.458	27	6.84E-03	17	4.31E-03	63%	Pass
57	0.466	27	6.84E-03	17	4.31E-03	63%	Pass
58	0.473	27	6.84E-03	17	4.31E-03	63%	Pass
59	0.481	23	5.83E-03	15	3.80E-03	65%	Pass
60	0.488	22	5.58E-03	14	3.55E-03	64%	Pass
61	0.496	22	5.58E-03	14	3.55E-03	64%	Pass
62	0.503	19	4.82E-03	13	3.30E-03	68%	Pass
63	0.511	18	4.56E-03	13	3.30E-03	72%	Pass
64	0.518	18	4.56E-03	13	3.30E-03	72%	Pass
65	0.526	17	4.31E-03	13	3.30E-03	76%	Pass
66	0.533	17	4.31E-03	13	3.30E-03	76%	Pass
67	0.541	16	4.06E-03	12	3.04E-03	75%	Pass
68	0.548	16	4.06E-03	12	3.04E-03	75%	Pass
69	0.556	16	4.06E-03	12	3.04E-03	75%	Pass
70	0.563	15	3.80E-03	11	2.79E-03	73%	Pass
71	0.571	14	3.55E-03	11	2.79E-03	79%	Pass
72	0.578	12	3.04E-03	11	2.79E-03	92%	Pass
73	0.585	12	3.04E-03	11	2.79E-03	92%	Pass
74	0.593	12	3.04E-03	9	2.28E-03	75%	Pass
75	0.600	11	2.79E-03	8	2.03E-03	73%	Pass
76	0.608	11	2.79E-03	7	1.77E-03	64%	Pass
77	0.615	10	2.53E-03	7	1.77E-03	70%	Pass
78	0.623	9	2.28E-03	7	1.77E-03	78%	Pass
79	0.630	9	2.28E-03	7	1.77E-03	78%	Pass
80	0.638	9	2.28E-03	7	1.77E-03	78%	Pass
81	0.645	9	2.28E-03	7	1.77E-03	78%	Pass

Interval	Existing Condition			Detention Optimized			Pass or Fail?
	Q (cfs)	Hours > Q	% time	Hours>Q	% time	Post/Pre	
82	0.653	9	2.28E-03	7	1.77E-03	78%	Pass
83	0.660	9	2.28E-03	6	1.52E-03	67%	Pass
84	0.668	8	2.03E-03	6	1.52E-03	75%	Pass
85	0.675	8	2.03E-03	6	1.52E-03	75%	Pass
86	0.683	6	1.52E-03	6	1.52E-03	100%	Pass
87	0.690	6	1.52E-03	6	1.52E-03	100%	Pass
88	0.698	6	1.52E-03	5	1.27E-03	83%	Pass
89	0.705	6	1.52E-03	5	1.27E-03	83%	Pass
90	0.712	5	1.27E-03	5	1.27E-03	100%	Pass
91	0.720	5	1.27E-03	4	1.01E-03	80%	Pass
92	0.727	5	1.27E-03	4	1.01E-03	80%	Pass
93	0.735	5	1.27E-03	2	5.07E-04	40%	Pass
94	0.742	5	1.27E-03	2	5.07E-04	40%	Pass
95	0.750	5	1.27E-03	2	5.07E-04	40%	Pass
96	0.757	5	1.27E-03	2	5.07E-04	40%	Pass
97	0.765	5	1.27E-03	2	5.07E-04	40%	Pass
98	0.772	5	1.27E-03	2	5.07E-04	40%	Pass
99	0.780	5	1.27E-03	2	5.07E-04	40%	Pass
100	0.787	4	1.01E-03	2	5.07E-04	50%	Pass

Peak Flows calculated with Cunnane Plotting Position

Return Period (years)	Pre-dev. Q (cfs)	Post-Dev. Q (cfs)	Reduction (cfs)
10	0.787	0.714	0.073
9	0.751	0.704	0.047
8	0.708	0.691	0.017
7	0.685	0.663	0.022
6	0.682	0.609	0.073
5	0.644	0.593	0.051
4	0.600	0.567	0.032
3	0.565	0.481	0.084
2	0.476	0.386	0.090

ATTACHMENT 3

List of the "n" Largest Peaks: Pre & Post-Developed Conditions

Basic Probabilistic Equation:

R = 1/P R: Return period (years).

P: Probability of a flow to be equaled or exceeded any given year (dimensionless).

Cunnane Equation:

$$P = \frac{i-0.4}{n+0.2}$$

Weibull Equation:

$$P = \frac{i}{n+1}$$

i: Position of the peak whose probability is desired (sorted from large to small)

n: number of years analyzed.

Explanation of Variables for the Tables in this Attachment

Peak: Refers to the peak flow at the date given, taken from the continuous simulation hourly results of the n year analyzed.

Posit: If all peaks are sorted from large to small, the position of the peak in a sorting analysis is included under the variable Posit.

Date: Date of the occurrence of the peak at the outlet from the continuous simulation

Note: all peaks are not annual maxima; instead they are defined as event maxima, with a threshold to separate peaks of at least 12 hours. In other words, any peak P in a time series is defined as a value where dP/dt = 0, and the peak is the largest value in 25 hours (12 hours before, the hour of occurrence and 12 hours after the occurrence, so it is in essence a daily peak).

List of Peak events and Determination of P2 and P10 (Pre-Development)
North City Presbyterian Church POC 1 - Poway

T (Year)	Cunnane (cfs)	Weibull (cfs)
10	**1.48**	**1.49**
9	**1.40**	**1.45**
8	**1.32**	**1.35**
7	**1.32**	**1.32**
6	**1.31**	**1.31**
5	**1.19**	**1.20**
4	**1.13**	**1.13**
3	**1.04**	**1.04**
2	**0.86**	**0.86**

Note:
Cunnane is the preferred method by the HMP permit.

Peaks (cfs)	Date	Posit	Period of Return (Years)	
			Weibull	Cunnane
0.589	12/6/1966	45	1.02	1.01
0.598	2/8/1993	44	1.05	1.04
0.602	4/14/2003	43	1.07	1.06
0.606	2/15/1992	42	1.10	1.09
0.62	1/9/1998	41	1.12	1.11
0.63	4/1/1982	40	1.15	1.14
0.673	12/5/1966	39	1.18	1.17
0.674	11/29/1982	38	1.21	1.20
0.703	2/21/2005	37	1.24	1.23
0.729	2/21/2000	36	1.28	1.27
0.753	1/18/1993	35	1.31	1.31
0.758	3/8/1974	34	1.35	1.35
0.764	2/17/1998	33	1.39	1.39
0.775	4/21/1988	32	1.44	1.43
0.776	1/4/1995	31	1.48	1.48
0.777	2/6/1976	30	1.53	1.53
0.777	9/10/1976	29	1.59	1.58
0.78	11/16/1972	28	1.64	1.64
0.78	2/16/1980	27	1.70	1.70
0.807	11/23/1965	26	1.77	1.77
0.86	2/27/2001	25	1.84	1.84
0.86	2/12/2003	24	1.92	1.92
0.863	3/17/1963	23	2.00	2.00
0.932	1/29/1980	22	2.09	2.09
0.935	4/18/1995	21	2.19	2.19
0.952	1/6/1979	20	2.30	2.31
0.985	3/1/1983	19	2.42	2.43
0.994	1/9/2005	18	2.56	2.57
1.003	2/8/1983	17	2.71	2.72
1.02	11/30/1982	16	2.88	2.90
1.053	1/7/1974	15	3.07	3.10
1.094	2/28/1970	14	3.29	3.32
1.101	11/12/1976	13	3.54	3.59
1.127	12/29/1978	12	3.83	3.90
1.136	12/18/1978	11	4.18	4.26
1.169	2/14/1998	10	4.60	4.71
1.211	11/5/1987	9	5.11	5.26
1.312	12/29/2004	8	5.75	5.95
1.315	2/3/1998	7	6.57	6.85
1.315	2/8/1998	6	7.67	8.07
1.474	3/17/1982	5	9.20	9.83
1.518	1/10/1978	4	11.50	12.56
1.593	1/25/1995	3	15.33	17.38
1.629	3/24/1983	2	23.00	28.25
1.824	2/21/1980	1	46.00	75.33

List of Peak events and Determination of P2 and P10 (Post-Development)
North City Presbyterian Church POC 1 - Poway

T (Year)	Cunnane (cfs)	Weibull (cfs)	Peaks (cfs)			Period of Return (Years)	
10	**1.17**	**1.20**		Date	Posit	Weibull	Cunnane
9	**1.14**	**1.16**	0.353	10/20/2004	45	1.02	1.01
8	**1.12**	**1.13**	0.36	1/11/1980	44	1.05	1.04
7	**1.10**	**1.10**	0.397	12/9/1965	43	1.07	1.06
6	**1.06**	**1.06**	0.406	3/1/1991	42	1.10	1.09
5	**1.02**	**1.03**	0.408	11/25/1985	41	1.12	1.11
4	**0.97**	**0.98**	0.418	1/29/1980	40	1.15	1.14
3	**0.89**	**0.89**	0.427	3/17/1982	39	1.18	1.17
2	**0.66**	**0.66**	0.437	1/15/1978	38	1.21	1.20
			0.445	11/30/1982	37	1.24	1.23
			0.447	1/11/2005	36	1.28	1.27
			0.45	1/16/1978	35	1.31	1.31
			0.467	1/8/1993	34	1.35	1.35
			0.48	2/22/2004	33	1.39	1.39
			0.488	1/14/1993	32	1.44	1.43
			0.497	4/8/1975	31	1.48	1.48
			0.504	1/9/2005	30	1.53	1.53
			0.511	2/15/1986	29	1.59	1.58
			0.522	3/1/1978	28	1.64	1.64
			0.58	10/27/2004	27	1.70	1.70
			0.61	2/8/1993	26	1.77	1.77
			0.642	2/8/1976	25	1.84	1.84
			0.646	3/2/1983	24	1.92	1.92
			0.659	4/1/1982	23	2.00	2.00
			0.691	2/16/1980	22	2.09	2.09
			0.703	1/25/1969	21	2.19	2.19
			0.752	3/5/1995	20	2.30	2.31
			0.799	12/5/1966	19	2.42	2.43
			0.816	2/21/2005	18	2.56	2.57
			0.829	11/22/1996	17	2.71	2.72
			0.884	12/4/1974	16	2.88	2.90
			0.886	4/18/1995	15	3.07	3.10
			0.895	1/4/1995	14	3.29	3.32
			0.921	11/23/1965	13	3.54	3.59
			0.959	2/3/1998	12	3.83	3.90
			0.995	3/1/1983	11	4.18	4.26
			1.005	12/18/1978	10	4.60	4.71
			1.042	12/29/1978	9	5.11	5.26
			1.053	2/8/1998	8	5.75	5.95
			1.092	12/29/2004	7	6.57	6.85
			1.124	1/6/1979	6	7.67	8.07
			1.162	1/29/1980	5	9.20	9.83
			1.281	11/12/1976	4	11.50	12.56
			1.3	2/28/1970	3	15.33	17.38
			1.507	1/10/1978	2	23.00	28.25
			1.597	2/21/1980	1	46.00	75.33

Note:
Cunnane is the preferred method by the HMP permit.

List of Peak events and Determination of P2 and P10 (Pre-Development)
North City Presbyterian Church POC 2 - Poway

T (Year)	Cunnane (cfs)	Weibull (cfs)
10	**0.79**	**0.79**
9	**0.75**	**0.78**
8	**0.71**	**0.73**
7	**0.69**	**0.69**
6	**0.68**	**0.68**
5	**0.64**	**0.65**
4	**0.60**	**0.60**
3	**0.56**	**0.57**
2	**0.48**	**0.48**

Note:
Cunnane is the preferred method by the HMP permit.

Peaks (cfs)	Date	Posit	Period of Return (Years)	
			Weibull	Cunnane
0.342	1/31/1996	45	1.02	1.01
0.345	12/4/1974	44	1.05	1.04
0.349	12/5/1966	43	1.07	1.06
0.352	2/6/1998	42	1.10	1.09
0.361	4/14/2003	41	1.12	1.11
0.364	2/8/1993	40	1.15	1.14
0.368	1/9/1998	39	1.18	1.17
0.372	2/21/2005	38	1.21	1.20
0.402	1/4/1995	37	1.24	1.23
0.405	2/16/1980	36	1.28	1.27
0.42	9/10/1976	35	1.31	1.31
0.423	2/21/2000	34	1.35	1.35
0.424	2/6/1976	33	1.39	1.39
0.425	11/23/1965	32	1.44	1.43
0.429	3/8/1974	31	1.48	1.48
0.431	2/17/1998	30	1.53	1.53
0.443	11/29/1982	29	1.59	1.58
0.447	1/18/1993	28	1.64	1.64
0.452	4/21/1988	27	1.70	1.70
0.454	11/16/1972	26	1.77	1.77
0.474	2/27/2001	25	1.84	1.84
0.474	2/12/2003	24	1.92	1.92
0.476	1/29/1980	23	2.00	2.00
0.486	3/17/1963	22	2.09	2.09
0.497	1/6/1979	21	2.19	2.19
0.503	3/1/1983	20	2.30	2.31
0.505	4/18/1995	19	2.42	2.43
0.52	1/9/2005	18	2.56	2.57
0.534	2/8/1983	17	2.71	2.72
0.56	1/7/1974	16	2.88	2.90
0.569	11/30/1982	15	3.07	3.10
0.571	2/28/1970	14	3.29	3.32
0.574	11/12/1976	13	3.54	3.59
0.594	12/18/1978	12	3.83	3.90
0.614	2/14/1998	11	4.18	4.26
0.621	12/29/1978	10	4.60	4.71
0.664	11/5/1987	9	5.11	5.26
0.682	2/3/1998	8	5.75	5.95
0.682	2/8/1998	7	6.57	6.85
0.71	12/29/2004	6	7.67	8.07
0.787	3/17/1982	5	9.20	9.83
0.79	1/10/1978	4	11.50	12.56
0.844	1/25/1995	3	15.33	17.38
0.867	3/24/1983	2	23.00	28.25
0.956	2/21/1980	1	46.00	75.33

List of Peak events and Determination of P2 and P10 (Post-Development)
North City Presbyterian Church POC 2 - Poway

T (Year)	Cunnane (cfs)	Weibull (cfs)	Peaks (cfs)			Period of Return (Years)	
10	**0.71**	**0.72**		Date	Posit	Weibull	Cunnane
9	**0.70**	**0.71**	0.187	3/1/1991	45	1.02	1.01
8	**0.69**	**0.70**	0.188	11/25/1985	44	1.05	1.04
7	**0.66**	**0.67**	0.202	1/29/1980	43	1.07	1.06
6	**0.61**	**0.62**	0.202	11/30/1982	42	1.10	1.09
5	**0.59**	**0.59**	0.204	1/7/1993	41	1.12	1.11
4	**0.57**	**0.57**	0.211	1/15/1978	40	1.15	1.14
3	**0.48**	**0.48**	0.215	1/16/1978	39	1.18	1.17
2	**0.39**	**0.39**	0.22	1/11/2005	38	1.21	1.20
			0.229	3/17/1982	37	1.24	1.23
			0.235	1/8/1993	36	1.28	1.27
			0.24	3/1/1978	35	1.31	1.31
			0.244	4/8/1975	34	1.35	1.35
			0.244	1/14/1993	33	1.39	1.39
			0.246	2/15/1986	32	1.44	1.43
			0.252	4/1/1982	31	1.48	1.48
			0.254	1/9/2005	30	1.53	1.53
			0.278	4/21/1988	29	1.59	1.58
			0.287	2/8/1993	28	1.64	1.64
			0.295	10/27/2004	27	1.70	1.70
			0.324	2/8/1976	26	1.77	1.77
			0.327	3/2/1983	25	1.84	1.84
			0.353	1/25/1969	24	1.92	1.92
			0.386	3/5/1995	23	2.00	2.00
			0.405	12/5/1966	22	2.09	2.09
			0.406	2/16/1980	21	2.19	2.19
			0.411	11/22/1996	20	2.30	2.31
			0.422	2/21/2005	19	2.42	2.43
			0.455	12/4/1974	18	2.56	2.57
			0.456	1/4/1995	17	2.71	2.72
			0.476	11/23/1965	16	2.88	2.90
			0.485	4/18/1995	15	3.07	3.10
			0.499	12/29/2004	14	3.29	3.32
			0.54	3/1/1983	13	3.54	3.59
			0.56	2/14/1998	12	3.83	3.90
			0.586	1/29/1980	11	4.18	4.26
			0.589	1/6/1979	10	4.60	4.71
			0.596	12/29/1978	9	5.11	5.26
			0.606	1/7/1974	8	5.75	5.95
			0.659	12/18/1978	7	6.57	6.85
			0.693	11/12/1976	6	7.67	8.07
			0.713	2/28/1970	5	9.20	9.83
			0.729	2/8/1998	4	11.50	12.56
			0.734	2/3/1998	3	15.33	17.38
			0.854	1/10/1978	2	23.00	28.25
			0.982	2/21/1980	1	46.00	75.33

Note:
Cunnane is the preferred method by the HMP permit.

ATTACHMENT 4

AREA VS ELEVATION

The storage provided by the LID BMP is entered into the LID Module within SWMM – please refer to Attachment 7 for further information.

Volume provided above the first surface outlet is accounted for in the basin module within SWMM. A stage-storage relationship is provided within this Module, a copy of which is located on the following pages.

DISCHARGE VS ELEVATION

The orifice has been selected to maximize its size while still restricting flows to conform with the required 10% of the Q2 event flow as mandated in the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. While REC acknowledges that the orifice is small, to increase the size of the outlet would impact the basin's ability to restrict flows beneath the HMP thresholds, thus preventing the BMP from conformance with HMP requirements.

In order to further reduce the risk of blockage of the orifices, regular maintenance of the riser and orifice must be performed to ensure potential blockages are minimized. A detail of the orifice and riser structure is provided in Attachment 5 of this memorandum.

A stage-discharge relationship is provided on the following pages for the surface outlet structure. The LID low flow orifice discharge relationship is addressed within the LID Module within SWMM – please refer to Attachment 7 for further information.

DISCHARGE EQUATIONS

1) Weir:

$$Q_W = C_W \cdot L \cdot H^{3/2} \qquad (1)$$

2) Slot:

As an orifice: $$Q_s = B_s \cdot h_s \cdot c_g \cdot \sqrt{2g\left(H - \frac{h_s}{2}\right)} \qquad (2.a)$$

As a weir: $$Q_s = C_W \cdot B_s \cdot H^{3/2} \qquad (2.b)$$

For H > h_s slot works as weir until orifice equation provides a smaller discharge. The elevation such that equation (2.a) = equation (2.b) is the elevation at which the behavior changes from weir to orifice.

3) Vertical Orifices

As an orifice: $$Q_o = 0.25 \cdot \pi D^2 \cdot c_g \cdot \sqrt{2g\left(H - \frac{D}{2}\right)} \qquad (3.a)$$

As a weir: Critical depth and geometric family of circular sector must be solved to determined Q as a function of H:

$$\frac{Q_O^2}{g} = \frac{A_{cr}^3}{T_{cr}}; \quad H = y_{cr} + \frac{A_{cr}}{2 \cdot T_{cr}}; \; T_{cr} = 2\sqrt{y_{cr}(D - y_{cr})}\,; \quad A_{cr} = \frac{D^2}{8}[\alpha_{cr} - sin(\alpha_{cr})]\,;$$

$$y_{cr} = \frac{D}{2}[1 - sin(0.5 \cdot \alpha_{cr})] \qquad (3.b.1, 3.b.2, 3.b.3, 3.b.4 \text{ and } 3.b.5)$$

There is a value of H (approximately H = 110% D) from which orifices no longer work as weirs as critical depth is not possible at the entrance of the orifice. This value of H is obtained equaling the discharge using critical equations and equations (3.b).

A mathematical model is prepared with the previous equations depending on the type o discharge.

The following are the variables used above:

Q_W, Q_s, Q_O = Discharge of weir, slot or orifice (cfs)

C_W, c_g : Coefficients of discharge of weir (typically 3.1) and orifice (0.61 to 0.62)

L, B_s, D, h_s : Length of weir, width of slot, diameter of orifice and height of slot, respectively; (ft)

H: Level of water in the pond over the invert of slot, weir or orifice (ft)

A_{cr}, T_{cr}, y_{cr}, α_{cr}: Critical variables for circular sector: area (sq-ft), top width (ft), critical depth (ft), and angle to the center, respectively.

Stage-Area for Biofiltration BMP Basin B

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	2557	**0**	**BIOFILTRATION (1)**
0.08	2608	215	
0.17	2660	435	
0.25	2712	659	
0.33	2764	887	
0.42	2817	1119	
0.50	2870	1356	**SURFACE DISCHARGE (2)**
0.58	2924	1598	
0.67	2978	1844	
0.75	3032	2094	
0.83	3087	2349	
0.92	3142	2608	
1.00	3198	2873	
1.08	3254	3141	
1.17	3310	3415	
1.25	3367	3693	
1.33	3425	3976	
1.42	3482	4264	
1.50	3540	4557	**EMERGENCY WEIR (3)**
1.58	3599	4854	
1.67	3658	5156	
1.75	3717	5464	
1.83	3776	5776	
1.92	3837	6093	
2.00	3897	6415	

SUB SURFACE STORAGE BMP B

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	2557	1534	**Amended Soil Base (0.3 voids)**
-3.50	2557	1534	**Gravel Base (0.4 voids)**
Gravel & Amended Soil	**TOTAL =**	3068	(ft^3)
Surface Total	**TOTAL =**	1356	(ft^3)
IMP	**TOTAL =**	**4425**	**(ft^3)**

(1): The area at any surface elevation corresponds to the area of gravel and amended soil (Bio-retention layer)
(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)
(3): This elevation corresponds to the top of the riser elevation.

Effective Depth:	6.36 in

Stage-Area for Biofiltration BMP Basin A

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
0.00	699	**0**	**BIOFILTRATION (1)**
0.08	741	60	
0.17	784	124	
0.25	828	191	
0.33	871	262	
0.42	915	336	
0.50	960	414	**SURFACE DISCHARGE (2)**
0.58	1005	496	
0.67	1050	582	
0.75	1096	671	
0.83	1142	764	
0.92	1188	861	
1.00	1235	962	
1.08	1282	1067	
1.17	1330	1176	
1.25	1378	1289	
1.33	1426	1406	
1.42	1475	1526	
1.50	1524	1651	**EMERGENCY WEIR (3)**
1.58	1574	1781	
1.67	1624	1914	
1.75	1674	2051	
1.83	1725	2193	
1.92	1776	2339	
2.00	1828	2489	

SUB SURFACE STORAGE BMP A

Elevation (ft)	Area (ft^2)	Volume (ft^3)	
-2.00	699	419	**Amended Soil Base (0.3 voids)**
-3.50	699	419	**Gravel Base (0.4 voids)**
Gravel & Amended Soil	**TOTAL =**	839	(ft^3)
Surface Total	**TOTAL =**	414	(ft^3)
IMP	**TOTAL =**	**1253**	**(ft^3)**

(1): The area at any surface elevation corresponds to the area of gravel and amended soil (Bio-retention layer)
(2): Volume at this elevation coresponds with surface volume for WQ purposes (invert of lowest surface outlet)
(3): This elevation corresponds to the top of the riser elevation.

Effective Depth:	7.11 in

Outlet structure for Discharge of Basin B

*Note: h = head above the invert of the lowest surface discharge opening.

Discharge vs Elevation Table

Low orifice	0.750 "	Lower slot		Lower Weir			
Number of orif:	1	Number of slots:	1	Number of weirs:	0		
Cg-low:	0.61	Invert:	0.33 ft	Invert:	0.000 ft		
		B	8.00 ft	B:	0.000 ft		
Middle orifice	2.500 "	hslot	0.083 ft				
Number of orif:	0						
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir	
invert elev:	0 ft	Number of slots:	0	Number of weirs:	0	Invert:	1.000 ft
		Invert:	0.00 ft	Invert:	0.000 ft	W:	12.00 ft
		B:	0.00 ft	B:	0.00 ft		
		hslot	0.000 ft				

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.042	0.667	0.200	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0013
0.083	1.333	0.400	0.003	0.004	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0034
0.125	2.000	0.600	0.005	0.006	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0046
0.167	2.667	0.800	0.006	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0055
0.208	3.333	1.000	0.006	0.007	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0063
0.250	4.000	1.200	0.007	0.012	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0070
0.292	4.667	1.400	0.008	0.029	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0077
0.333	5.333	1.600	0.008	0.073	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0083
0.375	6.000	1.800	0.009	0.088	0.009	0.000	0.000	0.000	0.211	0.000	0.000	0.000	0.000	0.2197
0.417	6.667	2.000	0.009	0.093	0.009	0.000	0.000	0.000	0.597	0.000	0.000	0.000	0.000	0.6059
0.458	7.333	2.200	0.010	0.098	0.010	0.000	0.000	0.000	0.942	0.000	0.000	0.000	0.000	0.9519
0.500	8.000	2.400	0.010	0.103	0.010	0.000	0.000	0.000	1.154	0.000	0.000	0.000	0.000	1.1641
0.542	8.667	2.600	0.011	0.107	0.011	0.000	0.000	0.000	1.332	0.000	0.000	0.000	0.000	1.3430
0.583	9.333	2.800	0.011	0.112	0.011	0.000	0.000	0.000	1.490	0.000	0.000	0.000	0.000	1.5007
0.625	10.000	3.000	0.012	0.116	0.012	0.000	0.000	0.000	1.632	0.000	0.000	0.000	0.000	1.6433
0.667	10.667	3.200	0.012	0.120	0.012	0.000	0.000	0.000	1.762	0.000	0.000	0.000	0.000	1.7745
0.708	11.333	3.400	0.012	0.124	0.012	0.000	0.000	0.000	1.884	0.000	0.000	0.000	0.000	1.8965
0.750	12.000	3.600	0.013	0.127	0.013	0.000	0.000	0.000	1.998	0.000	0.000	0.000	0.000	2.0112
0.792	12.667	3.800	0.013	0.131	0.013	0.000	0.000	0.000	2.107	0.000	0.000	0.000	0.000	2.1197
0.833	13.333	4.000	0.013	0.135	0.013	0.000	0.000	0.000	2.209	0.000	0.000	0.000	0.000	2.2228
0.875	14.000	4.200	0.014	0.138	0.014	0.000	0.000	0.000	2.308	0.000	0.000	0.000	0.000	2.3214
0.917	14.667	4.400	0.014	0.141	0.014	0.000	0.000	0.000	2.402	0.000	0.000	0.000	0.000	2.4160
0.958	15.333	4.600	0.014	0.145	0.014	0.000	0.000	0.000	2.493	0.000	0.000	0.000	0.000	2.5070
1.000	16.000	4.800	0.015	0.148	0.015	0.000	0.000	0.000	2.580	0.000	0.000	0.000	0.000	2.5948
1.042	16.667	5.000	0.015	0.151	0.015	0.000	0.000	0.000	2.665	0.000	0.000	0.000	0.316	2.9961
1.083	17.333	5.200	0.015	0.154	0.015	0.000	0.000	0.000	2.747	0.000	0.000	0.000	0.895	3.6569
1.125	18.000	5.400	0.016	0.157	0.016	0.000	0.000	0.000	2.826	0.000	0.000	0.000	1.644	4.4860
1.167	18.667	5.600	0.016	0.160	0.016	0.000	0.000	0.000	2.904	0.000	0.000	0.000	2.531	5.4508
1.208	19.333	5.800	0.016	0.163	0.016	0.000	0.000	0.000	2.979	0.000	0.000	0.000	3.537	6.5328
1.250	20.000	6.000	0.017	0.166	0.017	0.000	0.000	0.000	3.053	0.000	0.000	0.000	4.650	7.7193
1.292	20.667	6.200	0.017	0.169	0.017	0.000	0.000	0.000	3.125	0.000	0.000	0.000	5.860	9.0010
1.333	21.333	6.400	0.017	0.171	0.017	0.000	0.000	0.000	3.195	0.000	0.000	0.000	7.159	10.3710
1.375	22.000	6.600	0.017	0.174	0.017	0.000	0.000	0.000	3.263	0.000	0.000	0.000	8.543	11.8235
1.417	22.667	6.800	0.018	0.177	0.018	0.000	0.000	0.000	3.331	0.000	0.000	0.000	10.005	13.3536
1.458	23.333	7.000	0.018	0.179	0.018	0.000	0.000	0.000	3.397	0.000	0.000	0.000	11.543	14.9575
1.500	24.000	7.200	0.018	0.182	0.018	0.000	0.000	0.000	3.461	0.000	0.000	0.000	13.152	16.6318

Outlet structure for Discharge of Basin A

*Note: h = head above the invert of the lowest surface discharge opening.

Discharge vs Elevation Table

Low orifice	0.750 "	Lower slot		Lower Weir			
Number of orif:	2	Number of slots:	0	Number of weirs:	0		
Cg-low:	0.61	Invert:	0.00 ft	Invert:	0.000 ft		
		B	0.00 ft	B:	0.000 ft		
Middle orifice	2.500 "	hslot	0.000 ft				
Number of orif:	0						
Cg-middle:	0.61	Upper slot		Upper Weir		Emergency weir	
invert elev:	0 ft	Number of slots:	0	Number of weirs:	0	Invert:	1.000 ft
		Invert:	0.00 ft	Invert:	0.000 ft	W:	12.00 ft
		B:	0.00 ft	B:	0.00 ft		
		hslot	0.000 ft				

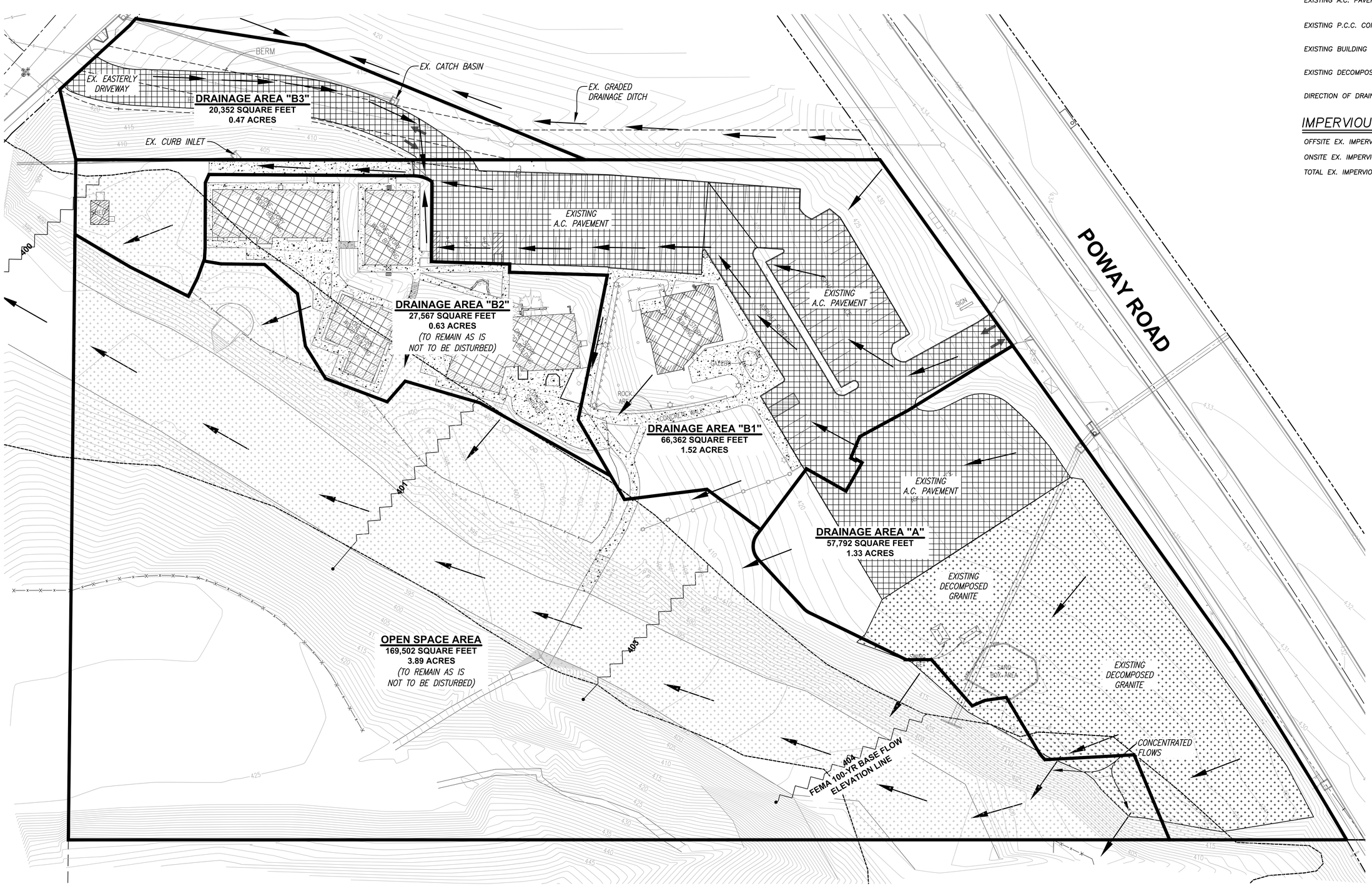
h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qlweir (cfs)	Quweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.042	0.667	0.200	0.003	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0025
0.083	1.333	0.400	0.007	0.008	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0069
0.125	2.000	0.600	0.009	0.012	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0092
0.167	2.667	0.800	0.011	0.014	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0111
0.208	3.333	1.000	0.013	0.014	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0126
0.250	4.000	1.200	0.014	0.023	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0140
0.292	4.667	1.400	0.015	0.057	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0153
0.333	5.333	1.600	0.017	0.147	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0165
0.375	6.000	1.800	0.018	0.176	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0176
0.417	6.667	2.000	0.019	0.186	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0186
0.458	7.333	2.200	0.020	0.196	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0196
0.500	8.000	2.400	0.021	0.206	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0206
0.542	8.667	2.600	0.021	0.215	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0215
0.583	9.333	2.800	0.022	0.223	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0223
0.625	10.000	3.000	0.023	0.231	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0231
0.667	10.667	3.200	0.024	0.239	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0239
0.708	11.333	3.400	0.025	0.247	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0247
0.750	12.000	3.600	0.025	0.255	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0255
0.792	12.667	3.800	0.026	0.262	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0262
0.833	13.333	4.000	0.027	0.269	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0269
0.875	14.000	4.200	0.028	0.276	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0276
0.917	14.667	4.400	0.028	0.283	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0283
0.958	15.333	4.600	0.029	0.289	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0289
1.000	16.000	4.800	0.030	0.296	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0296
1.042	16.667	5.000	0.030	0.302	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.316	0.3466
1.083	17.333	5.200	0.031	0.308	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.895	0.9257
1.125	18.000	5.400	0.031	0.314	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.644	1.6754
1.167	18.667	5.600	0.032	0.320	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.531	2.5631
1.208	19.333	5.800	0.033	0.326	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.537	3.5700
1.250	20.000	6.000	0.033	0.332	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.650	4.6832
1.292	20.667	6.200	0.034	0.337	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.860	5.8934
1.333	21.333	6.400	0.034	0.343	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.159	7.1934
1.375	22.000	6.600	0.035	0.348	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.543	8.5774
1.417	22.667	6.800	0.035	0.354	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.005	10.0406
1.458	23.333	7.000	0.036	0.359	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.543	11.5788
1.500	24.000	7.200	0.036	0.364	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.152	13.1886

ATTACHMENT 5

Pre & Post-Developed Maps, Project Plan and Detention

Section Sketches

NORTH CITY PRESBYTERIAN CHURCH
PRE DEVELOPMENT OVERVIEW MAP



LEGEND

- EXISTING CONTOURS
- DRAINAGE AREA
- FEMA MAP NO. 06073C1354–F 100 YR FLOODWAY BOUNDARY
- EXISTING A.C. PAVEMENT
- EXISTING P.C.C. CONCRETE
- EXISTING BUILDING
- EXISTING DECOMPOSED GRANITE
- DIRECTION OF DRAINAGE

IMPERVIOUS AREAS

OFFSITE EX. IMPERVIOUS AREA = 6,430 sf

ONSITE EX. IMPERVIOUS AREA = 69,884 sf

TOTAL EX. IMPERVIOUS AREA = 76,314 sf

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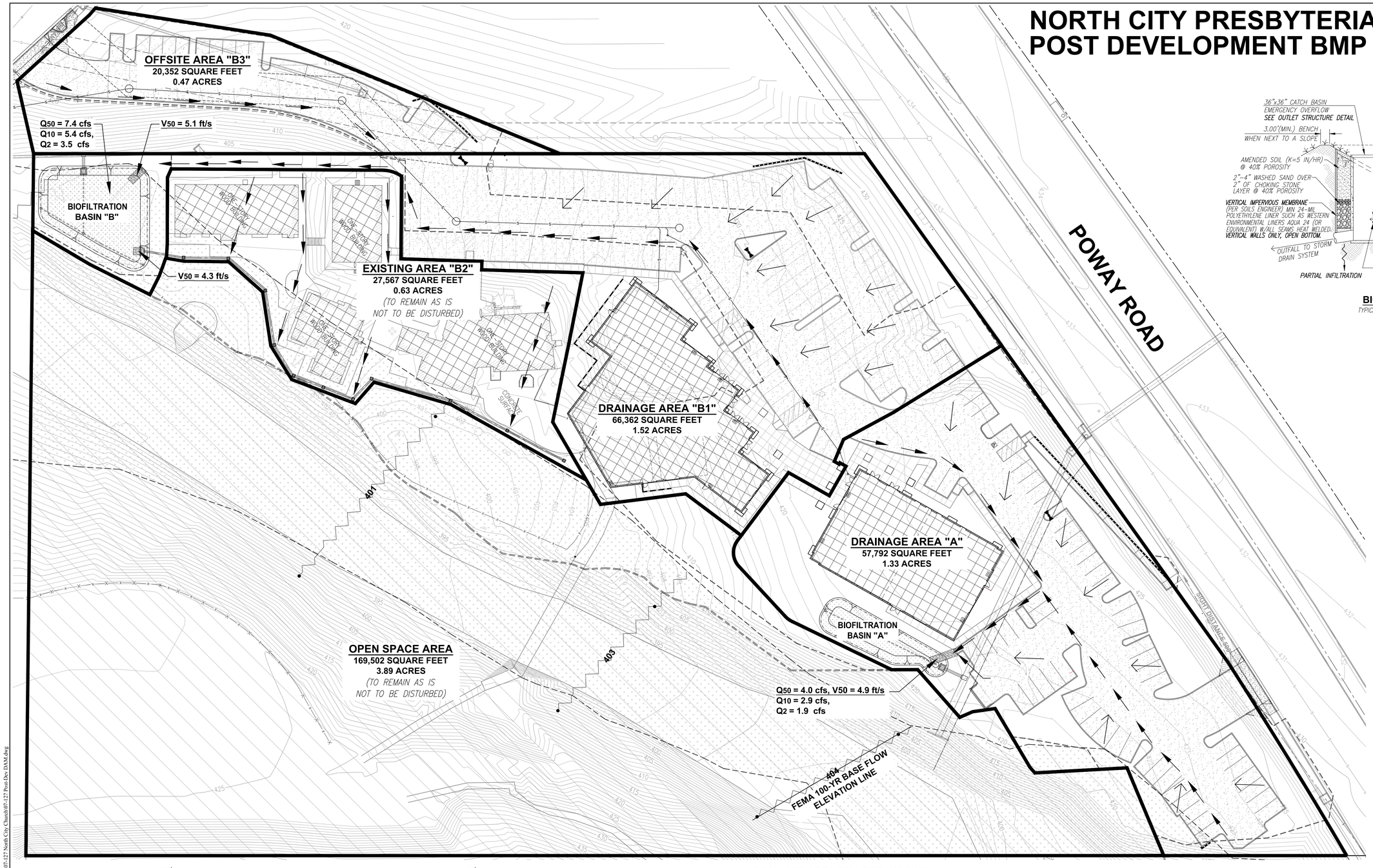
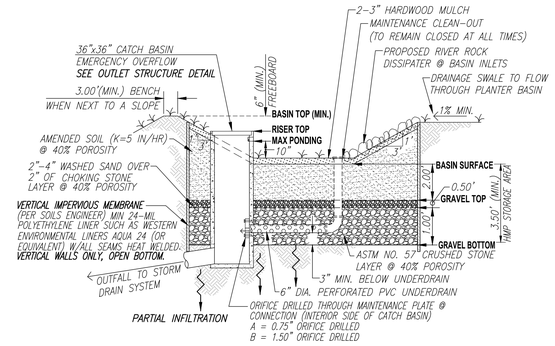
SPEAR & ASSOCIATES, INC. JOB NO. 07–127 NJD

NORTH CITY PRESBYTERIAN CHURCH
POST DEVELOPMENT BMP OVERVIEW MAP





BIOFILTRATION BASIN

TYPICAL SECTION & OUTLET CONNECTION
NOT-TO-SCALE

BIOFILTRATION BASIN MEDIA

PER COUNTY OF SAN DIEGO 2014 LID HANDBOOK, APPENDIX C FACT SHEETS.

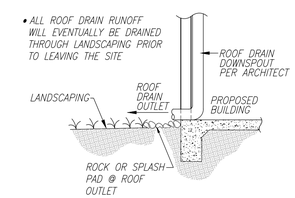
24" AMENDED SOIL LAYER
COMPOSITION AND TEXTURE:
65% SAND, 20% SANDY LOAM, & 15% COMPOST (FROM VEGETATION-BASED FEEDSTOCK). ANIMAL WASTES OR BY-PRODUCTS SHOULD NOT BE APPLIED.

PERMEABILITY:
5 IN/HR INFILTRATION RATE FOR THE FLOW-BASED SUSMP METHOD (1-6IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION).

CHEMICAL COMPOSITION: TOTAL PHOSPHORUS < 15 PARTS PER MILLION (PPM); PH 6-8; CATION EXCHANGE CAPACITY > 5 MILLIEQUIVALENTS PER 100 GRAMS (MEQ/100 G) OF SOIL; ORGANIC MATTER CONTENT < 5 PERCENT BY WEIGHT.

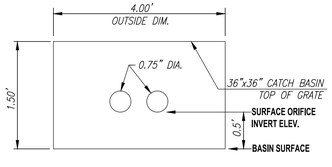
18" DRAINAGE LAYER
SEPARATE SOIL MEDIA FROM UNDERDRAIN LAYER WITH 2 TO 4 INCHES OF WASHED SAND, FOLLOWED BY 2 INCHES OF CHOKING STONE (ASTM NO. 8) OVER 1.0-FOOT OF ASTM NO. 57 STONE.

SURFACE VEGETATION
AS SPECIFIED BY THE LANDSCAPE ARCHITECT PLANS.



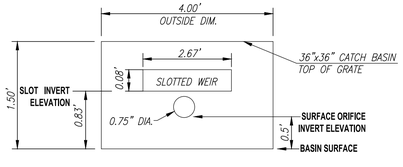
ROOF DRAIN OUTLET

TYPICAL ROOF DRAIN OUTLET AT LANDSCAPED AREAS
NO SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN A

36" CATCH BASIN'S OUTSIDE WALL,
(2) ORIFICES TO BE INSTALLED ON SOUTH WALL
NOT-TO-SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN B

36" CATCH BASIN'S OUTSIDE WALL,
(3) SLOTTED WEIR TO BE INSTALLED ON NORTH, EAST, AND SOUTH WALLS
NOT-TO-SCALE

DRAINAGE AREA DMA BREAKDOWN

SYMBOL	DRAINAGE AREA SURFACE	SOIL TYPE	'A' (EAST SIDE)	'B1' (WEST SIDE)	EXISTING AREA 'B2' (TO REMAIN AS IS & UNDISTURBED)	OPEN SPACE (TO REMAIN AS IS & UNDISTURBED)	OFFSITE 'B3' PRIVATE ACCESS & PARKING EASEMENT
	BUILDING ROOFTOP	TYPE 'C'	7,310 SQ FT	10,498 SQ FT	9,392 SQ FT	0 SQ FT	0 SQ FT
	PARKING/DRIVE AISLE IMPERVIOUS AREA	TYPE 'C'	23,332 SQ FT	30,574 SQ FT	0 SQ FT	0 SQ FT	9,268 SQ FT
	HARDSCAPING/SIDEWALK	TYPE 'C'	3,162 SQ FT	6,290 SQ FT	8,548 SQ FT	0 SQ FT	0 SQ FT
	LANDSCAPING AREA	TYPE 'C'	23,988 SQ FT	19,000 SQ FT	9,627 SQ FT	169,502 SQ FT	11,084 SQ FT
	TOTAL =		57,792 SQ FT	66,362 SQ FT	27,567 SQ FT	169,502 SQ FT	20,352 SQ FT
	TOTAL LOT AREA = 321,223 SQ FT						

30 15 0 30 60 90

SCALE: 1" = 30'

LEGEND

EXISTING CONTOURS (380)
DRAINAGE AREA
FEMA MAP NO. 06073C1354-F 100 YR FLOODWAY BOUNDARY
DIRECTION OF DRAINAGE
SHEET FLOW

PLOT DATE: 10/26/2017 8:36 AM S:\AutoCad Projects\2007\07-127 North City Church\07-127 Post-Dev DAM.dwg

SPEAR & ASSOCIATES, INC. JOB NO. 07-127 NJD

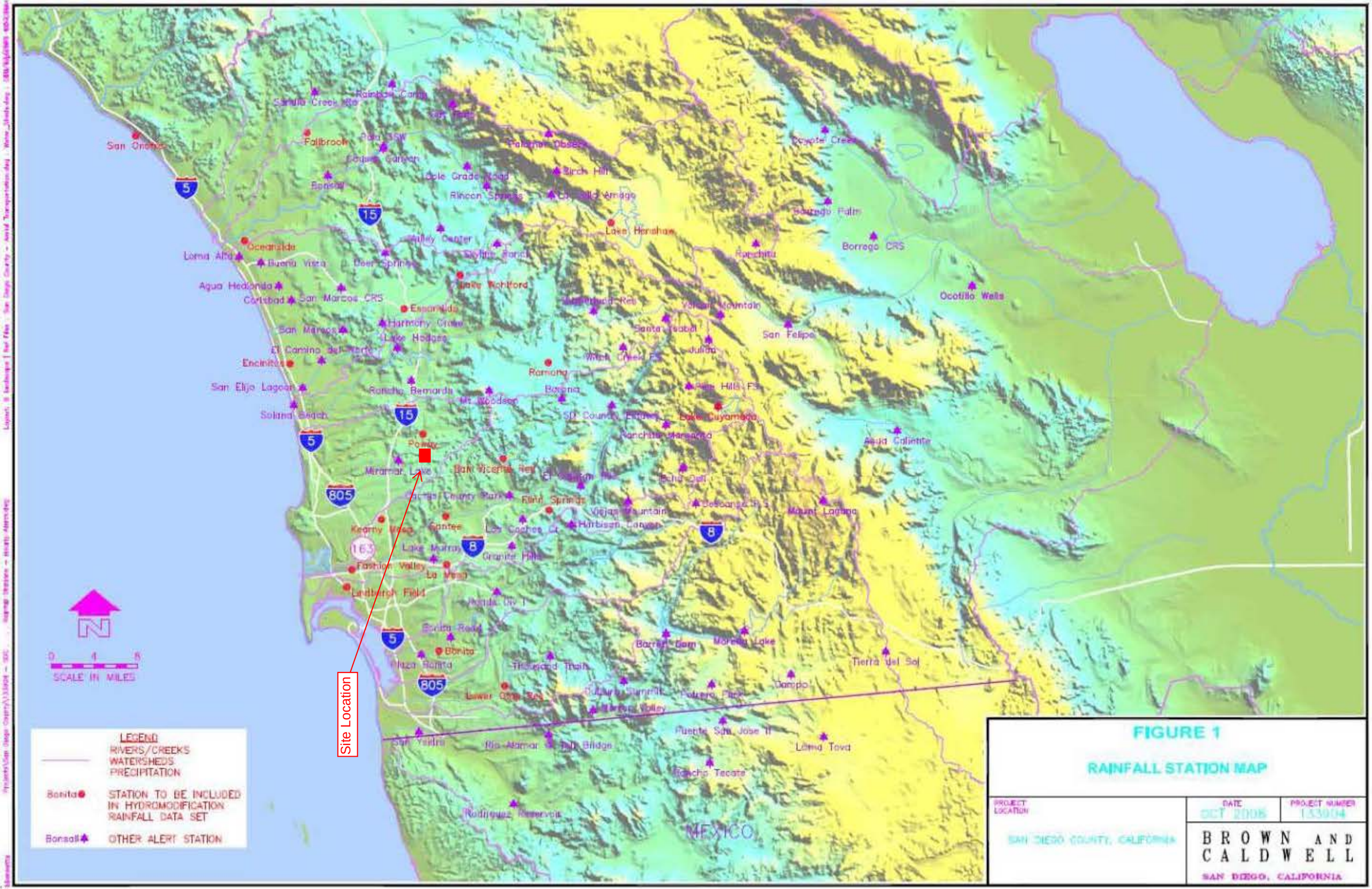
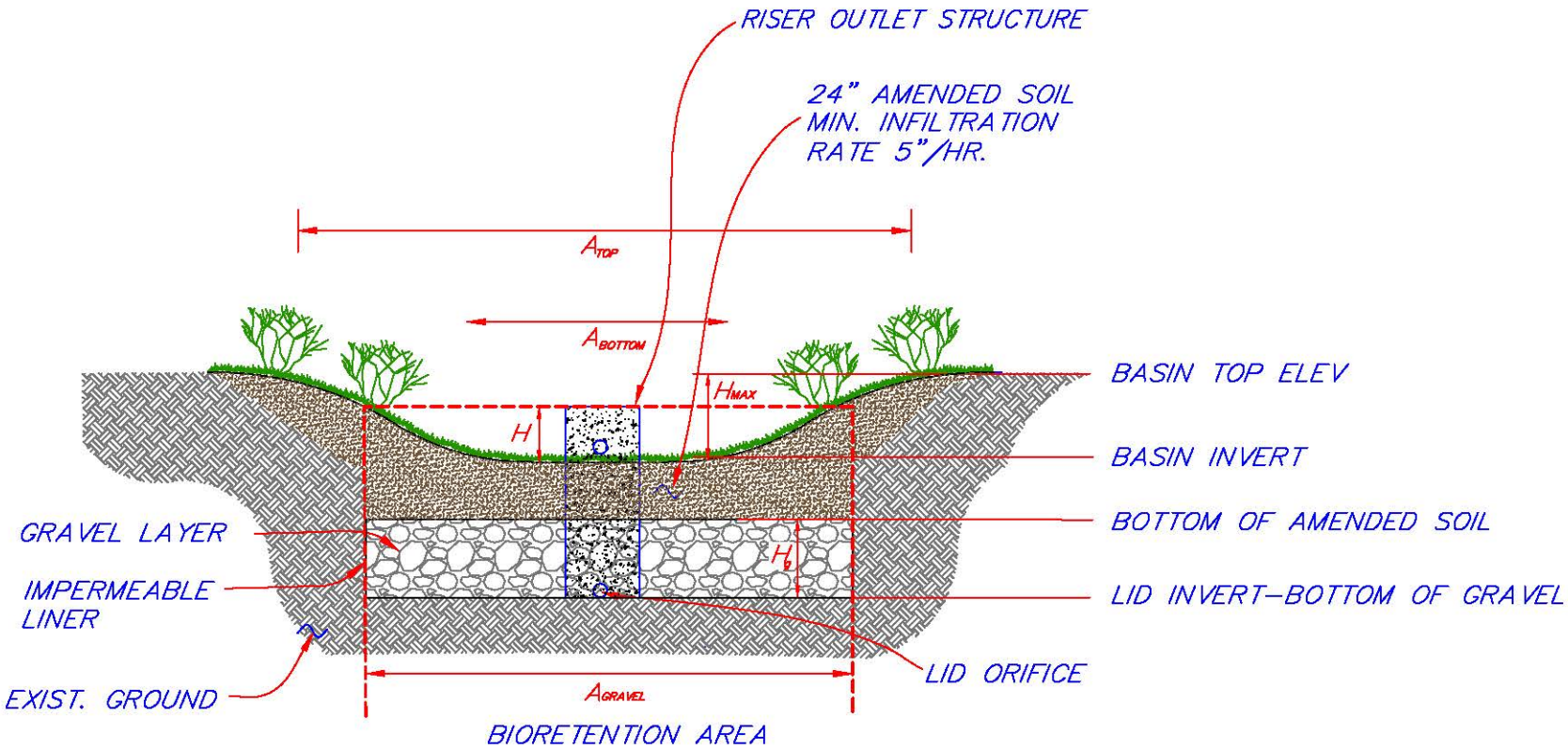


FIGURE 1

RAINFALL STATION MAP

PROJECT LOCATION	DATE	PROJECT NUMBER
SAN DIEGO COUNTY, CALIFORNIA	OCT 2005	153904

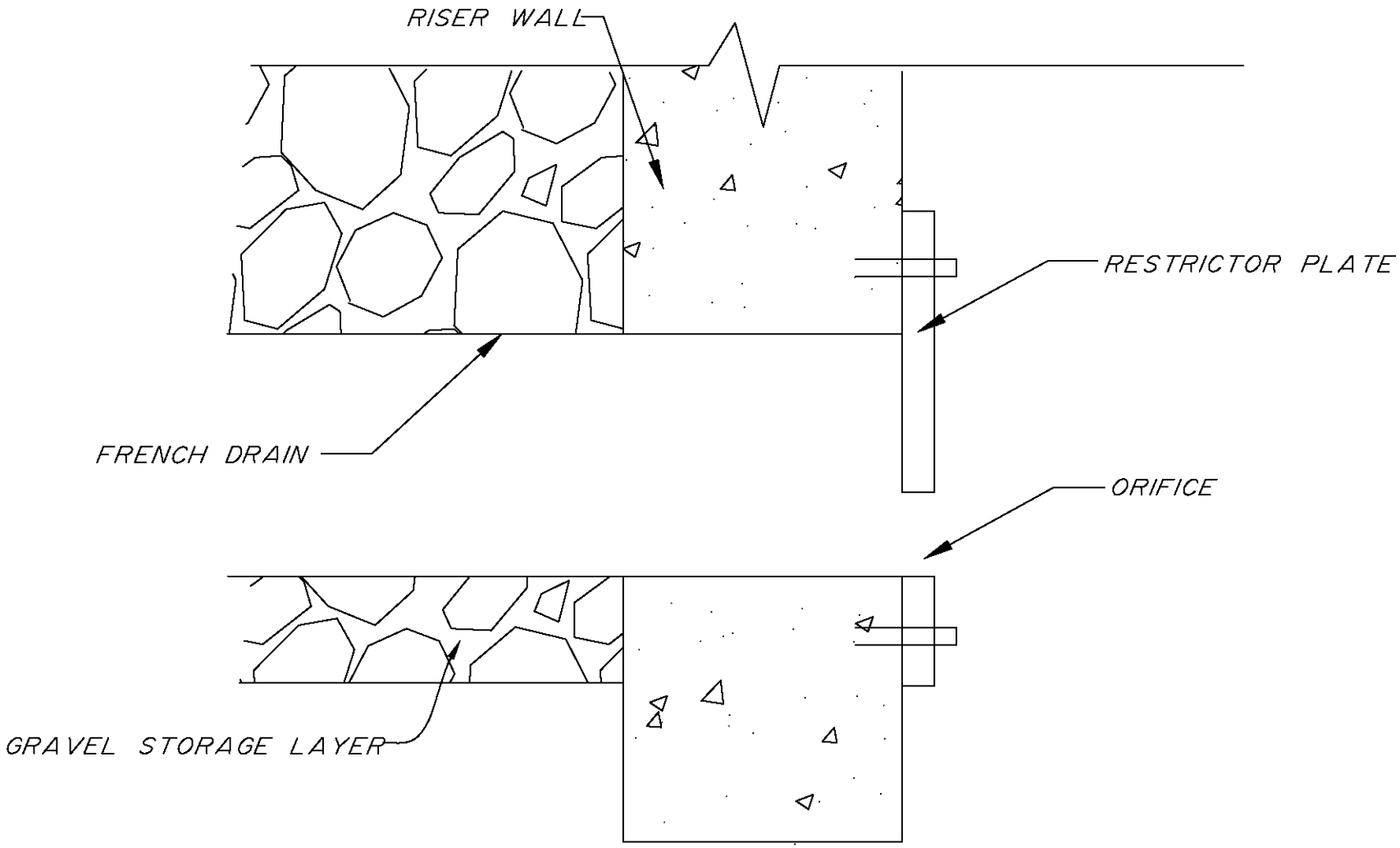
BROWN AND CALDWELL
SAN DIEGO, CALIFORNIA



BIOFILTRATION AREA CROSS SECTION

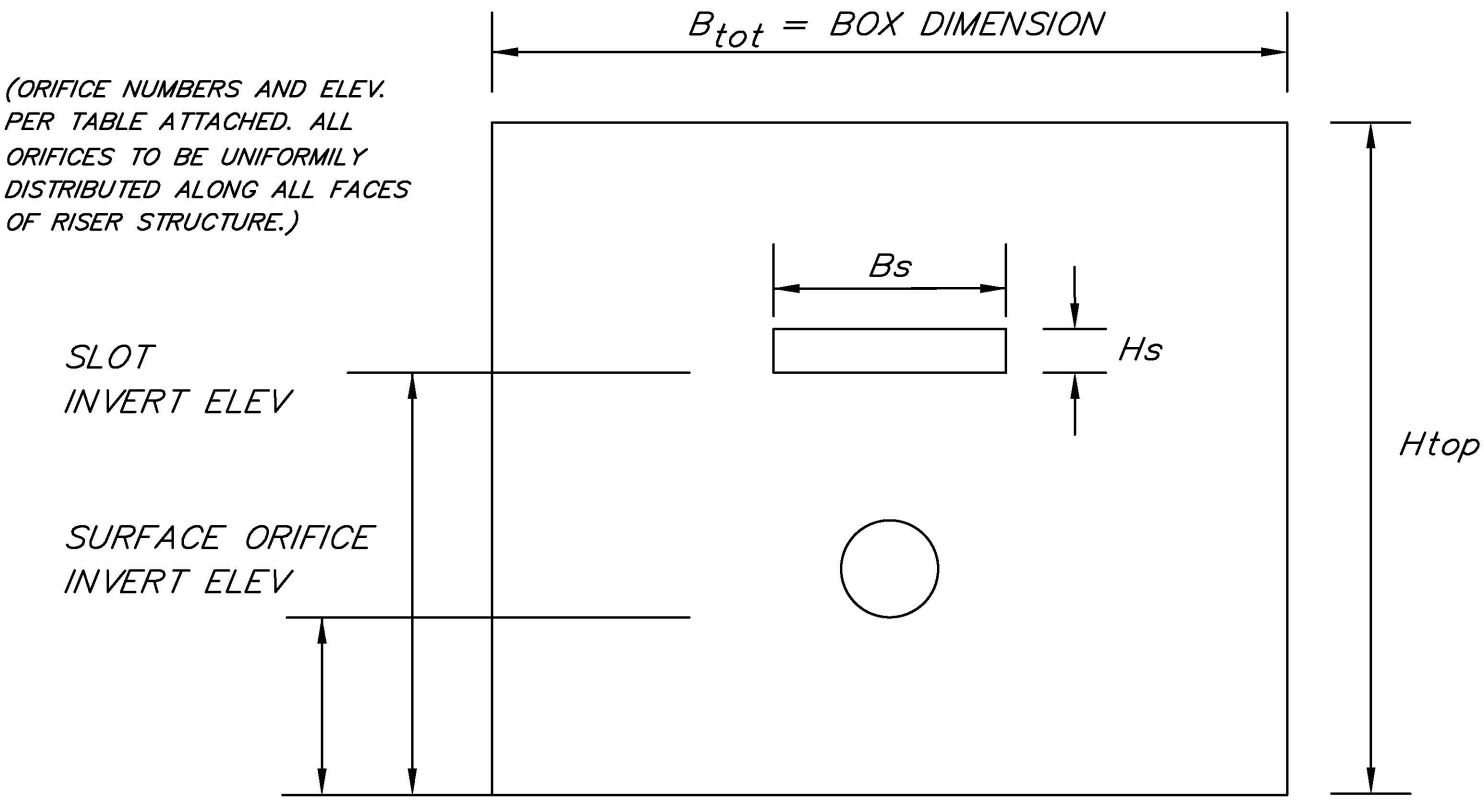
NOT TO SCALE

BMP	H(FT)	H_{MAX} (FT)	Hg (FT)	LID (INCHES)	A_{GRAVEL} (FT^2)	A_{BOTTOM} (FT^2)	A_{TOP} (FT^2)
B	1.50	2.00	1.5	1.50	2557	2557	3897
A	1.50	2.00	1.5	0.75	699	699	1828



LID ORIFICE DETAIL

NOT TO SCALE

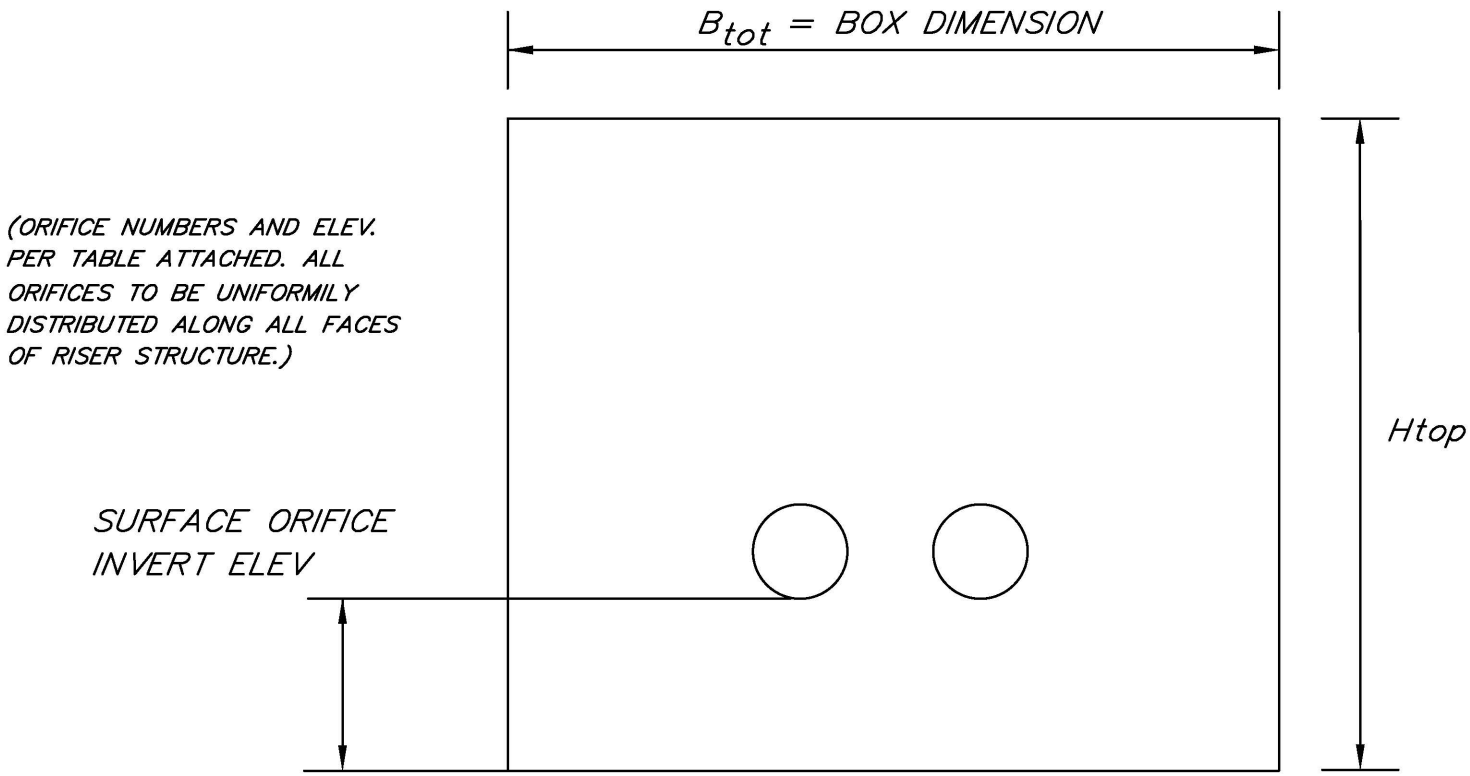


BIOFILTRATION OUTLET STRUCTURE DETAIL BASIN B - SECTION (TYP)

NOT TO SCALE

BASIN	SURFACE ORIFICE #/DIAM	SURFACE ORIFICE ELEV (FT)	SLOT Bs (FT)	SLOT Hs (FT)	SLOT ELEV (FT)	SPILLWAY Btot (FT)	SPILLWAY Htop (FT)
B	1-0.75"	0.5	8.00	0.083	0.83	12.0	1.50

NOTE: Btot IS THE INSIDE PERIMETER OF THE OUTLET STRUCTURE.



BIOFILTRATION OUTLET STRUCTURE DETAIL BASIN A- SECTION (TYP)

NOT TO SCALE

BASIN	SURFACE ORIFICE		SPILLWAY	
	#-DIAM	ELEV (FT)	Btot (FT)	Htop (FT)
A	2-0.75"	0.50	12.0	1.50

NOTE: Btot IS THE INSIDE PERIMETER OF THE OUTLET STRUCTURE.

ATTACHMENT 6

SWMM Input Data in Input Format (Existing & Proposed Models)

PRE_DEV

```
[TITLE]

[OPTIONS]
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           10/05/1962
START_TIME           00:00:00
REPORT_START_DATE    10/05/1962
REPORT_START_TIME    00:00:00
END_DATE             10/05/2007
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type       Parameters
;;---------- ----------
MONTHLY      0.06   0.08   0.11   0.16   0.18   0.21   0.21   0.20   0.16   0.12   0.08   0.06
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Poway            INTENSITY 1:00   1.0    TIMESERIES Poway

[SUBCATCHMENTS]
;;                                                   Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
DMA-1-1          Poway            POC-1            2.6235   0        476      3        0
DMA-1-2          Poway            POC-2            1.3267   0        482      3        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1-1          0.012      0.10       0.05       0.10       25         OUTLET
DMA-1-2          0.012      0.10       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
DMA-1-1          6          0.075      0.32
DMA-1-2          6          0.075      0.32

[OUTFALLS]
;;               Invert     Outfall    Stage/Table      Tide
;;Name           Elev.      Type       Time Series      Gate
;;-------------- ---------- ---------- ---------------- ----
POC-1            0          FREE                        NO
POC-2            0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
```

```
Poway            FILE "PowayRain.prn"

[REPORT]
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -482.569 8033.483 432.622 11300.683
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            -440.969           8181.992
POC-2            370.048            8202.966

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-1-1          -440.969           10552.119
DMA-1-2          391.022            10545.127

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Poway            39.759             11152.174
```

POST_DEV

```
[TITLE]

[OPTIONS]
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
START_DATE           10/05/1962
START_TIME           00:00:00
REPORT_START_DATE    10/05/1962
REPORT_START_TIME    00:00:00
END_DATE             10/05/2007
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
ALLOW_PONDING        NO
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type       Parameters
;;---------- ----------
MONTHLY      0.06   0.08   0.11   0.16   0.18   0.21   0.21   0.2    0.16   0.12   0.08   0.06
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
Poway            INTENSITY 1:00   1.0    TIMESERIES Poway

[SUBCATCHMENTS]
;;                                                   Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
DMA-A            Poway            LID_A            1.31067  59.2     214      3        0
DMA_B            Poway            LID_B            2.56483  66.7     243      3        0
LID_A            Poway            DIV_A            0.016047 0.0      10       0        0
LID_B            Poway            DIV_B            0.058701 0.0      10       0        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-A            0.012      0.10       0.05       0.10       25         OUTLET
DMA_B            0.012      0.10       0.05       0.10       25         OUTLET
LID_A            0.012      0.10       0.05       0.10       25         OUTLET
LID_B            0.012      0.10       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
DMA-A            6          0.075      0.32
DMA_B            6          0.075      0.32
LID_A            6          0.075      0.32
LID_B            6          0.075      0.32

[LID_CONTROLS]
;;               Type/Layer Parameters
;;-------------- ---------- ----------
LID_A            BC
```

POST_DEV

```
LID_A            SURFACE    7.11       0.05       0.0        0.0        5
LID_A            SOIL       24         0.4        0.2        0.1        5          5          1.5
LID_A            STORAGE    18         0.67       0          0
LID_A            DRAIN      0.2679     0.5        0          6

LID_B            BC
LID_B            SURFACE    6.36       0.05       0.0        0.0        5
LID_B            SOIL       24         0.4        0.2        0.1        5          5          1.5
LID_B            STORAGE    18         0.67       0          0
LID_B            DRAIN      0.2930     0.5        0          6

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSatur  FromImprv  ToPerv     Report
File
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- -------
----
LID_A            LID_A            1       699        0          0          100        0
LID_B            LID_B            1       2557       0          0          100        0

[OUTFALLS]
;;               Invert     Outfall    Stage/Table      Tide
;;Name           Elev.      Type       Time Series      Gate
;;-------------- ---------- ---------- ---------------- ----
POC-2            0          FREE                        NO
POC-1            0          FREE                        NO

[DIVIDERS]
;;               Invert     Diverted         Divider
;;Name           Elev.      Link             Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DIV_A            0          BYPASS_A         CUTOFF     0.01819    0          0          0          0
DIV_B            0          BYPASS_B         CUTOFF     0.07115    0          0          0          0

[STORAGE]
;;               Invert   Max.     Init.    Storage    Curve                      Ponded   Evap.
;;Name           Elev.    Depth    Depth    Curve      Params                     Area     Frac.
Infiltration Parameters
;;-------------- -------- -------- -------- ---------- -------- -------- -------- -------- -------- ----
-------------------
BASIN_A          0        1.5      0        TABULAR    STORAGE_A                  1828     0
BASIN_B          0        1.5      0        TABULAR    STORAGE_B                  3897     0

[CONDUITS]
;;               Inlet            Outlet                      Manning    Inlet      Outlet     Init.
Max.
;;Name           Node             Node             Length     N          Offset     Offset     Flow
Flow
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ---------
- ----------
BYPASS_A         DIV_A            BASIN_A          10         0.01       0          0          0
0
BYPASS_B         DIV_B            BASIN_B          10         0.01       0          0          0
0
UDRAIN_B         DIV_B            POC-1            10         0.01       0          0          0
0
UDRAIN_A         DIV_A            POC-2            10         0.01       0          0          0
0

[OUTLETS]
;;               Inlet            Outlet           Outflow    Outlet          Qcoeff/
Flap
;;Name           Node             Node             Height     Type            QTable           Qexpon
Gate
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------
- ----
OUTLET_A         BASIN_A          POC-2            0          TABULAR/HEAD    OUT_A
NO
OUTLET_B         BASIN_B          POC-1            0          TABULAR/HEAD    OUT_B
NO

[XSECTIONS]
```

POST_DEV

```
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels
;;-------------- ------------ ---------------- ---------- ---------- ---------- ----------
BYPASS_A         DUMMY        0                0          0          0          1
BYPASS_B         DUMMY        0                0          0          0          1
UDRAIN_B         DUMMY        0                0          0          0          1
UDRAIN_A         DUMMY        0                0          0          0          1

[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate
;;-------------- ---------- ---------- ---------- ----------

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
OUT_A            Rating     0.000      0.0000
OUT_A                       0.042      0.0025
OUT_A                       0.083      0.0069
OUT_A                       0.125      0.0092
OUT_A                       0.167      0.0111
OUT_A                       0.208      0.0126
OUT_A                       0.250      0.0140
OUT_A                       0.292      0.0153
OUT_A                       0.333      0.0165
OUT_A                       0.375      0.0176
OUT_A                       0.417      0.0186
OUT_A                       0.458      0.0196
OUT_A                       0.500      0.0206
OUT_A                       0.542      0.0215
OUT_A                       0.583      0.0223
OUT_A                       0.625      0.0231
OUT_A                       0.667      0.0239
OUT_A                       0.708      0.0247
OUT_A                       0.750      0.0255
OUT_A                       0.792      0.0262
OUT_A                       0.833      0.0269
OUT_A                       0.875      0.0276
OUT_A                       0.917      0.0283
OUT_A                       0.958      0.0289
OUT_A                       1.000      0.0296
OUT_A                       1.042      0.3466
OUT_A                       1.083      0.9257
OUT_A                       1.125      1.6754
OUT_A                       1.167      2.5631
OUT_A                       1.208      3.5700
OUT_A                       1.250      4.6832
OUT_A                       1.292      5.8934
OUT_A                       1.333      7.1934
OUT_A                       1.375      8.5774
OUT_A                       1.417      10.0406
OUT_A                       1.458      11.5788
OUT_A                       1.500      13.1886

OUT_B            Rating     0.000      0.000
OUT_B                       0.042      0.001
OUT_B                       0.083      0.003
OUT_B                       0.125      0.005
OUT_B                       0.167      0.006
OUT_B                       0.208      0.006
OUT_B                       0.250      0.007
OUT_B                       0.292      0.008
OUT_B                       0.333      0.008
OUT_B                       0.375      0.220
OUT_B                       0.417      0.606
OUT_B                       0.458      0.952
OUT_B                       0.500      1.164
OUT_B                       0.542      1.343
OUT_B                       0.583      1.501
OUT_B                       0.625      1.643
OUT_B                       0.667      1.774
OUT_B                       0.708      1.897
OUT_B                       0.750      2.011
```

```
OUT_B                       0.792      2.120
OUT_B                       0.833      2.223
OUT_B                       0.875      2.321
OUT_B                       0.917      2.416
OUT_B                       0.958      2.507
OUT_B                       1.000      2.595
OUT_B                       1.042      2.996
OUT_B                       1.083      3.657
OUT_B                       1.125      4.486
OUT_B                       1.167      5.451
OUT_B                       1.208      6.533
OUT_B                       1.250      7.719
OUT_B                       1.292      9.001
OUT_B                       1.333      10.371
OUT_B                       1.375      11.823
OUT_B                       1.417      13.354
OUT_B                       1.458      14.958
OUT_B                       1.500      16.632

STORAGE_A        Storage    0.00       960
STORAGE_A                   0.08       1005
STORAGE_A                   0.17       1050
STORAGE_A                   0.25       1096
STORAGE_A                   0.33       1142
STORAGE_A                   0.42       1188
STORAGE_A                   0.50       1235
STORAGE_A                   0.58       1282
STORAGE_A                   0.67       1330
STORAGE_A                   0.75       1378
STORAGE_A                   0.83       1426
STORAGE_A                   0.92       1475
STORAGE_A                   1.00       1524
STORAGE_A                   1.08       1574
STORAGE_A                   1.17       1624
STORAGE_A                   1.25       1674
STORAGE_A                   1.33       1725
STORAGE_A                   1.42       1776
STORAGE_A                   1.50       1828

STORAGE_B        Storage    0.00       2870
STORAGE_B                   0.08       2924
STORAGE_B                   0.17       2978
STORAGE_B                   0.25       3032
STORAGE_B                   0.33       3087
STORAGE_B                   0.42       3142
STORAGE_B                   0.50       3198
STORAGE_B                   0.58       3254
STORAGE_B                   0.67       3310
STORAGE_B                   0.75       3367
STORAGE_B                   0.83       3425
STORAGE_B                   0.92       3482
STORAGE_B                   1.00       3540
STORAGE_B                   1.08       3599
STORAGE_B                   1.17       3658
STORAGE_B                   1.25       3717
STORAGE_B                   1.33       3776
STORAGE_B                   1.42       3837
STORAGE_B                   1.50       3897

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Poway            FILE "PowayRain.prn"

[REPORT]
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL
```

POST_DEV

```
[TAGS]

[MAP]
DIMENSIONS -3625.732 7210.305 948.263 11290.394
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-2            -1021.257          7395.764
POC-1            -1563.237          7405.525
DIV_A            -1021.257          9146.822
DIV_B            -1558.357          9162.501
BASIN_A          740.354            9147.859
BASIN_B          -3417.823          9162.501

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-A            -1021.266          10845.763
DMA_B            -1602.281          10865.792
LID_A            -1021.266          9734.110
LID_B            -1572.998          9743.279

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Poway            -1299.691          11104.936
```

ATTACHMENT 7

EPA SWMM FIGURES AND EXPLANATIONS

Per the attached, the reader can see the screens associated with the EPA-SWMM Model in both pre-development and post-development conditions. Each portion, i.e., sub-catchments, outfalls, storage units, weir as a discharge, and outfalls (point of compliance), are also shown.

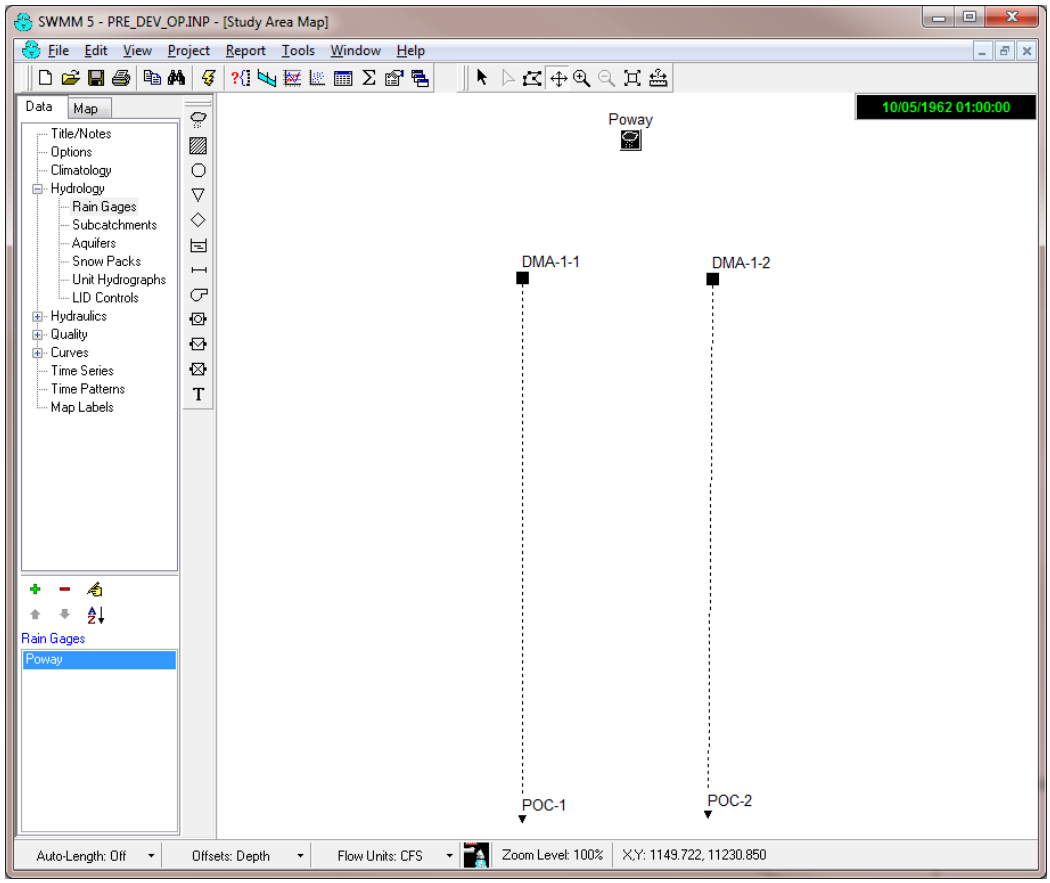
Variables for modeling are associated with typical recommended values by the EPA-SWMM model, typical values found in technical literature (such as Maidment's Handbook of Hydrology). Recommended values for the SWMM model have been attained from the interim Orange County criteria established for their SWMM calibration. Currently, no recommended values have been established by the San Diego County HMP Permit for the SWMM Model.

Soil characteristics of the existing soils were determined from the NRCS Web Soil Survey (located in Attachment 8 of this report).

Some values incorporated within the SWMM model have been determined from the professional experience of REC using conservative assumptions that have a tendency to increase the size of the needed BMP and also generate a long-term runoff as a percentage of rainfall similar to those measured in gage stations in Southern California by the USGS.

A Technical document prepared by Tory R Walker Engineering for the Cities of San Marcos, Oceanside and Vista (Reference [1]) can also be consulted for additional information regarding typical values for SWMM parameters.

PRE-DEVELOPED CONDITION



Outfall POC-1

Property	Value
Name	POC-1
X-Coordinate	-440.969
Y-Coordinate	8181.992
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

User-assigned name of outfall

Rain Gage Poway

Property	Value
Name	Poway
X-Coordinate	39.759
Y-Coordinate	11152.174
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	TIMESERIES
TIME SERIES:	
- Series Name	Poway
DATA FILE:	
- File Name	*
- Station ID	*
- Rain Units	IN

User-assigned name of rain gage

Outfall POC-2

Property	Value
Name	POC-2
X-Coordinate	370.048
Y-Coordinate	8202.966
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

User-assigned name of outfall

Subcatchment DMA-1-1

Property	Value
Name	DMA-1-1
X-Coordinate	-440.969
Y-Coordinate	10552.119
Description	
Tag	
Rain Gage	Poway
Outlet	POC-1
Area	2.6235
Width	476
% Slope	3
% Imperv	0
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

User-assigned name of subcatchment

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

Subcatchment DMA-1-2

Property	Value
Name	DMA-1-2
X-Coordinate	391.022
Y-Coordinate	10545.127
Description	
Tag	
Rain Gage	Poway
Outlet	POC-2
Area	1.3267
Width	482
% Slope	3
% Imperv	0
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

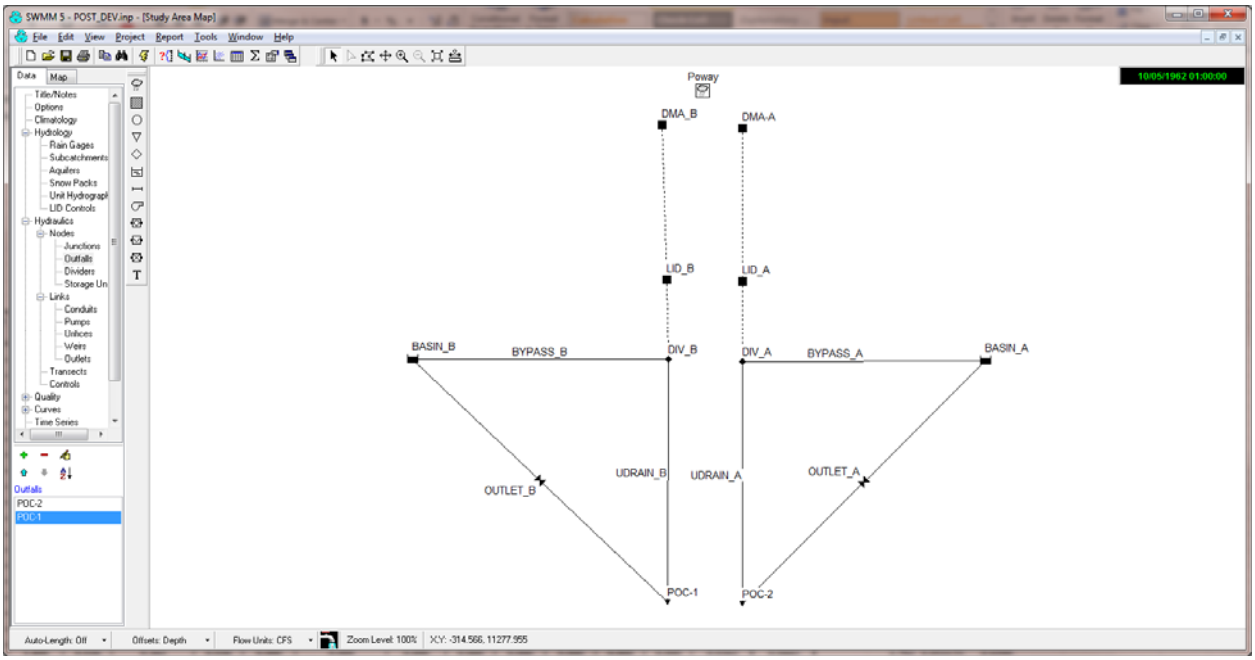
User-assigned name of subcatchment

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

POST-DEVELOPED CONDITION



Rain Gage Poway

Property	Value
Name	Poway
X-Coordinate	-1299.691
Y-Coordinate	11104.936
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	TIMESERIES
TIME SERIES:	
- Series Name	Poway
DATA FILE:	
- File Name	*
- Station ID	*
- Rain Units	IN

Name of rainfall data file

Outfall POC-1

Property	Value
Name	POC-1
X-Coordinate	-1563.237
Y-Coordinate	7405.525
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

Outfall POC-2

Property	Value
Name	POC-2
X-Coordinate	-1021.257
Y-Coordinate	7395.764
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

Subcatchment DMA_B

Property	Value
Name	DMA_B
X-Coordinate	-1602.281
Y-Coordinate	10865.792
Description	
Tag	
Rain Gage	Poway
Outlet	LID_B
Area	2.56483
Width	243
% Slope	3
% Imperv	66.7
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Mannings N for pervious area

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

Subcatchment LID_B

Property	Value
Name	LID_B
X-Coordinate	-1572.998
Y-Coordinate	9743.279
Description	
Tag	
Rain Gage	Poway
Outlet	DIV_B
Area	0.058701
Width	10
% Slope	0
% Imperv	0.0
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Subcatchment DMA-A

Property	Value
Name	DMA-A
X-Coordinate	-1021.266
Y-Coordinate	10845.763
Description	
Tag	
Rain Gage	Poway
Outlet	LID_A
Area	1.31067
Width	214
% Slope	3
% Imperv	59.2
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

Subcatchment LID_A

Property	Value
Name	LID_A
X-Coordinate	-1021.266
Y-Coordinate	9734.110
Description	
Tag	
Rain Gage	Poway
Outlet	DIV_A
Area	0.016047
Width	10
% Slope	0
% Imperv	0.0
N-Imperv	0.012
N-Perv	0.10
Dstore-Imperv	0.05
Dstore-Perv	0.10
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT ...
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration parameters (click to edit)

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	6
Conductivity	0.075
Initial Deficit	0.32

EXPLANATION OF SELECTED VARIABLES

EXPLANATION OF SELECTED VARIABLES

Sub-Catchment Areas:

Please refer to the attached diagrams that indicate the DMA and Bio-Retention BMP (BMP) sub areas modeled within the project site at both the pre and post developed conditions draining to the POC.

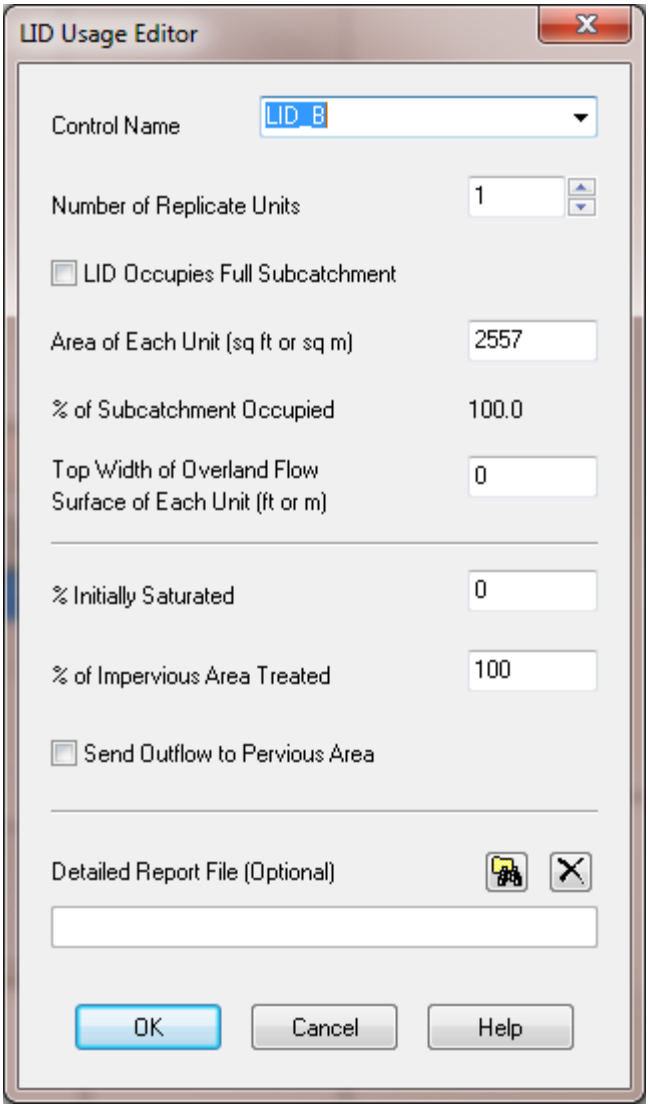
Parameters for the pre- and post-developed models include soil type C as determined from the site specific Natural Resources Conservation Service (NRCS) geologic review (attached at the end of this appendix). Suction head, conductivity and initial deficit corresponds to average values expected for these soils types, according to sources consulted, professional experience, and approximate values obtained by the interim Orange County modeling approach.

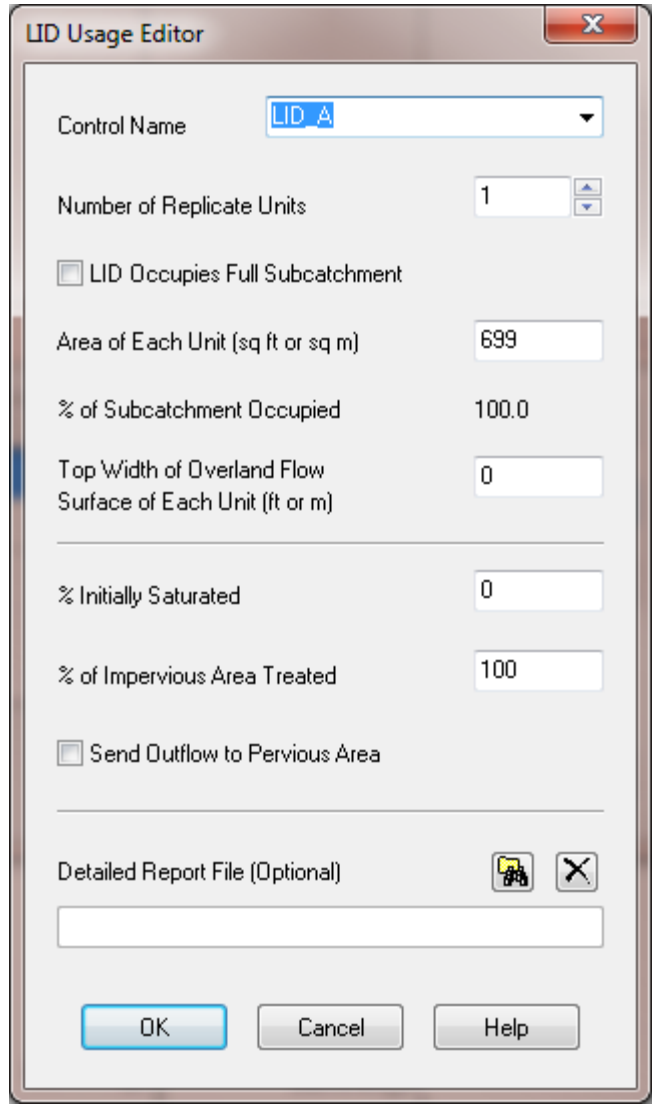
REC selected infiltration values, such that the percentage of total precipitation that becomes runoff, is realistic for the soil types and slightly smaller than measured values for Southern California watersheds.

Selection of a Kinematic Approach: As the continuous model is based on hourly rainfall, and the time of concentration for the pre-development and post-development conditions is significantly smaller than 60 minutes, precise routing of the flows through the impervious surfaces, the underdrain pipe system, and the discharge pipe was considered unnecessary. The truncation error of the precipitation into hourly steps is much more significant than the precise routing in a system where the time of concentration is much smaller than 1 hour.

Sub-Catchment BMP:

The area of bio-filtration must be equal to the area of the development tributary to the bioretention facility (area that drains into the biofiltration, equal external area plus bio-filtration itself). Five (5) decimal places were given regarding the areas of the bio-filtration to insure that the area used by the program for the LID subroutine corresponds exactly with this tributary.


LID Usage Editor
Control Name
LID_B
Number of Replicate Units
1
LID Occupies Full Subcatchment
Area of Each Unit (sq ft or sq m)
2557
% of Subcatchment Occupied
100.0
Top Width of Overland Flow Surface of Each Unit (ft or m)
0
% Initially Saturated
0
% of Impervious Area Treated
100
Send Outflow to Pervious Area
Detailed Report File (Optional)
OK
Cancel
Help


LID Usage Editor
Control Name
LID_A
Number of Replicate Units
1
LID Occupies Full Subcatchment
Area of Each Unit (sq ft or sq m)
699
% of Subcatchment Occupied
100.0
Top Width of Overland Flow Surface of Each Unit (ft or m)
0
% Initially Saturated
0
% of Impervious Area Treated
100
Send Outflow to Pervious Area
Detailed Report File (Optional)
OK
Cancel
Help

LID Control Editor

Control Name: LID_B

LID Type: Bio-Retention Cell

Process Layers: Surface | Soil | Storage | Underdrain

Storage Depth (in. or mm)	6.36
Vegetation Volume Fraction	0.05
Surface Roughness (Mannings n)	0.0
Surface Slope (percent)	0.0

LID Control Editor

Control Name: LID_B

LID Type: Bio-Retention Cell

Process Layers: Surface | Soil | Storage | Underdrain

Thickness (in. or mm)	24
Porosity (volume fraction)	0.4
Field Capacity (volume fraction)	0.2
Wilting Point (volume fraction)	0.1
Conductivity (in/hr or mm/hr)	5
Conductivity Slope	5
Suction Head (in. or mm)	1.5

LID Control Editor

Control Name: LID_B

LID Type: Bio-Retention Cell

Process Layers: Surface | Soil | Storage | Underdrain

Height (in. or mm)	18
Void Ratio (Voids / Solids)	0.67
Conductivity (in/hr or mm/hr)	0
Clogging Factor	0

Note: use a Conductivity of 0 if the LID unit has an impermeable bottom.

LID Control Editor

Control Name: LID_B

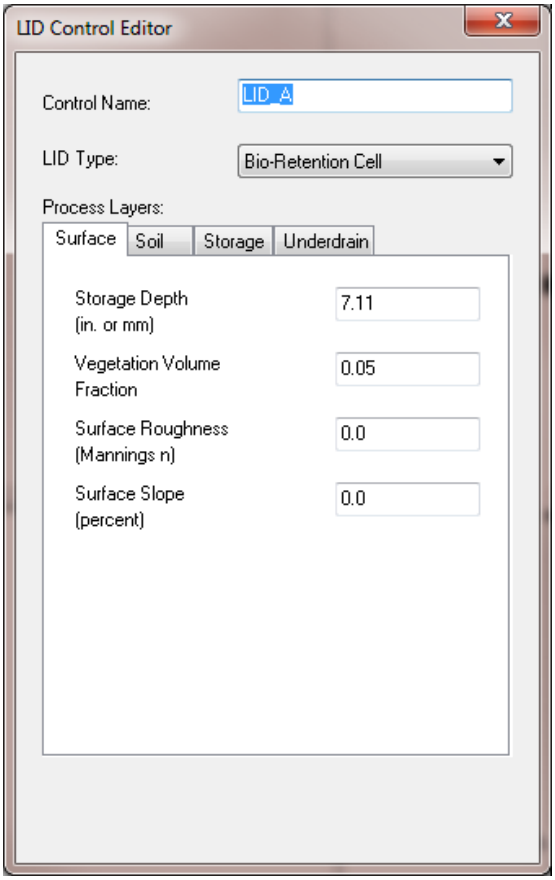
LID Type: Bio-Retention Cell

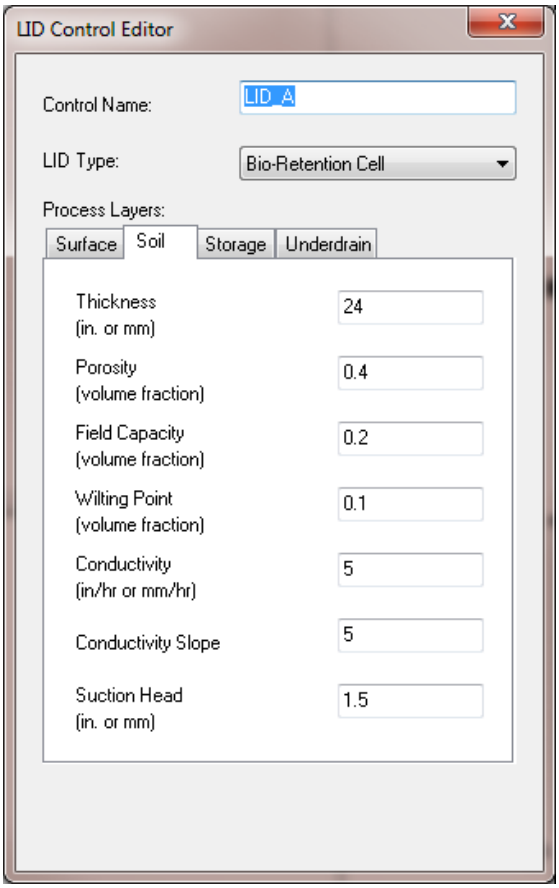
Process Layers: Surface | Soil | Storage | Underdrain

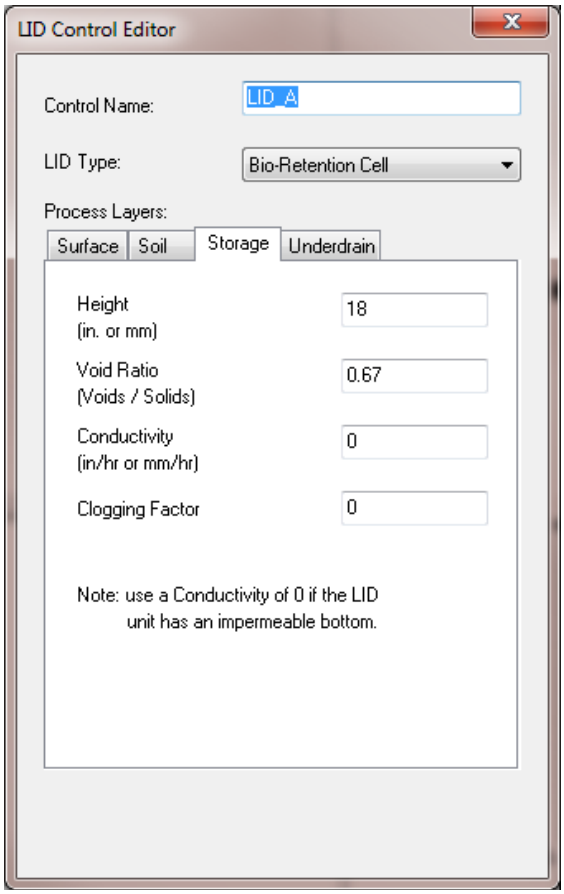
Drain Coefficient (in/hr or mm/hr)	0.2930
Drain Exponent	0.5
Drain Offset Height (in. or mm)	0

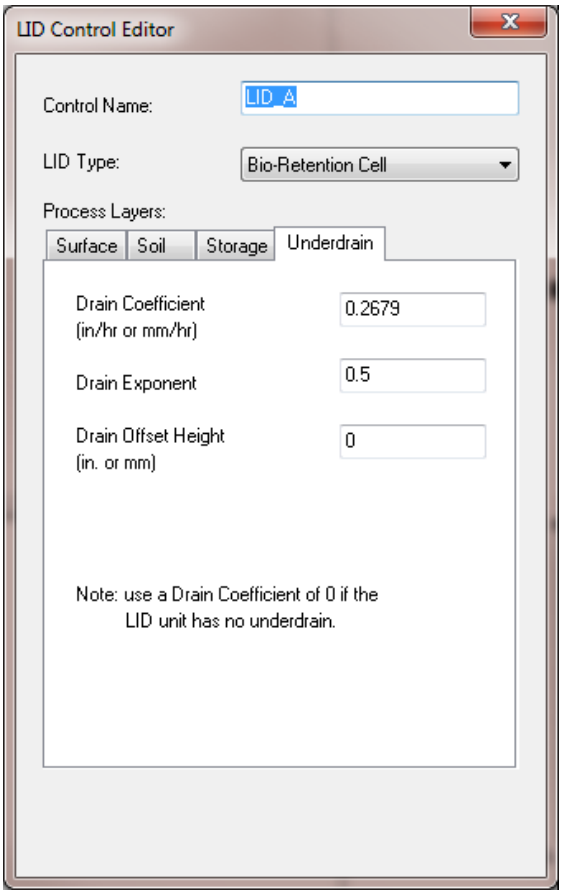
Note: use a Drain Coefficient of 0 if the LID unit has no underdrain.

OK


LID Control Editor
Control Name:
LID_A
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Storage Depth (in. or mm)
7.11
Vegetation Volume Fraction
0.05
Surface Roughness (Mannings n)
0.0
Surface Slope (percent)
0.0


LID Control Editor
Control Name:
LID_A
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Thickness (in. or mm)
24
Porosity (volume fraction)
0.4
Field Capacity (volume fraction)
0.2
Wilting Point (volume fraction)
0.1
Conductivity (in/hr or mm/hr)
5
Conductivity Slope
5
Suction Head (in. or mm)
1.5


LID Control Editor
Control Name:
LID_A
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Height (in. or mm)
18
Void Ratio (Voids / Solids)
0.67
Conductivity (in/hr or mm/hr)
0
Clogging Factor
0
Note: use a Conductivity of 0 if the LID unit has an impermeable bottom.


LID Control Editor
Control Name:
LID_A
LID Type:
Bio-Retention Cell
Process Layers:
Surface
Soil
Storage
Underdrain
Drain Coefficient (in/hr or mm/hr)
0.2679
Drain Exponent
0.5
Drain Offset Height (in. or mm)
0
Note: use a Drain Coefficient of 0 if the LID unit has no underdrain.

LID Control Editor: Explanation of Significant Variables

Storage Depth:

The storage depth variable within the SWMM model is representative of the storage volume provided beneath the surface riser outlet and the surface of the bio filtration facility.

In those cases where the surface storage has a variable area that is also different to the area of the gravel and amended soil, the SWMM model needs to be calibrated as the LID module will use the storage depth multiplied by the BMP area as the amount of volume stored at the surface.

Let A_{BMP} be the area of the BMP (area of amended soil and area of gravel). The proper value of the storage depth S_D to be included in the LID module can be calculated by using geometric properties of the surface volume. Let A_0 be the surface area at the bottom of the surface pond, and let A_i be the surface area at the elevation of the invert of the first row of orifices (or at the invert of the riser if not surface orifices are included). Finally, let h_i be the difference in elevation between A_0 and A_i. By volumetric definition:

$$A_{BMP} \cdot S_D = \frac{(A_0 + A_i)}{2} h_i \qquad (1)$$

Equation (1) allows the determination of S_D to be included as Storage Depth in the LID module.

Porosity: A porosity value of 0.4 has been selected for the model. The amended soil is to be highly sandy in content in order to have a saturated hydraulic conductivity of approximately 5 in/hr.

REC considers such a value to be slightly high; however, in order to comply with the HMP Permit, the value recommended by the Copermittees for the porosity of amended soil is 0.4, per Appendix A of the Final Hydromodification Management Plan by Brown & Caldwell, dated March 2011. Such porosity is equal to the porosity of the gravel per the same document.

Void Ratio: The ratio of the void volume divided by the soil volume is directly related to porosity as n/(1-n). As the underdrain layer is composed of gravel, a porosity value of 0.4 has been selected (also per Appendix A of the Final HMP document), which results in a void ratio of 0.4/(1-0.4) = 0.67 for the gravel detention layer.

Conductivity: Due to the soil type C underlying the BMPs (see Attachment 8), no infiltration was possible on the project site. As such, the LID's have been modeled with zero infiltration.

Clogging factor: A clogging factor was not used (0 indicates that there is no clogging assumed within the model). The reason for this is related to the fairness of a comparison with the SDHM model and the HMP sizing tables: a clogging factor was not considered, and instead, a conservative value of infiltration was recommended.

Drain (Flow) coefficient: The flow coefficient C in the SWMM Model is the coefficient needed to transform the orifice equation into a general power law equation of the form:

$$q = C(H - H_D)^n \tag{2}$$

where q is the peak flow in in/hr, n is the exponent (typically 0.5 for orifice equation), H_D is the elevation of the centroid of the orifice in inches (assumed equal to the invert of the orifice for small orifices and in our design equal to 0) and H is the depth of the water in inches.

The general orifice equation can be expressed as:

$$Q = \frac{\pi}{4} c_g \frac{D^2}{144} \sqrt{2g \frac{(H - H_D)}{12}} \tag{3}$$

where Q is the peak flow in cfs, D is the diameter in inches, c_g is the typical discharge coefficient for orifices (0.61-0.63 for thin walls and around 0.75-0.8 for thick walls), g is the acceleration of gravity in ft/s^2, and H and H_D are defined above and are also used in inches in Equation (3).

It is clear that:

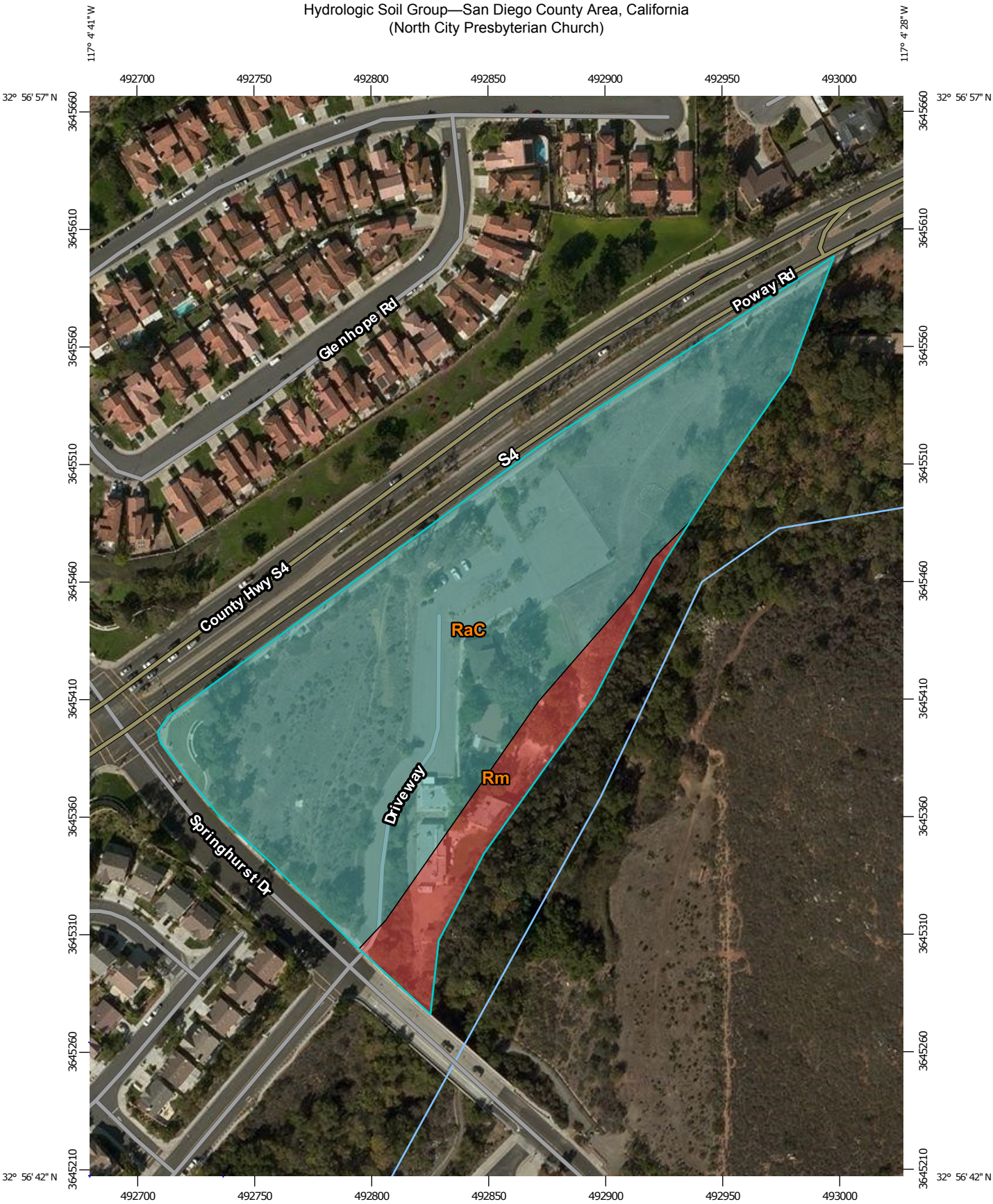
$$q \left(\frac{in}{hr}\right) X \frac{A_{BMP}}{12 \; X \; 3600} = Q \; (cfs) \tag{4}$$

Cut-Off Flow: Q (cfs) and q (in/hr) are also the cutoff flow. For numerical reasons to insure the LID is full, the model uses cut-off = 1.01 Q.

ATTACHMENT 8

Geotechnical Soils Survey

Hydrologic Soil Group—San Diego County Area, California
(North City Presbyterian Church)



Map Scale: 1:2,240 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil 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: http://websoilsurvey.nrcs.usda.gov
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 9, Sep 17, 2015

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

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

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.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
RaC	Ramona sandy loam, 5 to 9 percent slopes	C	6.5	87.3%
Rm	Riverwash	D	0.9	12.7%
Totals for Area of Interest			**7.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

ATTACHMENT 9

Summary Files from the SWMM Model

PRE_DEV

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
  --------------------------------------------------------------


  *********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  *********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CFS
  Process Models:
    Rainfall/Runoff ........ YES
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Starting Date ............ OCT-05-1962 00:00:00
  Ending Date .............. OCT-05-2007 23:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 01:00:00
  Wet Time Step ............ 00:15:00
  Dry Time Step ............ 04:00:00


  **************************        Volume         Depth
  Runoff Quantity Continuity     acre-feet        inches
  **************************     ---------       -------
  Total Precipitation ......       180.113       547.150
  Evaporation Loss .........         2.449         7.440
  Infiltration Loss ........       167.271       508.140
  Surface Runoff ...........        11.661        35.425
  Final Surface Storage ....         0.000         0.000
  Continuity Error (%) .....        -0.705


  **************************        Volume        Volume
  Flow Routing Continuity        acre-feet      10^6 gal
  **************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......        11.661         3.800
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         0.000         0.000
  External Outflow .........        11.661         3.800
  Internal Outflow .........         0.000         0.000
  Storage Losses ...........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......         0.000         0.000
  Continuity Error (%) .....         0.000


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------
--
                            Total      Total      Total      Total      Total       Total     Peak
Runoff
                           Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff
Coeff
  Subcatchment                 in         in         in         in         in    10^6 gal      CFS
  ---------------------------------------------------------------------------------------------------
--
```

```
  DMA-1-1                  547.15       0.00       7.48     508.90      34.50        2.46     1.82
0.063
  DMA-1-2                  547.15       0.00       7.36     506.64      37.26        1.34     0.96
0.068


  Analysis begun on:  Tue May 31 16:44:12 2016
  Analysis ended on:  Tue May 31 16:44:23 2016
  Total elapsed time: 00:00:11
```

POST_DEV

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------

*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ OCT-05-1962 00:00:00
Ending Date .............. OCT-05-2007 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


WARNING 04: minimum elevation drop used for Conduit BYPASS_A

WARNING 04: minimum elevation drop used for Conduit BYPASS_B

WARNING 04: minimum elevation drop used for Conduit UDRAIN_B

WARNING 04: minimum elevation drop used for Conduit UDRAIN_A

**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......       180.115       547.150
Evaporation Loss .........        25.706        78.088
Infiltration Loss ........        58.652       178.172
Surface Runoff ...........        98.144       298.140
Final Surface Storage ....         0.000         0.000
Continuity Error (%) .....        -1.325


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        98.144        31.982
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........        98.123        31.975
Internal Outflow .........         0.000         0.000
Storage Losses ...........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.021


********************************
Highest Flow Instability Indexes
********************************
```

POST_DEV

```
  All links are stable.


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :    60.00 sec
  Average Time Step           :    60.00 sec
  Maximum Time Step           :    60.00 sec
  Percent in Steady State     :     0.00
  Average Iterations per Step :     1.00


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------
--
                            Total      Total      Total      Total      Total       Total     Peak
Runoff
                           Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff
Coeff
  Subcatchment                 in         in         in         in         in    10^6 gal      CFS
  ---------------------------------------------------------------------------------------------------
--
  DMA-A                    547.15       0.00      57.91     206.53     288.32       10.26     1.01
0.527
  DMA_B                    547.15       0.00      65.97     168.88     317.17       22.09     1.99
0.580
  LID_A                    547.15   23548.70     877.49       0.00   23369.01       10.18     1.01
0.970
  LID_B                    547.15   13858.26     839.70       0.00   13674.78       21.80     2.00
0.949


  ***********************
  LID Performance Summary
  ***********************

  ---------------------------------------------------------------------------------------------------
------------
                                          Total      Evap     Infil   Surface    Drain      Init.
Final     Pcnt.
                                         Inflow      Loss      Loss   Outflow   Outflow   Storage
Storage     Error
  Subcatchment      LID Control             in        in        in        in        in        in
in
  ---------------------------------------------------------------------------------------------------
------------
  LID_A             LID_A             24095.85    877.54      0.00   7187.72  16182.39      0.00
0.00     -0.63
  LID_B             LID_B             14405.41    839.73      0.00   1886.98  11788.38      0.00
0.00     -0.76

  ******************
  Node Depth Summary
  ******************

  --------------------------------------------------------------------
                                  Average  Maximum  Maximum  Time of Max
                                    Depth    Depth      HGL   Occurrence
  Node                 Type         Feet     Feet     Feet  days hr:min
  --------------------------------------------------------------------
  POC-2                OUTFALL      0.00     0.00     0.00     0  00:00
  POC-1                OUTFALL      0.00     0.00     0.00     0  00:00
  DIV_A                DIVIDER      0.00     0.00     0.00     0  00:00
  DIV_B                DIVIDER      0.00     0.00     0.00     0  00:00
  BASIN_A              STORAGE      0.01     1.09     1.09  6348  00:15
  BASIN_B              STORAGE      0.00     0.67     0.67  6348  00:19
```

POST_DEV

```
*******************
Node Inflow Summary
*******************

-------------------------------------------------------------------------------------
                                 Maximum  Maximum                  Lateral       Total
                                 Lateral    Total  Time of Max      Inflow      Inflow
                                  Inflow   Inflow   Occurrence      Volume      Volume
Node                 Type           CFS      CFS  days hr:min    10^6 gal    10^6 gal
-------------------------------------------------------------------------------------
POC-2                OUTFALL       0.00     1.01  6348  00:15       0.000      10.180
POC-1                OUTFALL       0.00     1.84  6348  00:19       0.000      21.793
DIV_A                DIVIDER       1.01     1.01  6348  00:15      10.183      10.183
DIV_B                DIVIDER       2.00     2.00  6348  00:15      21.797      21.797
BASIN_A              STORAGE       0.00     0.99  6348  00:15       0.000       3.113
BASIN_B              STORAGE       0.00     1.93  6348  00:15       0.000       3.074


**********************
Node Surcharge Summary
**********************

Surcharging occurs when water rises above the top of the highest conduit.
-----------------------------------------------------------------------
                                            Max. Height   Min. Depth
                                 Hours      Above Crown    Below Rim
Node                 Type      Surcharged         Feet         Feet
-----------------------------------------------------------------------
DIV_A                DIVIDER    394487.02        0.000        0.000
DIV_B                DIVIDER    394487.02        0.000        0.000
BASIN_A              STORAGE    394487.02        1.087        0.413
BASIN_B              STORAGE    394487.02        0.667        0.833


*********************
Node Flooding Summary
*********************

No nodes were flooded.


**********************
Storage Volume Summary
**********************

-----------------------------------------------------------------------------------------------
                       Average     Avg   E&I       Maximum     Max    Time of Max    Maximum
                        Volume    Pcnt  Pcnt        Volume    Pcnt     Occurrence    Outflow
Storage Unit          1000 ft3    Full  Loss      1000 ft3    Full    days hr:min        CFS
-----------------------------------------------------------------------------------------------
BASIN_A                  0.006       0     0         1.372      66    6348  00:15       0.99
BASIN_B                  0.009       0     0         2.062      41    6348  00:18       1.77


***********************
Outfall Loading Summary
***********************

-----------------------------------------------------------
                      Flow       Avg.      Max.       Total
                      Freq.      Flow      Flow      Volume
Outfall Node          Pcnt.       CFS       CFS    10^6 gal
-----------------------------------------------------------
POC-2                  5.52      0.02      1.01      10.180
POC-1                  5.09      0.04      1.84      21.793
-----------------------------------------------------------
System                 5.31      0.06      2.84      31.973


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

POST_DEV

Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
BYPASS_A	DUMMY	0.99	6348	00:15			
BYPASS_B	DUMMY	1.93	6348	00:15			
UDRAIN_B	DUMMY	0.07	163	01:53			
UDRAIN_A	DUMMY	0.02	163	02:00			
OUTLET_A	DUMMY	0.99	6348	00:15			
OUTLET_B	DUMMY	1.77	6348	00:19			

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
BYPASS_A	0.01	0.01	0.01	394487.02	0.01
BYPASS_B	0.01	0.01	0.01	394487.02	0.01
UDRAIN_B	0.01	0.01	0.01	394487.02	0.01
UDRAIN_A	0.01	0.01	0.01	394487.02	0.01

Analysis begun on: Tue May 31 13:11:54 2016
Analysis ended on: Tue May 31 13:12:26 2016
Total elapsed time: 00:00:32

TECHNICAL MEMORANDUM:

Coarse Sediment Analysis for:

North City Presbyterian Church

Prepared For:

Spears & Associates

Prepared by:

Luis Parra, PhD, CPSWQ, ToR, D.WRE.
R.C.E. 66377

REC Consultants
2442 Second Avenue
San Diego, CA 92101
Telephone: (619) 232-9200

1. SUMMARY

The purpose of this Technical Memo is to demonstrate that the North City Presbyterian Church project avoids any Critical Coarse Sediment Yield Area (CCSYA) draining directly to Peñasquitos Creek. The methodology explained in Appendix H of the City of San Diego BMP Design Manual (updated by the Critical Coarse Sediment Technical Advisory Committee on March 2016, from which the City of San Diego, The County of San Diego, Technical Experts and representatives of the Water Quality Control Board were represented, see Appendix 1) will be used to conclude that the Potential Critical Coarse Sediment Yield Areas (PCCSYAs) within the project are avoided and no further action is required.

2. METHODOLOGY TO IDENTIFY CCSYAs

2.1 Identification of CCSYAs

The Watershed Management Area Analysis (WMAA) PCCSYA Map prepared by the County of San Diego (commonly known as the Rash Map where PCCSYA are depicted in red) is used initially to identify PCCSYA in the project. Figure 1 displays the red areas identified for the project, all of them adjacent to Peñasquitos Creek.

2.2 Refinement Options

2.2.1 Depositional Analysis

If it can be demonstrated that the potential source of coarse sediment is deposited in existing system prior to reaching the first downstream unlined water of the state, then PCCSYA can be removed from further considerations. Depositional systems may include natural sinks, existing structural BMPs, existing hardened MS4 systems or other existing similar features that produce a peak velocity from the discrete 2-year, 24 hour runoff event of less than 3 ft/s in the system being analyzed.

It is clear for the location of the PCCSYA next to the banks of the creek that a deposition of coarse sediments before reaching Peñasquitos Creek will not occur, as the PCCSYA drain directly into the creek. Therefore, this refinement option is considered unnecessary for this project.

2.2.2 Threshold Channel Analysis

A threshold channel is a stream channel in which channel boundary material has no significant movement during the design flow. If there is no movement of bed load in the stream channel, then it is not anticipated that reductions in sediment supply will be detrimental to stream stability because the channel bed consists of the parent material and not coarse sediment supplied from upstream. In such a situation, changes in sediment supply are not considered a geomorphic condition of concern. At this point, a threshold channel analysis was not performed because it is unnecessary: it will be demonstrated per section 2.2.4 and 3 that CCSYAs will be avoided.

2.2.3 Coarse Sediment Source Area Verification

A sieve analysis has not been performed, and it is not required as sections 2.2.4 and 3 will prove that PCCSYAs will be avoided by the project. Therefore, this optional analysis is not included.

2.2.4 Verification of Geomorphic Landscape Units (GLUs)

GLU analysis was performed in detail. A verification of the slope, land use and geology of the project size confirms that GLU analysis will not remove PCCSYA areas; however, it will help to identify GLU areas more precisely to prove that the proposed project will avoid any impact on such areas.

Appendix 1 shows Worksheet H.6-1 from new Appendix H completed according to the GLU analysis performed by REC, with added information provided by Spears and Associates.

From the GLU figures prepared, the PCCSYAs of Figure 1 are now CCSYAs and have been delineated with site-specific precision in figure H.7.A for pre-development conditions, and consequently, inF H.7.B for post-development conditions. It is clear from Figure H.7.B that CCSYAs are different than those shown on Figure 1. Post-development conditions will avoid CCSYAs in the property. Consequently, the protection measurement used by the project will be avoidance (See section 3).

2.3 Conclusion of the Refinement Options

After a refinement analysis a PCCSYA has two options: it is either a Critical Coarse Sediment Yield Area (CCSYA) or it becomes a Non Critical Coarse Sediment Yield Area (Non-CCSYA). Only one of the refinement options need to produce a positive result for PCCSYA to become a Non-CCSYA. If no positive result occurs, then PCCSYA becomes CCSYA. CCSYAs have been identified in Figure H.7.B. Those areas will be avoided by the re-development project.

3. AVOIDANCE AND BYPASS

The project can avoid the PCCSYAs included within its boundaries as those areas are located adjacent to Peñasquitos Creek and are not part of the impacted areas by the project. Post-development conditions will avoid CCSYAs in the property as slopes larger than 10% with a land use of Forest will be avoided (slopes adjacent to Peñasquitos Creek will not be graded or impacted).

4. DEMONSTRATE NO NET IMPACT

Calculations of No net impact based on a continuous simulation model and a sediment yield model will not be necessary for this project as Section 3 demonstrates that the PCCSYAs classified as CCSYAs will be avoided by the project.

5. CONCLUSIONS OF THE STUDY

Peñasquitos Creek slopes downstream of the project area (and within the property area) are considered CCSYAs once the GLU analysis is completed (Figure H.7.A). Those areas are smaller and more precisely defined (Figure H.7.B) than the areas identified by the "Rash" Map (Figure 1), and will be avoided in Post-Development Conditions by the re-development project of the North City Presbyterian Church.

6. LIST OF APPENDICES

- Appendix 1:
  - Worksheet H.6-1
  - Figures H-1, H.2A, H.2B, H.3, H.5A, H.5B, H.7A, H.7B
  - Figure 1

APPENDIX 1:

- Worksheet H.6-1.
- Figures H-1, H.2A, H.2B, H.3, H.5A, H.5B, H.7A, H.7B
- Figure 1

Verification of GLUs		Worksheet H.6-1
Detailed project-level review of GLUs may be performed to verify the presence or absence of potential critical coarse sediment yield areas within the project site and/or upstream areas. Use this form to document the evaluation of slope, geology, and land cover combined to determine the site-specific GLUs. Complete all sections of this form.		
Project Name: North City Presbyterian Church.		
Project Tracking Number / Permit Application Number: APN : 316-040-36-00		
1	What are the pre-project slopes? All slopes exist in the project (see figure H.1).	☒ 0% to 10% (1) ☒ 10% to 20% (2) ☒ 20% to 40% (3) ☒ >40% (4)
2	What is the underlying geology? Refer to Appendix H.6 to classify geologic categories into a geology grouping. Note: site-specific geology may be determined in the field by a qualified geologist. See figures H.2.A & H.2.B	☒ Coarse bedrock (CB) (Kgd) ☐ Coarse sedimentary impermeable (CSI) ☒ Coarse sedimentary permeable (CSP) (Qya) ☐ Fine bedrock (FB) ☐ Fine sedimentary impermeable (FSI) ☐ Fine sedimentary permeable (FSP) ☐ Other (O)
3	What is the pre-project land cover? Refer to Appendix H.6 for land cover category definitions. See figure H.3 Note: Land cover shall be determined from aerial photography and/or field visit.	☐ Agriculture/grass ☒ Forest (ID # 47) ☒ Developed ☐ Scrub/shrub ☐ Other ☐ Unknown
4	List the GLU(s) within the project site and/or upstream areas. Note the GLU nomenclature format is as follows: Geology – Land Cover – Slope Category (e.g. "CB-Agricultural/Grass-3" for a GLU consisting of coarse bedrock geology, agricultural/grass land cover, and 20% to 40% slope).	16 combinations: 4 slopes (0-10%, 10%-20%, 20%-40%, >40%) x 2 Geology Types (CB, ESP) x 2 Land Covers (Forest, Dev)

Worksheet H.6-1; Page 2 of 2			
5	Photo(s) Insert photos representative of the slopes, land cover, and geology. See figures H.5.A & H.5.B.		
6	Are any of the GLUs found within the project boundary and/or upstream areas (listed in row 4) also listed in Table H.6-1?	☒ Yes	Go to 7
		☐ No	Go to 8
7	End – Provide management measures for preservation of coarse sediment supply as described in this guidance document, or the project applicant may elect to determine whether downstream systems would be sensitive to reduction of coarse sediment yield from the project site and/or perform site-specific method for mapping critical coarse sediment yield areas. Avoidance : See 9, Notes. Also see Fig. H.7.A & B.		
8	End – Site-specific GLUs do not warrant preservation of coarse sediment supply, no measures for protection of critical coarse sediment yield areas onsite are necessary. Optional: use the note section below to provide justification for these findings.		
9	Notes All GLU areas that are PCCSYAs are downstream of the project and adjacent to Peñasquitos Creek. Those areas will not be graded/impacted by the project and will be avoided. Therefore, project does not impact PCCSYAs identified by GLU analysis.		

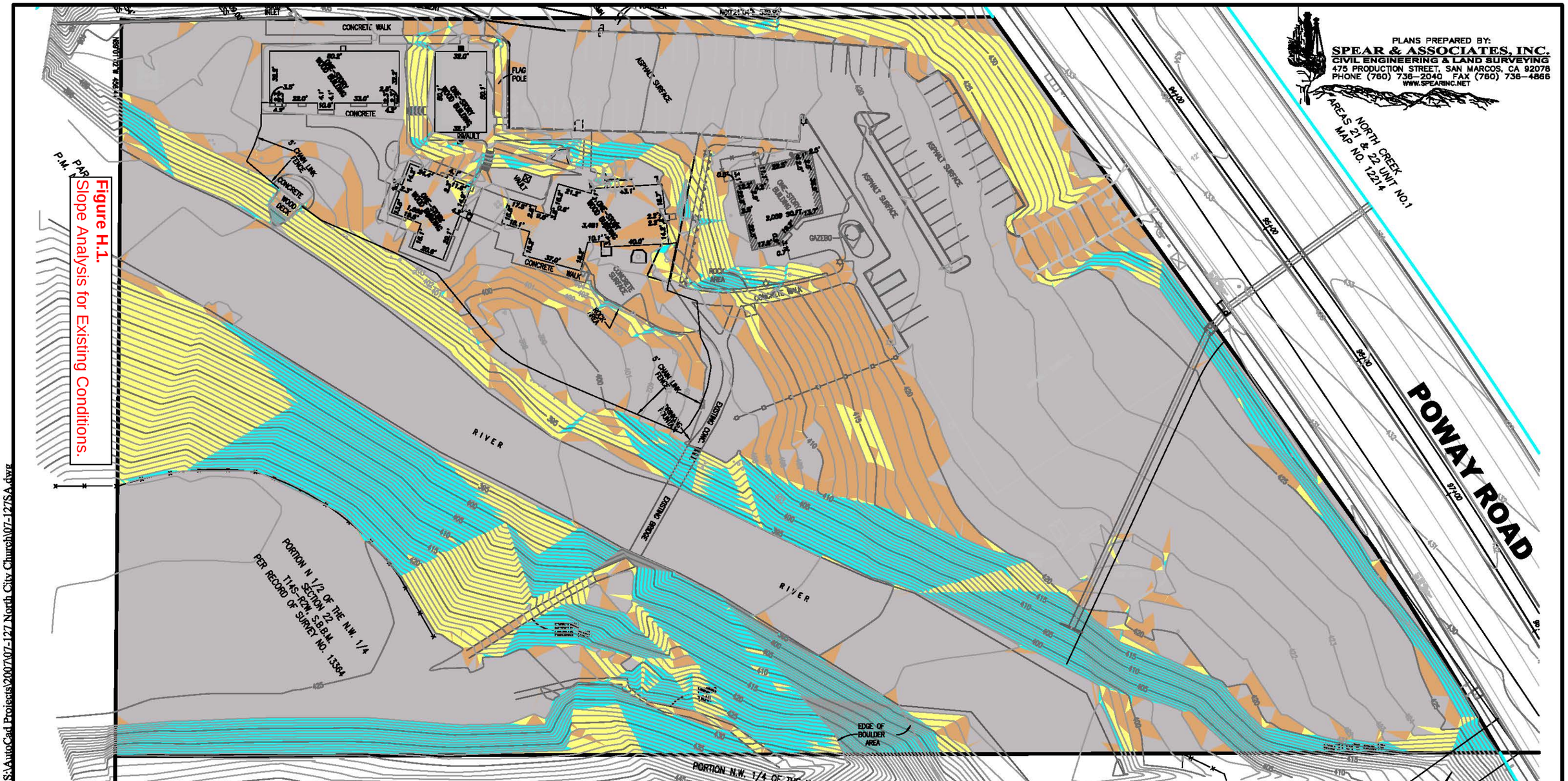


Figure H.1.
Slope Analysis for Existing Conditions.

Slope Analysis Table				
Number	Minimum Slope	Maximum Slope	Color	Square footage
1	0.00%	10.00%		191170
2	10.00%	20.00%		35029
3	20.00%	40.00%		41445
4	40.00%	100.00%		53177

LICENSED LAND SURVEYOR
RAMON J. SPEAR
EXP. 12-31-16
NO. 6404
STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:

RAMON J. SPEAR P.L.S.. 6404 DATE
EXP. 12/31/16

TOPOGRAPHY BY FIELD SURVEY
ADDRESS: 11717 POWAY ROAD
SAN DIEGO, CA 92064
APN: 316-040-36-00

60 30 0 60 120 180

SCALE: 1" = 60'

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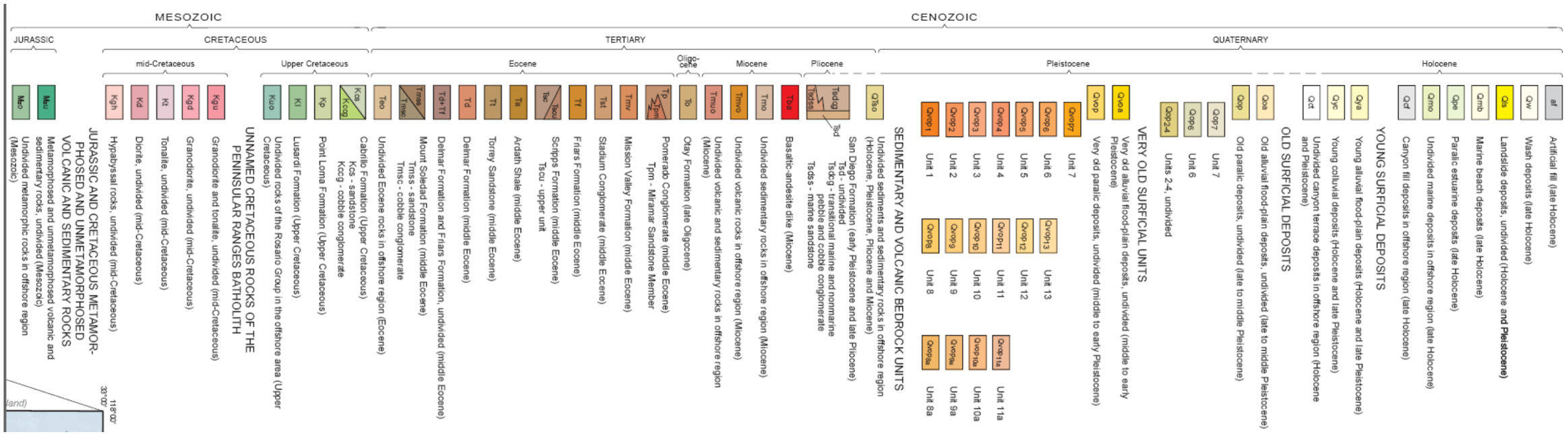


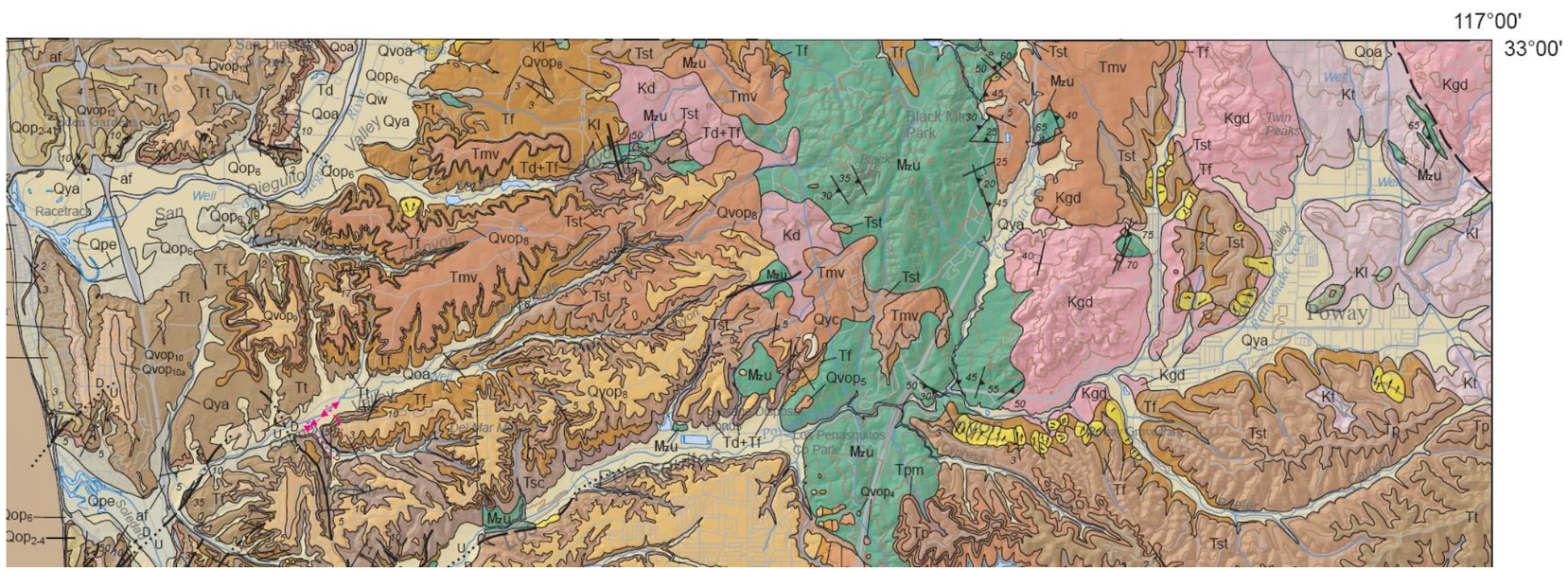


Figure H.2.A. General Legend and Overall Geology in the Area of the Project

Figure H.2.B. Project Location in the General Geology Map

R·E·C Consultants, Inc.

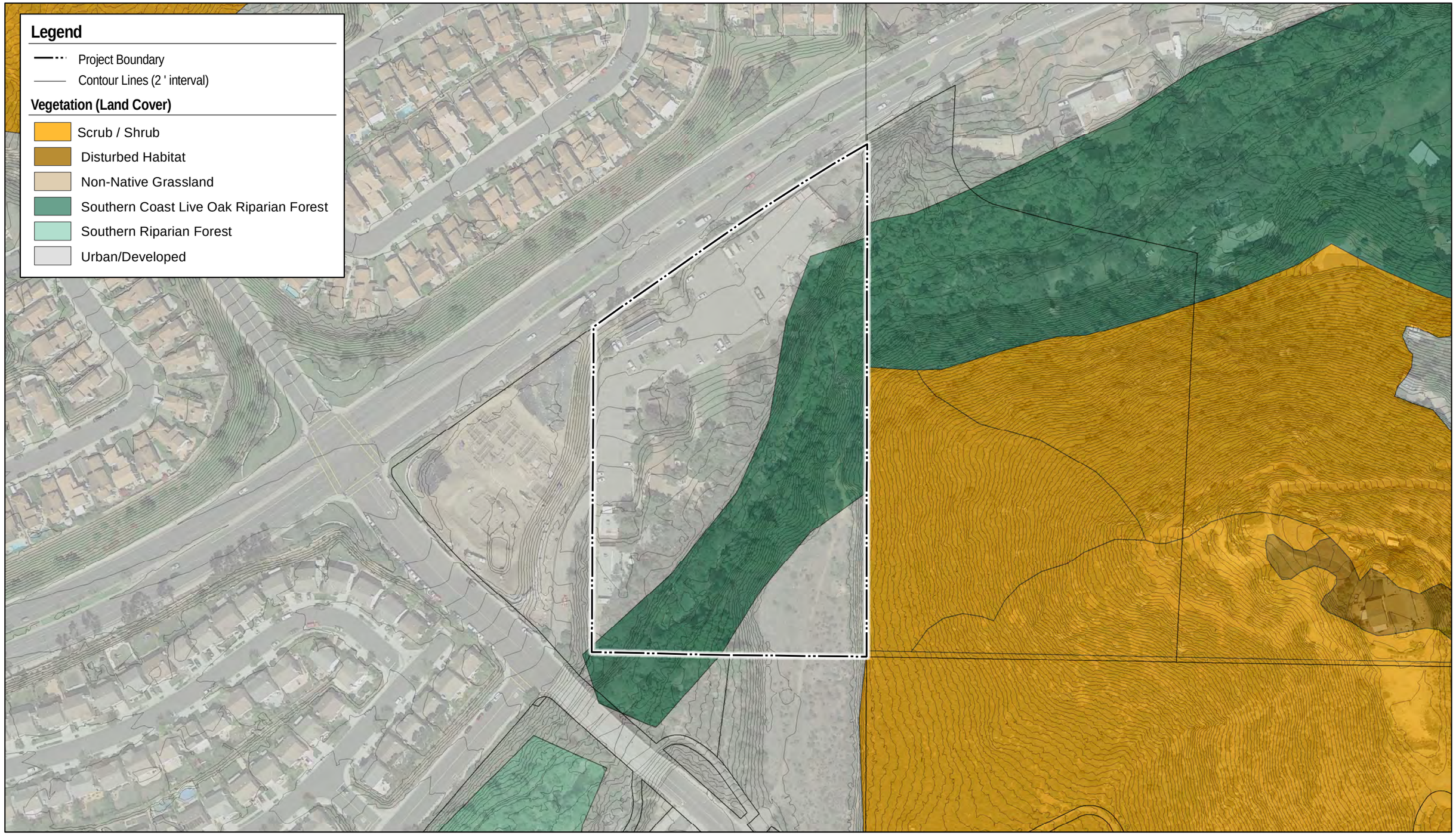
Project Boundary and Geology

NORTH CITY CHURCH

Feet 0 500 1,000

Data Source: ESRI Basemap, San Diego County Regional WMAA

December 2015



R·E·C Consultants, Inc.

Project Boundary and Vegetation (Land Cover)

NORTH CITY CHURCH

FIGURE H.3. Existing Land Cover

Feet
0 75 150

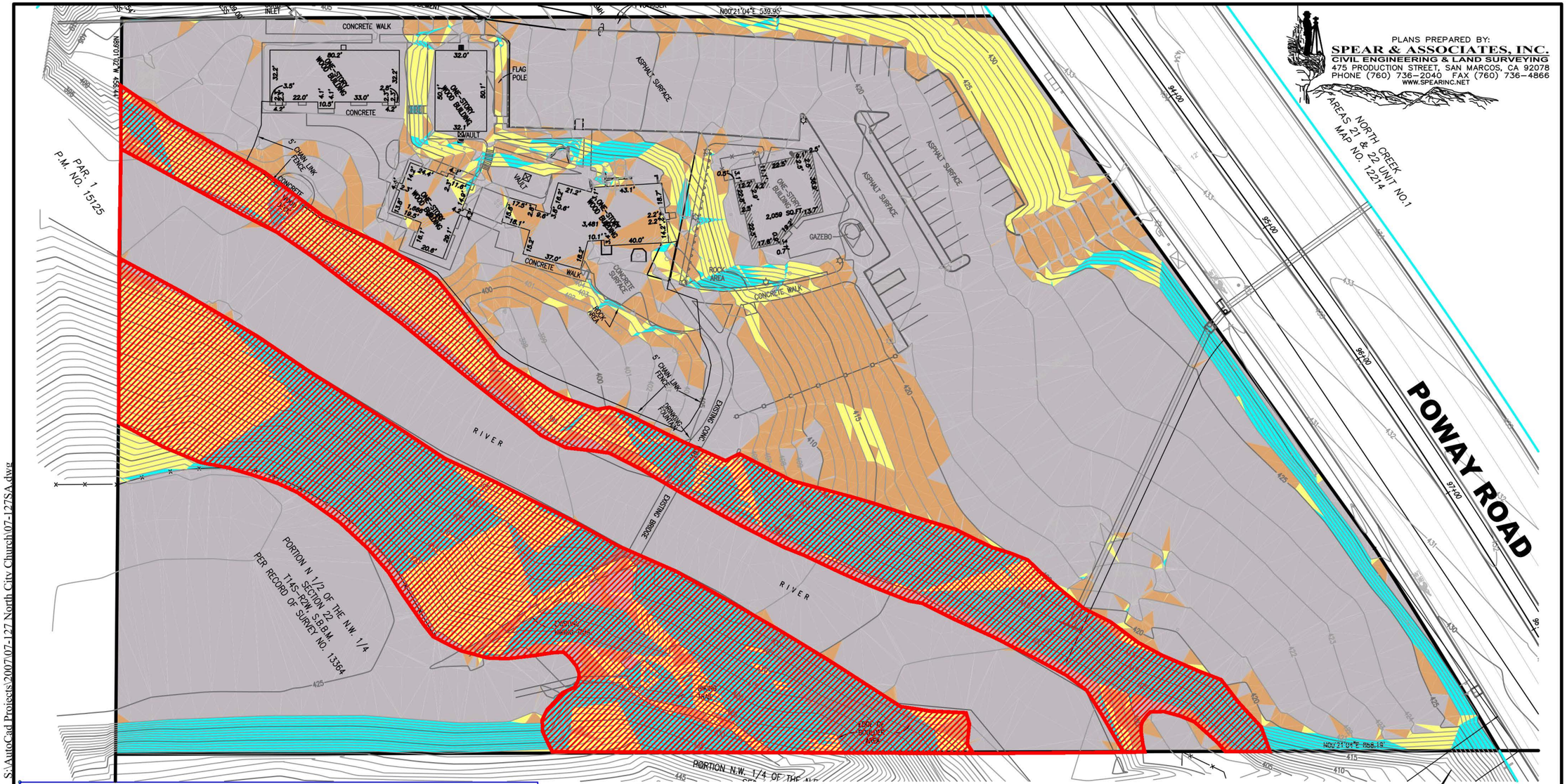
Data Source: ESRI Basemap, San Diego County Regional WMAA

December 2015

Figure H.5.A Aerial View (via Google) of Existing Project Area and Peñasquitos Creek.

Figure H.5.B Bird's Eye View (via Bing) of Existing Project Area and Peñasquitos Creek.

FIGURE H.7.A PCCSYAs according to GLU Analysis (Pre–Development).



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3	20.00%	40.00%		41445
4	40.00%	100.00%		53177

LICENSED LAND SURVEYOR
RAMON J. SPEAR
EXP. 12–31–16
NO. 6404
STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:

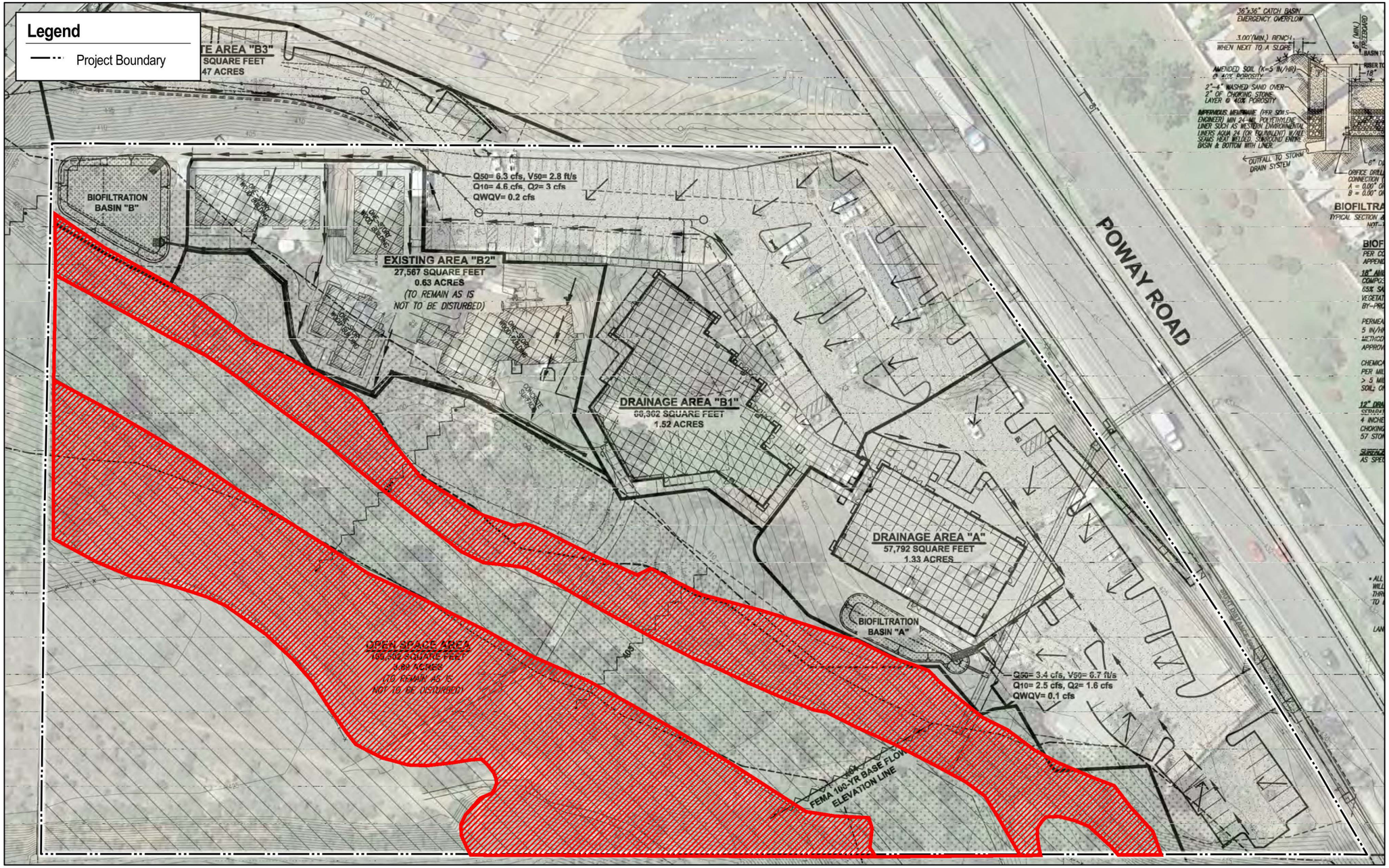
RAMON J. SPEAR P.L.S.. 6404 DATE
EXP. 12/31/16

TOPOGRAPHY BY FIELD SURVEY
ADDRESS: 11717 POWAY ROAD
SAN DIEGO, CA 92064
APN: 316–040–36–00

60 30 0 60 120 180

SCALE: 1" = 60'

FIGURE H.7.B PCCSYAs according to GLU Analysis (Post–Development).



R·E·C Consultants, Inc. **Project Site**

NORTH CITY CHURCH

Feet 0 30 60

Data Source: ESRI Basemap, San Diego County Regional WMAA

December 2015

R·E·C Consultants, Inc.

Project Boundary and Potential Critical Coarse Sediment Yield Areas

NORTH CITY PRESBYTERIAN CHURCH

1 inch = 100 feet

0 50 100 Feet

Data Source: ESRI Basemap, San Diego County Regional WMAA, National Hydrography Dataset (USGS).

March 2016

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

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Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	X Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Maintenance Agreement (Form DS-3247) (when applicable)	○ Included ☐ Not Applicable

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

<u>Preliminary Design / Planning / CEQA level submittal:</u>

- 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)
- ☐ When applicable, frequency of bioretention soil media replacement.
- ☐ 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 must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

- ☐ Vicinity map
- ☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
- ☐ BMP and HMP location and dimensions
- ☐ BMP and HMP specifications/cross section/model
- ☐ Maintenance recommendations and frequency
- ☐ LID features such as (permeable paver and LS location, dim, SF).

THE CITY OF SAN DIEGO RECORDING REQUESTED BY: **THE CITY OF SAN DIEGO** AND WHEN RECORDED MAIL TO:	
	(THIS SPACE IS FOR THE RECORDER'S USE ONLY)

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

APPROVAL NUMBER:	ASSESSOR'S PARCEL NUMBER:	PROJECT NUMBER:

This agreement is made by and between the City of San Diego, a municipal corporation [City] and

the owner or duly authorized representative of the owner [Property Owner] of property located at:

(PROPERTY ADDRESS)

and more particularly described as:

(LEGAL DESCRIPTION OF PROPERTY)

in the City of San Diego, County of San Diego, State of California.

Property Owner is required pursuant to the City of San Diego Municipal Code, Chapter 4, Article 3, Division 3, Chapter 14, Article 2, Division 2, and the Land Development Manual, Storm Water Standards to enter into a Storm Water Management and Discharge Control Maintenance Agreement [Maintenance Agreement] for the installation and maintenance of Permanent Storm Water Best Management Practices [Permanent Storm Water BMP's] prior to the issuance of construction permits. The Maintenance Agreement is intended to ensure the establishment and maintenance of Permanent Storm Water BMP's onsite, as described in the attached exhibit(s), the project's Storm Water Quality Management Plan [SWQMP] and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s):

_____

Property Owner wishes to obtain a building or engineering permit according to the Grading and/or Improvement Plan Drawing No(s) or Building Plan Project No(s):

Continued on Page 2

NOW, THEREFORE, the parties agree as follows:

1. Property Owner shall have prepared, or if qualified, shall prepare an Operation and Maintenance Procedure [OMP] for Permanent Storm Water BMP's, satisfactory to the City, according to the attached exhibit(s), consistent with the Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s):_____

2. Property Owner shall install, maintain and repair or replace all Permanent Storm Water BMP's within their property, according to the OMP guidelines as described in the attached exhibit(s), the project's WQTR and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s)_____.

3. Property Owner shall maintain operation and maintenance records for at least five (5) years. These records shall be made available to the City for inspection upon request at any time.

This Maintenance Agreement shall commence upon execution of this document by all parties named hereon, and shall run with the land.

Executed by the City of San Diego and by Property Owner in San Diego, California.

See Attached Exhibits(s):

_____
(Owner Signature)

_____
(Print Name and Title)

_____
(Company/Organization Name)

_____
(Date)

THE CITY OF SAN DIEGO

APPROVED:

_____
(City Control engineer Signature

_____
(Print Name)

_____
(Date)

NOTE: ALL SIGNATURES MUST INCLUDE NOTARY ACKNOWLEDMENTS PER CIVIL CODE SEC. 1180 ET.SEQ

OPERATION & MAINTENANCE (O&M) PLAN

1. Contents

1. PROJECT DESCRIPTION 1

2. OPERATION & MAINTENANCE (O&M) PLAN 1

3. Operation & Maintenance of BMP'S 1

A. Training 2
B. Landscaping 2
C. Irrigation System 5
D. Roof Drains 5
E. Trash Storage Areas 5
F. Storm Water Conveyance System Stenciling and Signing 6
G. Structural BMP: Biofiltration 7
H. Outlet Structures 9
I. Vector Control Owner Responsibilities 9

ATTACHMENTS

A1. Inspection & Maintenance Schedule

B1. Cost Estimate

C1. BMP Training Log

D1. Inspection & Maintenance Log

E1. Bmp Information Inserts

1. PROJECT DESCRIPTION

The project consists of constructing two new buildings, the removal of one existing building and the removal and replacement of parking areas and driveways. All other existing buildings will remain. The northeastern portion of the development will drain into a new biofiltration basin (Flow Through Planter) and its flow will be tied into the existing 48" RCP. The southwestern portion will drain into another new biofiltration basin and its flow will be directed into the existing 18" RCP.

2. OPERATION & MAINTENANCE (O&M) PLAN

This document has been prepared in compliance with the San Diego Regional Water Quality Control Board requirements and in accordance with requirements set by the City. A Storm Water Quality Management Plan (SWQMP) has been prepared for the project. It identifies the specific Best Management Practices (BMPs) required for the project. Refer to this project's SWQMP for additional information on BMPs. Proper maintenance of the project BMP's is required for their intended and effective function. This O&M Plan provides operation and maintenance procedures for the BMPs designated in the SWQMP. It includes procedures to be followed for inspection and maintenance of the BMPs, instructions for documenting the work performed, record keeping, and outlining the requirement and procedures for training of personnel involved in the process.

3. Operation & Maintenance of BMP'S

It shall be the responsibility of the "Owner or Designated Responsible Party" to maintain and to train all employees for the maintenance and operation of all BMPs, to achieve the maximum pollutant reduction they are designed for, as addressed in the approved Project's SWQMP. The following schedule of O&M's must be followed to satisfy the Conditions of Concern and the Pollutants of Concern as addressed in the approved Project's SWQMP. This schedule shall include periodic inspections of all Source Control and Treatment Control BMP's. All maintenance records for training, inspection and maintenance shall be retained and provided to the city or county upon request.

The owner may also be required to provide to the City, as part of the maintenance and operation agreement an executed access easement that shall be binding on the land throughout the life of the project.

Responsible Party for O&M and For Training

North City Presbyterian Church
11717 Poway Road, San Diego, CA 92064
Attention: Bill Parkhurst
Email: bill@northcitychurch.com
Phone: 858-748-4642

The Designated Responsible Party will be responsible for ensuring that individuals involved in O&M activities, including but not limited to contractors and new owners, will be trained according to the

training program herein, Additionally, upon any future sale of the property, the Owner will be responsible for ensuring that the new Designated Responsible Party is familiar with the contents of the plan and the requirements for the routine inspection, routine and non-routine maintenance and record keeping tasks as described herein. All parties involved in the O&M activities will be required to read this plan.

A. Training

Employee training is an important component of the Implementation of this O&M Plan. The employee training program may consist of a meeting with any new owners, Designated Responsible Party or contractor/employees Involved in the O&M activities to review the contents of this plan and to physically tour the facility to observe the BMPs and describe O&M requirements for each BMP. The Designated Responsible Party will implement the training program. All new contractors involved in landscape and/or facility maintenance at the site shall receive training within 30-days of hire and shall receive updated annual training. Maintenance contractor shall verify staff training annually.

The Designated Responsible Party shall be responsible for documenting all training activities and for maintaining records related to training. Forms for documentation of training are included in Attachment C1 of this plan. Training records must be shall be retained and provided to the city or county upon request.

B. Landscaping

Operational and maintenance needs include:

- Vegetation management to maintain adequate drainage and to limit habitat for mosquitoes, rodents and other disease-carrying vectors.
- Parking lot sweeping.
- Animal and vector control (any method to limit or eradicate the mammals, birds, insects or other arthropods which transmit disease pathogens).
- Periodic sediment removal to optimize performance.
- Trash, debris, grass trimmings, tree pruning, and leaf collection and removal to prevent obstruction of landscape areas so as not to prohibit their use as a BMP.
- Monitoring irrigation equipment.
- Removal of standing water, which may contribute to the development of aquatic plant communities or mosquito breeding areas.
- Preventive maintenance on sampling, flow measurement, and associated BMP equipment and structures.
- Erosion and structural maintenance to prevent the loss of soil and maintain the performance of all landscaping.

<u>Inspection Frequency</u>

The facility will be inspected and inspection visits will be completely documented:

- Once a month at a minimum.

- After every large storm (after every storm monitored or these storms with more than 0.50 inch of precipitation.)
- On a weekly basis during extended periods of wet weather.

Inspect for proper irrigation and fertilizer use, and ensure that all landscaped areas have minimum of 80% coverage.

Visual Inspection as part of landscape maintenance

- Inspect before and after the rainy season (October 1 through April 30).

Aesthetic Maintenance

The following activities will be included in the aesthetic maintenance program:

Grass Trimming: Trimming of grass will be done on all landscaped areas, around fences, at the inlet and outlet structures, and sampling structures.
Weed Control. Weeds will be removed through mechanical means. Herbicide shall not be used because these chemicals will impact the water quality monitoring.

Functional Maintenance

Functional maintenance has two components:

- Preventive maintenance
- Corrective maintenance

Preventive Maintenance

Preventive maintenance activities to be instituted for landscaped areas are:

- Grass Mowing: Vegetation seed, mix within the landscaped areas, are to be designed to be kept short to maintain adequate drainage and to limit the development of faunal habitats.
- Prohibitive dumping placards.
- Trash and Debris: During each inspection and maintenance visit to the site, debris and trash removal will be conducted to reduce the potential for inlet and outlet structures and other components from becoming clogged and inoperable during storm events.
- Sediment Removal: Sediment accumulation, as part of the operation and maintenance program at of landscaped areas, will be monitored once a month during the dry season, after every large storm (0.50 inch), and monthly during the wet season. Specifically, if sediment reaches a level at or near plant height, or could interfere with flow or operation, the sediment will be removed. If accumulation of debris or sediment is determined to be the cause of decline in design performance, prompt action (i.e., within ten working days) will be taken to restore the landscaped areas to design performance standards. Actions will include using additional fill and vegetation and/or removing accumulated sediment to correct channeling or ponding. Characterization and Appropriate disposal of sediment will comply with applicable local, county, state, or federal requirements. The landscaped areas will be re-graded, if the flow gradient has changed, and then replanted with sod.

- Removal of Standing Water: Standing water must be removed if it contributes to the development of aquatic plant communities or mosquito breeding areas.
- Fertilization and Irrigation: The vegetation seed mix is to been designed so that fertilization and irrigation is to be kept at a minimum.
- Elimination of Mosquito Breeding Habitats. The most effective mosquito control program is one that eliminates potential breeding habitats.

Corrective Maintenance

Corrective maintenance is required on an emergency or non-routine basis to correct problems and to restore the intended operation and safe function of all landscaped areas.

Corrective maintenance activities include:
Removal of Debris and Sediment: Sediment, debris, and trash, which impede the hydraulic functioning of landscaping and prevent vegetative growth, will be removed and properly disposed. Temporary arrangements will be made for handling the sediments until a permanent arrangement is made. Vegetation will be re-established after sediment removal.
Structural Repairs: Once deemed necessary, repairs to structural components of landscaping will be done within 10 working days. Qualified individuals (i.e., the designers or contractors) will conduct repairs where structural damage has occurred.
Embankment and Slope Repairs: Once deemed necessary, damage to the embankments and slopes of landscaped areas will be repaired as soon as possible, and within 10 working days maximum.
Erosion Repair: Where a reseeding program has been ineffective, or where other factors have created erosive conditions (i.e., pedestrian traffic, concentrated flow, etc.), corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance and use of landscaped areas as BMPs. There are a number of corrective actions than can be taken.
These include erosion control blankets, riprap, sodding, or reduced flow through the area. Designers or contractors will be consulted to address erosion problems if the solution is not evident.

Elimination of Animal Burrows

Animal burrows will be filled and steps taken to remove the animals if burrowing problems continue to occur (filling and compacting). If the problem persists, vector control specialists will be consulted regarding removal steps. This consulting is necessary as the threat of rabies in some areas may necessitate the animals being destroyed rather than relocated. If the BMP performance is affected, abatement will begin. Otherwise, abatement will be performed annually in September.
General Facility Maintenance: In addition to the above elements of corrective maintenance, general corrective maintenance will address the overall facility and its associated components. If corrective maintenance is being done to one component, other components will be inspected to see if maintenance is needed.

Maintenance Frequency
The Inspection & Maintenance Schedule included in enclosed Attachment A1 for all BMPs lists the schedule of maintenance activities to be implemented.

Debris and Sediment Disposal

Waste generated onsite is ultimately the responsibility of the Owner. Disposal of sediments, debris, and trash will comply with applicable local, county, state, and federal waste control programs.

Hazardous Waste
Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated onsite will be handled and disposed of according to applicable local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the CCR, Title 22, Article 11.

C. Irrigation System

Inspection Frequency and Procedure

The Irrigation system shall be checked each week as a minimum. The following items shall be checked to insure that they are functioning properly:
The Irrigation system shall be checked each week as a minimum. The following items shall be checked to insure that they are functioning properly:

- Shut-off devices
- Pressure drop sensors
- Moisture sensors
- All piping and sprinkler heads to insure there are no leaks and that proper water spread is maintained.
- All flow reducers.
- Check for overspray/runoff

D. Roof Drains

All roof drains shall be inspected 30 days prior to October 1st of each year to ensure that they are clean and free from trash and in good repair. They shall be flushed and any leaks or damages piping shall be either replaced or repaired. Where roof drains flow onto grass areas splash structures and or rock rip-rap shall be maintained so the flow from the roof drains do not cause erosion or damage to the grass area. During the rain season roof drains shall be inspected weekly and after each rain storm to insure that there is no trash and or silt build up that will restrict the run-off flow from the roof. All trash and/or silt build up shall be removed immediately.

- It is not permissible to directly connect roof drains into a drain system.
- Roof drain downspouts shall discharge runoff to a landscaped area, and to allow the runoff to flow through landscape, prior to entering a private yard drain system.

E. Trash Storage Areas

- All trash storage areas shall be inspected daily to insure that they are clean from trash. Also the following shall be inspected annually 30 days prior to October 1st of each year.
  - Pavement is in good repair.
  - Drainage will not run-off onto adjacent areas.

- That they remain screened or walled to prevent off-site transport of trash.
- That all lids are closed and/or awnings are in good repair to minimize direct precipitation.

F. Storm Water Conveyance System Stenciling and Signing

- Signage/stenciling are to be inspected for legibility and visual obstruction and shall be Repaired and cleared of any obstruction within 5 working day of inspection.
- Inspection Frequency: Semi-annually, 30 days prior to October 1st each year, and monthly during rainy season.

G. Structural BMP: Biofiltration

Vegetated Infiltration or Filtration BMP

Maintenance Indicators and Actions for Vegetated BMPs

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, The County must be contacted prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, City staff in the Watershed Protection Program must be contacted prior to any additional repairs or reconstruction.
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

Inspection Frequency

The facility will be inspected and inspection visits will be completely documented:

- Once a month at a minimum.
- After every large storm (after every storm monitored or these storms with more than 0.50 inch of precipitation.)
- On a weekly basis during extended periods of wet weather.

Maintenance is needed if vegetation height is greater than 5” (height shall be kept between 2” and 5”); if there is standing water; if debris are present or if sedimentation is occurring at the vegetation height; ensure that all landscaped areas have minimum of 80% coverage and that no animal burrows are present.

<u>Visual Inspection as part of landscape maintenance</u>

- Inspect before and after the rainy season (October 1 through April 30).

Maintenance Category 2

Minimally, the responsible party must provide annual documentation to the County verifying that the BMPs are maintained and functioning properly. However, if the responsible party fails to perform maintenance, the County (in a "backup" role) may be required to perform the maintenance; therefore security funding is required. Maintenance securities are required for an interim 5-year period. However, maintenance responsibilities remain in perpetuity.

Category 2 Mechanisms to Assure Maintenance

1. Watershed Protection Ordinance Requirement: WPO Section 67.812 requires ongoing maintenance of BMPs. In the event that the mechanisms below prove ineffective, or in addition to enforcing those mechanisms, civil action, criminal action or administrative citation could also be pursued for violations of the ordinance.

2. Public Nuisance Abatement: Under the WPO failure to maintain a BMP would constitute a public nuisance, which may be abated under the Uniform Public Nuisance Abatement Procedure. This provides an enforcement mechanism additional to the above, and would allow costs of maintenance to be billed to the owner, a lien placed on the property, and the tax collection process to be used.

3. Notice to Purchasers: Section 67.812(e) of the WPO requires developers to provide clear written notification to persons acquiring land upon which a BMP is located, or others assuming a BMP maintenance obligation, of the maintenance duty.

4. Conditions in Ongoing Land Use Permits: For those applications (listed in WPO Section 67.810(a)) upon whose approval ongoing conditions may be imposed, a condition will be added which requires the owner of the land upon which the stormwater facility is located to maintain that facility in accordance with the requirements specified in the maintenance plan. Failure to perform maintenance may then be addressed as a violation of the permit, under the ordinance governing that permit process.

5. Subdivision Public Report: Tentative Map and Tentative Parcel Map approvals will be conditioned to require that, prior to approval of a Final or Parcel Map, the subdivider must provide evidence to the County , that the subdivider to be issued for the sales of lots within the subdivision, a notification regarding the maintenance requirement. (The requirement for this condition would not be applicable to specific subdivisions which are exempt from regulation under the Subdivided Lands Act, or for which no public report will be issued.)

6. BMP Maintenance Agreement with Easement and Covenant: WPO Section 67.812(f) requires that an agreement will be entered into with the County, which will function in three ways:

a. It will commit the land to being used only for purposes of the BMP;
b. It will include an agreement by the landowner to maintain the BMPs in accordance with the maintenance plan (this obligation would be passed on to future purchasers or successors of the landowner, as a covenant); and
c. It will include an easement giving the County the right to enter onto the land (and any necessary adjacent land needed for access) to maintain the BMPs. This would be required of all applications listed in WPO Section 67.810 with Category 2 BMPs. In the case of subdivisions, this easement and covenant would be recorded on or prior to the Final or Parcel Map.

Funding:
The developer must provide the County with security to substantiate the maintenance agreement; security will remain in place for an interim period of 5 years from the date of approval of the structural BMP Verification Acceptance Package. The amount of the security would equal the estimated cost of 2 years of maintenance activities. The security may be a Cash Deposit, Letter of Credit, or other form acceptable to the County. If at any time, owners fail to maintain BMPs and the County must perform any of the maintenance activities, then owners must pay all of County's costs incurred in performing the maintenance as defined in the maintenance agreement.

H. Outlet Structures

All outlet structures shall be kept functional at all times. Routine inspection and corrective maintenance shall include removal of trash sediment and debris and repair of any structural damage or clogging of orifice outlets. The minimum maintenance frequency shall be 30 days prior to October 1st each year, weekly during rainy season or within 24 hours prior to rain forecasts.

I. Vector Control Owner Responsibilities

VECTOR MANAGEMET CONTROL REQUIREMENTS

Any method to limit or eradicate the mammals, birds, insects or other arthropods which transmit disease pathogens. Management of mosquitoes and other vectors in stormwater management structures, such as Bioretention Facilities and Best Management Practices, is critical for protecting public health.

In order to implement vector controls including minimizing the risk for mosquito-borne disease transmission, It is the responsibility of the Owner to regularly maintain the outlet structures and monitor the site after every storm event to ensure that the system (comprising of above and below ground storage facilities) is dewatered in less than 72 hours. Otherwise the owner will be required to implement a vector control plan in accordance with California Department of Public Health.

- Maintain all drainage inlets and outlets trash free; remove silt; make sure to clear any standing water after 72-hours of ponding.

Vector Control Resources:

1. For County of San Diego vector educational brochures please reference the following website: http://www.sdcounty.ca.gov/deh/pests/vector_disease.html
2. Please contact the County of San Diego vector control program with specific questions or concerns.

ATTACHMENT "A1"
INSPECTION & MAINTENANCE SCHEDULE

PREVENTATIVE MAINTENANCE AND ROUTINE INSPECTION					
TYPE BMP	Routine Action	Maintenance Indicator	Maintenance Frequency	MAINTENANCE ACTIVITY	SITE-SPECIFIC REQUIREMENTS
Landscaping & irrigation	Proper irrigation & Fertilizer.	Less than 80% coverage	30 days prior to October 1st each year and once during rainy season (October 1 through April 30)	Re-plant. Repair Irrigation system within 5-days.	All slopes and landscaped areas are to have a minimum coverage of 80%
Trash storage areas	Trash free and removal of silt	Visual Inspection	Daily inspection	Remove trash and silt Daily.	All trash storage areas to be free from trash and silt at all times
Roof drain	Trash free and removal of silt, sedimentation & Debris	Silt build up of more than 1" no trash	30 days prior to October 1st each year and weekly during rain season.	Remove all trash and silt and repair any damage to roof drains,	All Roof to be free from trash and silt and in good repair
Bioretention – Biofiltration Facilities	Trash free and removal of silt. Clear Clogged outlets and Standing Water.	Silt build up of more than 2" no trash, Exposed soils, dead vegetation, ponded water, and excessive vegetation (see TC-30)	30 days prior to October 1st each year, monthly during rainy season, and after Storm Event	Remove trash and silt –repair and reseed exposed areas, maintain grass height so as not be shorter than 2" or higher than 5" remove all ponded water weekly inspections, (See TC-30)	All bio-filters to be free from trash and silt at all times, grass area to be free from exposed soil and maintained to proper height, removal of any ponding of water for more than 72 hours.
Storm Water Conveyance system Stenciling & Signing	Must be legible at all times and have a clear view.	Fading of paint or illegible letters or	Semi-annually, 30 days prior to October 1st each year & monthly during rainy season	Repaint stenciling and/or replace signs 30 days prior to October 1st.	Appies to all stenciling and signs
Outlet Structures	Must be kept functional at all times. Clear Clogged outlets and Standing Water.	Silt, debris, trash accumulation, Ponding Water	30 days prior to October 1st each year and weekly during rainy season or within 24 hours prior to rain forecasts.	Silt, debris, trash accumulation and repair any structural damage to the outlet structures.	All outlet structures shall be kept functional at all times.

ATTACHMENT "B1"

Annual Estimate to Maintain all BMPs	Annual	10-Year
Landscaping & Biofiltration Maintenance of landscaping and bio-filters is already included in the property management responsibilities. Additional cost:	$400	$4,000
Irrigation System: Inspection and maintenance of the irrigation system is already included in the property management responsibilities, Additional cost:	$100	$1,000
Roof Drains: Roof drain inspection and maintenance is already included in the property management responsibilities.		
Training: Once a year & training of new employees within their first week of employment.	$100	$1,000
Stormdrain Signage (As needed or every 2 years)	$100	$1,000
Trash Storage Areas: Inspection of trash storage area & maintenance to those areas is already included in the property management responsibilities. Additional cost:	$50	$500
Total Estimated Annual Cost to Maintain BMPs	$750	$7,500

ATTACHMENT "C1"

BMP TRAINING LOG			
Date MO/Day/Yr	**Type of Training**	**Personnel Trained**	**Trainer**

ATTACHMENT "D1"

INSPECTION AND MAINTENANCE LOG				
BMP TYP & LOCATION	DATE M/D/Y	Name of Person Inspecting	Description of BMP Condition/ Description repair required if any	Date Repair made and Description repair made and by who

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. Broucher photocopies are not allowed.

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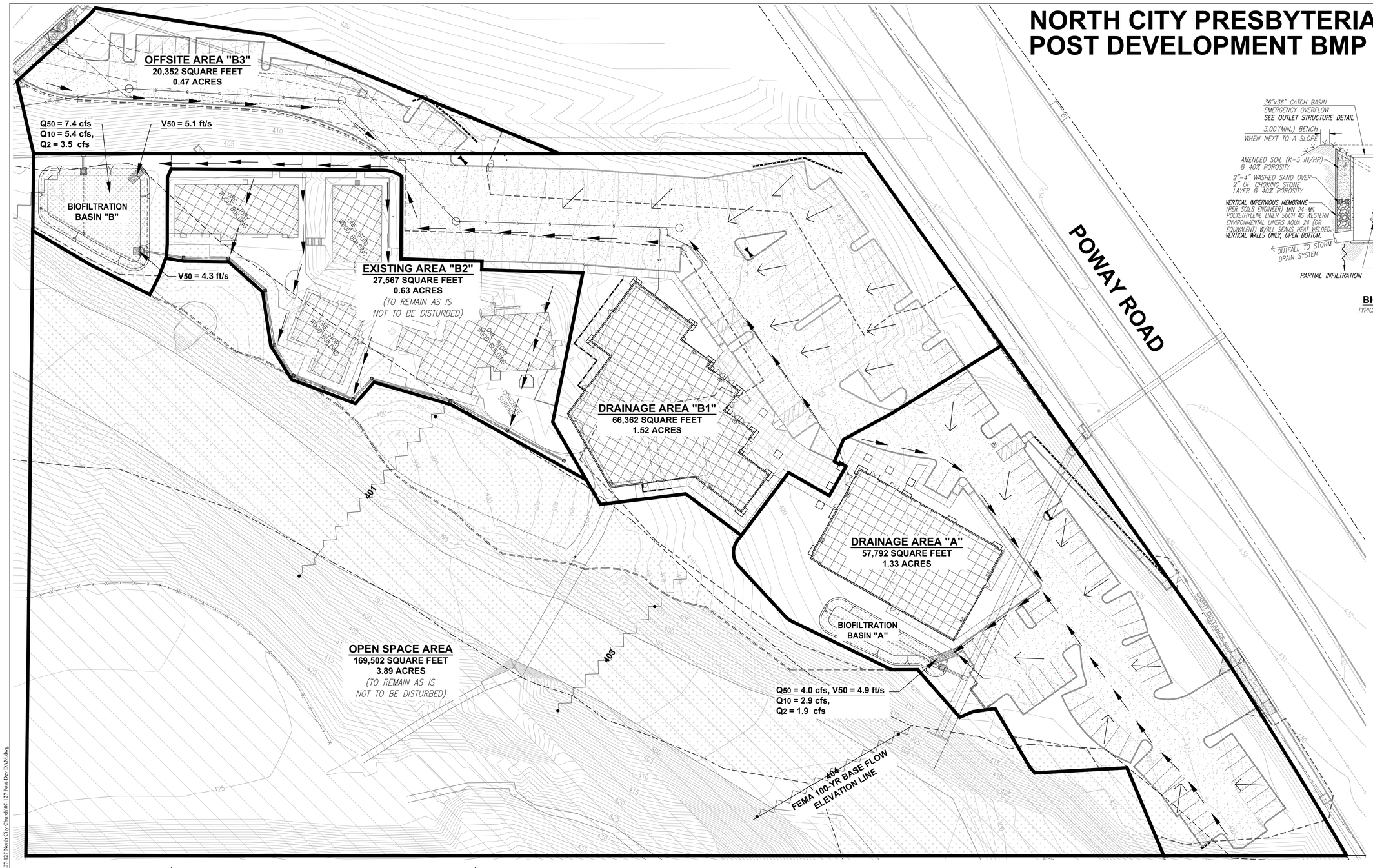
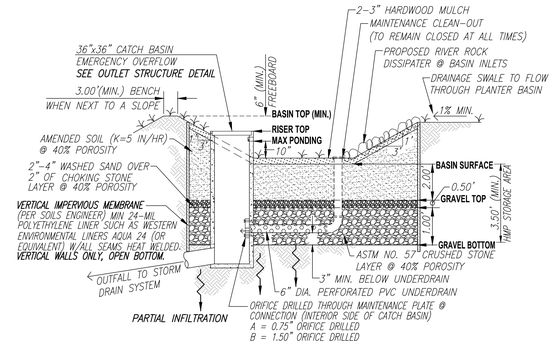
NORTH CITY PRESBYTERIAN CHURCH
POST DEVELOPMENT BMP OVERVIEW MAP





BIOFILTRATION BASIN

TYPICAL SECTION & OUTLET CONNECTION
NOT-TO-SCALE

BIOFILTRATION BASIN MEDIA

PER COUNTY OF SAN DIEGO 2014 LID HANDBOOK, APPENDIX C FACT SHEETS.

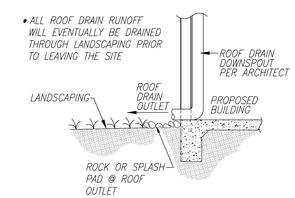
24" AMENDED SOIL LAYER
COMPOSITION AND TEXTURE:
65% SAND, 20% SANDY LOAM, & 15% COMPOST (FROM VEGETATION-BASED FEEDSTOCK). ANIMAL WASTES OR BY-PRODUCTS SHOULD NOT BE APPLIED.

PERMEABILITY:
5 IN/HR INFILTRATION RATE FOR THE FLOW-BASED SUSMP METHOD (1-6IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION).

CHEMICAL COMPOSITION: TOTAL PHOSPHORUS < 15 PARTS PER MILLION (PPM); PH 6-8; CATION EXCHANGE CAPACITY > 5 MILLIEQUIVALENTS PER 100 GRAMS (MEQ/100 G) OF SOIL; ORGANIC MATTER CONTENT < 5 PERCENT BY WEIGHT.

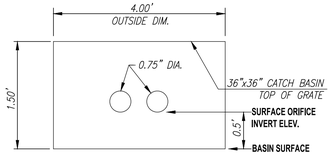
18" DRAINAGE LAYER
SEPARATE SOIL MEDIA FROM UNDERDRAIN LAYER WITH 2 TO 4 INCHES OF WASHED SAND, FOLLOWED BY 2 INCHES OF CHOKING STONE (ASTM NO. 8) OVER 1.0-FOOT OF ASTM NO. 57 STONE.

SURFACE VEGETATION
AS SPECIFIED BY THE LANDSCAPE ARCHITECT PLANS.



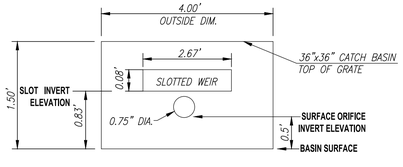
ROOF DRAIN OUTLET

TYPICAL ROOF DRAIN OUTLET AT LANDSCAPED AREAS
NO SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN A

36" CATCH BASIN'S OUTSIDE WALL,
(2) ORIFICES TO BE INSTALLED ON SOUTH WALL
NOT-TO-SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN B

36" CATCH BASIN'S OUTSIDE WALL,
(3) SLOTTED WEIR TO BE INSTALLED ON NORTH, EAST, AND SOUTH WALLS
NOT-TO-SCALE

DRAINAGE AREA DMA BREAKDOWN

SYMBOL	DRAINAGE AREA SURFACE	SOIL TYPE	'A' (EAST SIDE)	'B1' (WEST SIDE)	EXISTING AREA 'B2' (TO REMAIN AS IS & UNDISTURBED)	OPEN SPACE (TO REMAIN AS IS & UNDISTURBED)	OFFSITE 'B3' PRIVATE ACCESS & PARKING EASEMENT
	BUILDING ROOFTOP	TYPE 'C'	7,310 SQ FT	10,498 SQ FT	9,392 SQ FT	0 SQ FT	0 SQ FT
	PARKING/DRIVE AISLE IMPERVIOUS AREA	TYPE 'C'	23,332 SQ FT	30,574 SQ FT	0 SQ FT	0 SQ FT	9,268 SQ FT
	HARDSCAPING/SIDEWALK	TYPE 'C'	3,162 SQ FT	6,290 SQ FT	8,548 SQ FT	0 SQ FT	0 SQ FT
	LANDSCAPING AREA	TYPE 'C'	23,988 SQ FT	19,000 SQ FT	9,627 SQ FT	169,502 SQ FT	11,084 SQ FT
	TOTAL =		57,792 SQ FT	66,362 SQ FT	27,567 SQ FT	169,502 SQ FT	20,352 SQ FT
	TOTAL LOT AREA = 321,223 SQ FT						

30 15 0 30 60 90

SCALE: 1" = 30'

LEGEND

EXISTING CONTOURS (380)
DRAINAGE AREA
FEMA MAP NO. 06073C1354-F 100 YR FLOODWAY BOUNDARY
DIRECTION OF DRAINAGE
SHEET FLOW

PLOT DATE: 10/26/2017 8:36 AM S:\AutoCad Projects\2007\07-127 North City Church\07-127 Post-Dev DAM.dwg

SPEAR & ASSOCIATES, INC. JOB NO. 07-127 NJD

ATTACHMENT 5
DRAINAGE REPORT

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

HYDROLOGY & HYDRAULICS REPORT

Dated: 7/6/07, Revised: 7/8/08, 2/2/09, 6/30/09, 4/15/15, 9/4/15, 6/7/16

For

North City Presbyterian Church Project

Project Number: 150585

LOCATION: 11717 Poway Road, San Diego, CA 92064
APN 316-040-36

PREPARED BY:

SPEAR & ASS0CIATES, INC.
CIVIL ENGINEERS AND LAND SURVEYORS
475 Production Street
SAN MARCOS, CA 92078

PHONE: (760) 736-2040
FAX: (760) 736-4866

Date: 6/7/16

Danny Abada, PE

DECLARATION OF RESPONSIBLE CHARGE

I, HEREBY DECLARE THAT I AM THE CIVIL ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THIS PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONAL CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT DESIGN STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

6/7/16

Danny Abada
REGISTERED CIVIL ENGINEER
Spear & Associates Inc.

DATE

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II. DISCUSSION/CONCLUSION	1
SUMMARY OF FLOW RATES	1

ATTACHMENTS

A. LOCATION MAPS	2
B. HYDROLOGY CALCULATIONS	5
C. DRAINAGE MAP	31

I. INTRODUCTION

This hydrology report is prepared for the North City Presbyterian Church, located at 11717 Poway Road, San Diego, CA 92064. APN: 316-040-36.

The site encompasses 7.37 acres, but the development portion consists of 2.85 acres. The project also will add 0.47 acres of offsite parking areas draining to the site. The rest of the site will remain as is, undisturbed. The existing area (2.85 acres portion) was previously developed and currently includes several buildings, driveways and parking lots. The northern portion of the site has a 48" RCP crossing in an easterly direction and discharging its flow into Penasquitos River. The adjacent river area downstream from the project is an environmentally sensitive area. The southwest portion of the site drains to an existing 18" RCP that also discharges its flow into the river.

The topography slopes in a southwesterly direction with elevations ranging from approximately 433 to 420 and the site's runoff drains towards Penasquitos River. The adjacent 100-year floodplain was established by FEMA with flow elevations ranging from 400.0 to 407.0. The entire project is situated outside the 100-year floodplain.

The project consists of constructing two new buildings, the removal of one existing building and the removal and replacement of parking areas and driveways. All other existing buildings will remain. The northeastern portion of the development will drain into a new biofiltration basin (Flow Through Planter) and its flow will be tied into the existing 48" RCP. The southwestern portion will drain into another new biofiltration basin and its flow will be directed into the existing 18" RCP. The proposed drainage will maintain the existing flow characteristics of the site draining towards Penasquitos River and the Pacific Ocean approximately 10 miles west.

We have used the City of San Diego Hydrology Manual for this report. The report includes attachments for precipitation intensities, intensity duration calculations, soil type, runoff coefficients and times of concentration calculations. This report calculates the 2yr, 10yr, and 50yr flows generated from the site. The project soil is type C across all sub areas.

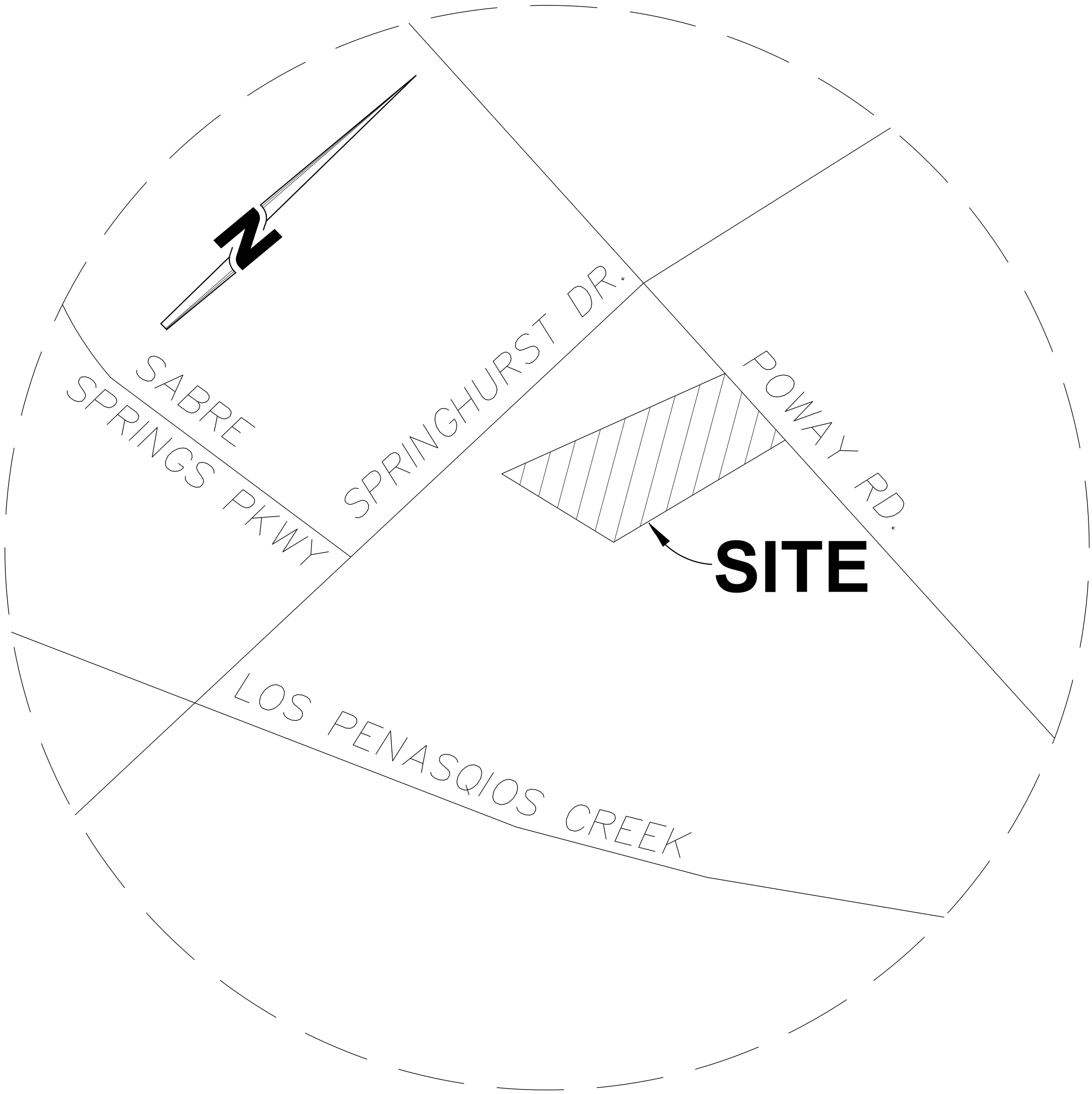
II. DISCUSSION/CONCLUSION

The project will not encroach into the 100-year flood plain established by FEMA. Post development peak flows, flow volumes and velocities for the 2yr, 10yr, and 50yr events will not exceed pre-development rates. This was achieved by maximizing existing pervious surfaces, onsite times of concentration and with the use of low impact and hydromodification strategies as shown on the project's Stormwater Management Plan.

Summary flow rates (see areas delineated in the Drainage Map)

	Storm Event 2-year (cfs)	***Storm Event 10-year (cfs)***	***Storm Event 50-year (cfs)***
Pre-Development Total	5.0	7.7	10.6
Post-Dev. Total	5.0	7.7	10.6
Pre-Development A	2.6	4.0	5.6
Post-Dev. A	1.9	2.9	4.0
Pre-Development B1	2.4	3.7	5.1
Post-Dev. B1	2.6	4.0	5.5

ATTACHMENT A



VICINITY MAP

NO SCALE

PER S.D. CO. THOMAS GUIDE
PAGE 1190, A-6

Aerial Picture Of The Site

FIGURE III

Project Name: *North City Presbyterian Church*
Address: 11717 Poway Road
San Diego, CA 92128

ATTACHMENT B

Post-Development Conditions **50-yr Event**

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	10.8	0.69	1.33	0.92	0.92	2.70	4.33	**4.0**
B1	8	0.69	1.52	1.05	1.05	2.70	5.25	**5.5**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	2.70	5.34	**1.4**
Offsite B3	9.1	0.48	0.47	0.23	0.23	2.70	4.83	**1.1**
Total Basin B	9.1				1.53	2.70	4.83	**7.4**
A1 & B1 & B2 & Offsite B3 Total Flow	10.8				2.45	2.70	4.33	**10.6**

Pre-Development Conditions

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	5.1	0.6	1.33	0.80	0.80	2.70	7.02	**5.6**
B1	7.3	0.6	1.52	0.91	0.91	2.70	5.57	**5.1**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	2.70	5.34	**1.4**
Offsite B3	9.1	0.48	0.47	0.23	0.23	2.70	4.83	**1.1**
Total B	9.1				1.40	2.70	4.83	**6.7**
A1 & B1 & B2 & Offsite B3 Total Flow	9.1				2.19	2.70	4.83	**10.6**

***Rational Method**

Post-Development Conditions **10-yr Event**

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	10.8	0.69	1.33	0.92	0.92	1.95	3.13	**2.9**
B1	8	0.69	1.52	1.05	1.05	1.95	3.79	**4.0**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	1.95	3.86	**1.0**
Offsite B3	9.1	0.48	0.47	0.23	0.23	1.95	3.49	**0.8**
Total Basin B	9.1				1.53	1.95	3.49	**5.4**
A1 & B1 & B2 & Offsite B3 Total Flow	10.8				2.45	1.95	3.13	**7.7**

Pre-Development Conditions

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	5.1	0.6	1.33	0.80	0.80	1.95	5.07	**4.0**
B1	7.3	0.6	1.52	0.91	0.91	1.95	4.02	**3.7**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	1.95	3.86	**1.0**
Offsite B3	9.1	0.48	0.47	0.23	0.23	1.95	3.49	**0.8**
Total B	9.1				1.40	1.95	3.49	**4.9**
A1 & B1 & B2 & Offsite B3 Total Flow	9.1				2.19	1.95	3.49	**7.7**

***Rational Method**

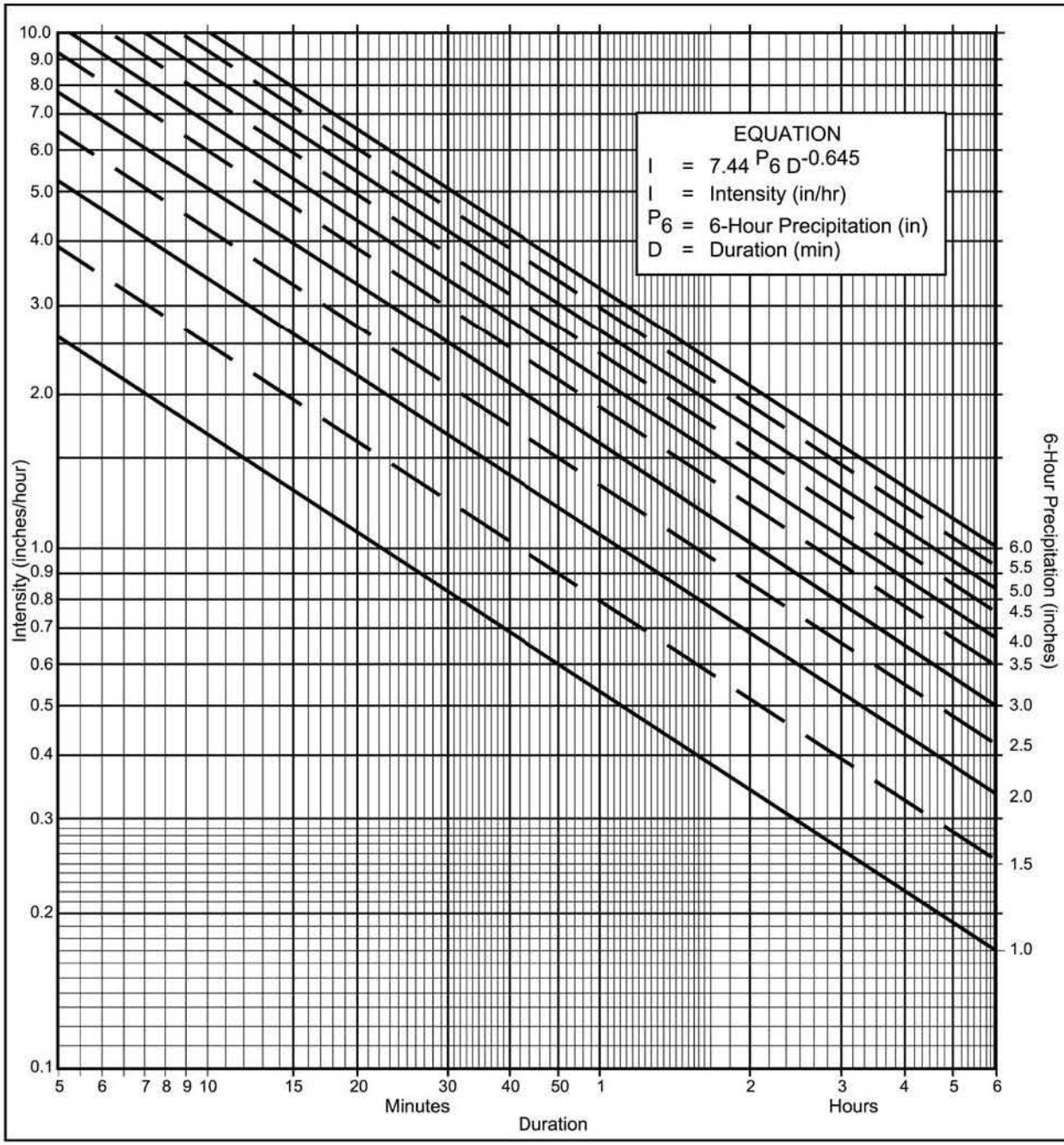
Post-Development Conditions **2-yr Event**

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	10.8	0.69	1.33	0.92	0.92	1.27	2.04	**1.9**
B1	8	0.69	1.52	1.05	1.05	1.27	2.47	**2.6**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	1.27	2.51	**0.6**
Offsite B3	9.1	0.48	0.47	0.23	0.23	1.27	2.27	**0.5**
Total Basin B	9.1				1.53	1.27	2.27	**3.5**
A1 & B1 & B2 & Offsite B3 Total Flow	10.8				2.45	1.27	2.04	**5.0**

Pre-Development Conditions

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**
A	5.1	0.6	1.33	0.80	0.80	1.27	3.30	**2.6**
B1	7.3	0.6	1.52	0.91	0.91	1.27	2.62	**2.4**
Undisturbed B2	7.8	0.41	0.63	0.26	0.26	1.27	2.51	**0.6**
Offsite B3	9.1	0.48	0.47	0.23	0.23	1.27	2.27	**0.5**
Total B	9.1				1.40	1.27	2.27	**3.2**
A1 & B1 & B2 & Offsite B3 Total Flow	9.1				2.19	1.27	2.27	**5.0**

***Rational Method**



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 50 year

(b) P_6 = 2.7 in., P_{24} = 4.45, $\frac{P_6}{P_{24}}$ = 61 %(2)

(c) Adjusted P_6(2) = 2.7 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

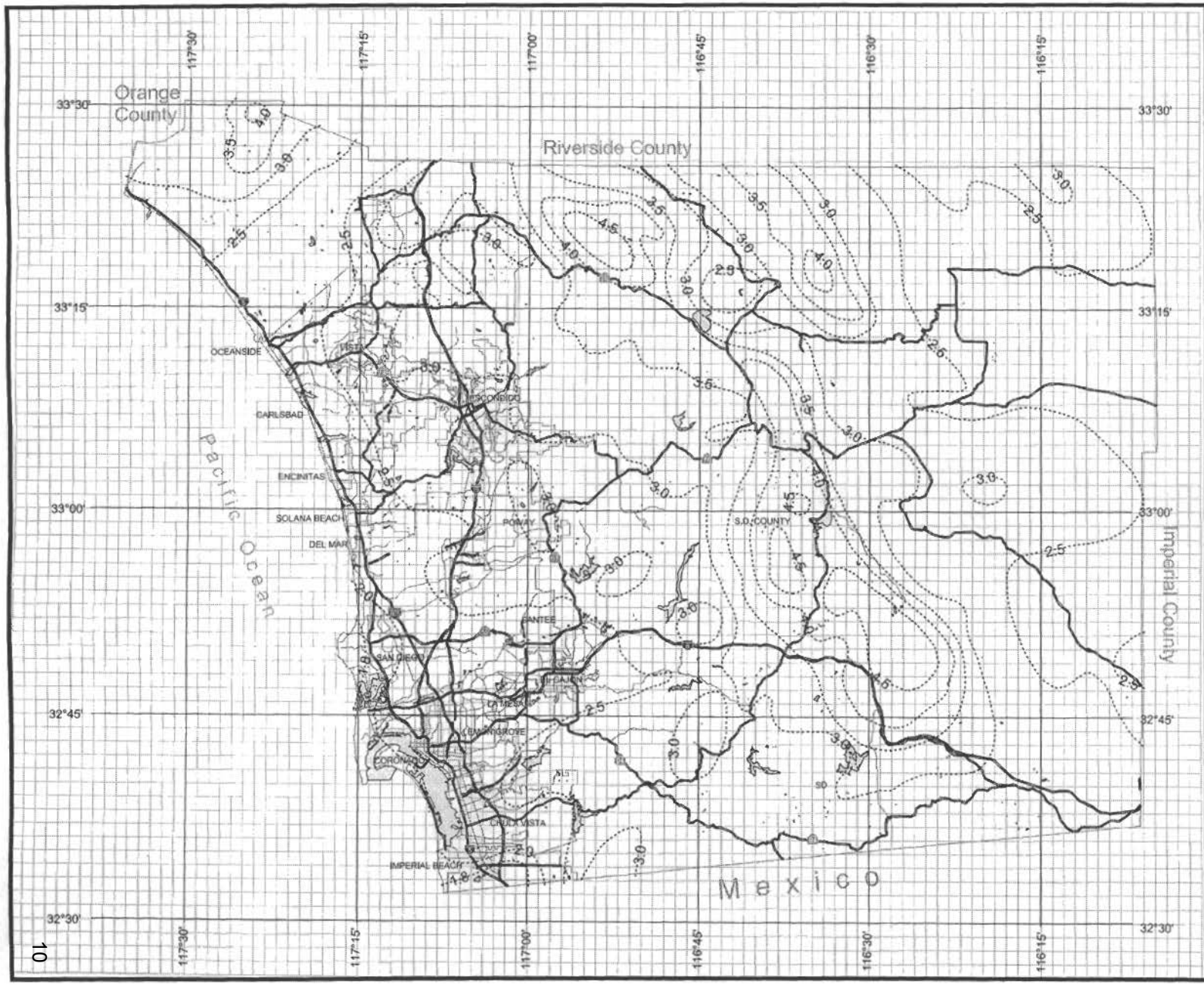
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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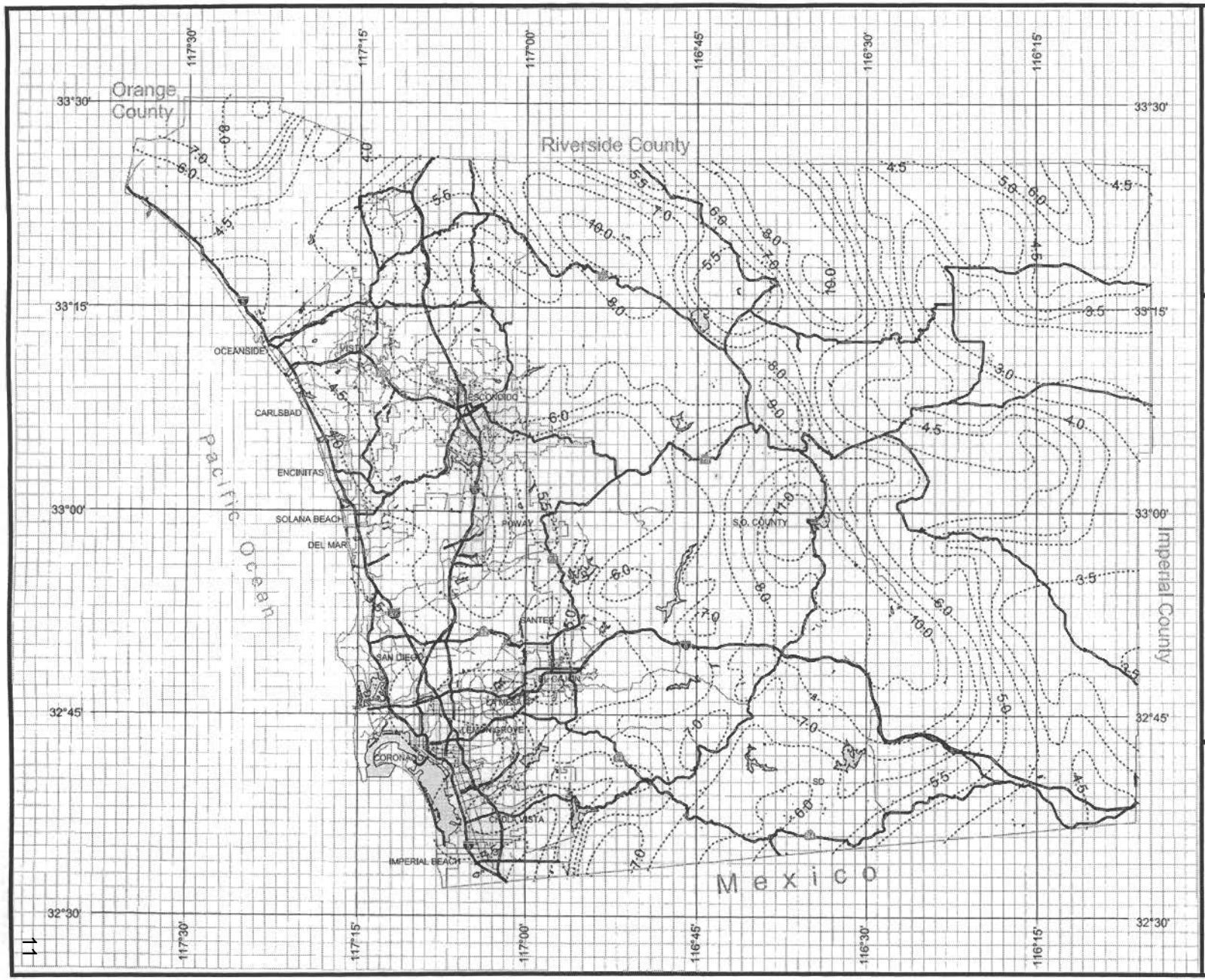

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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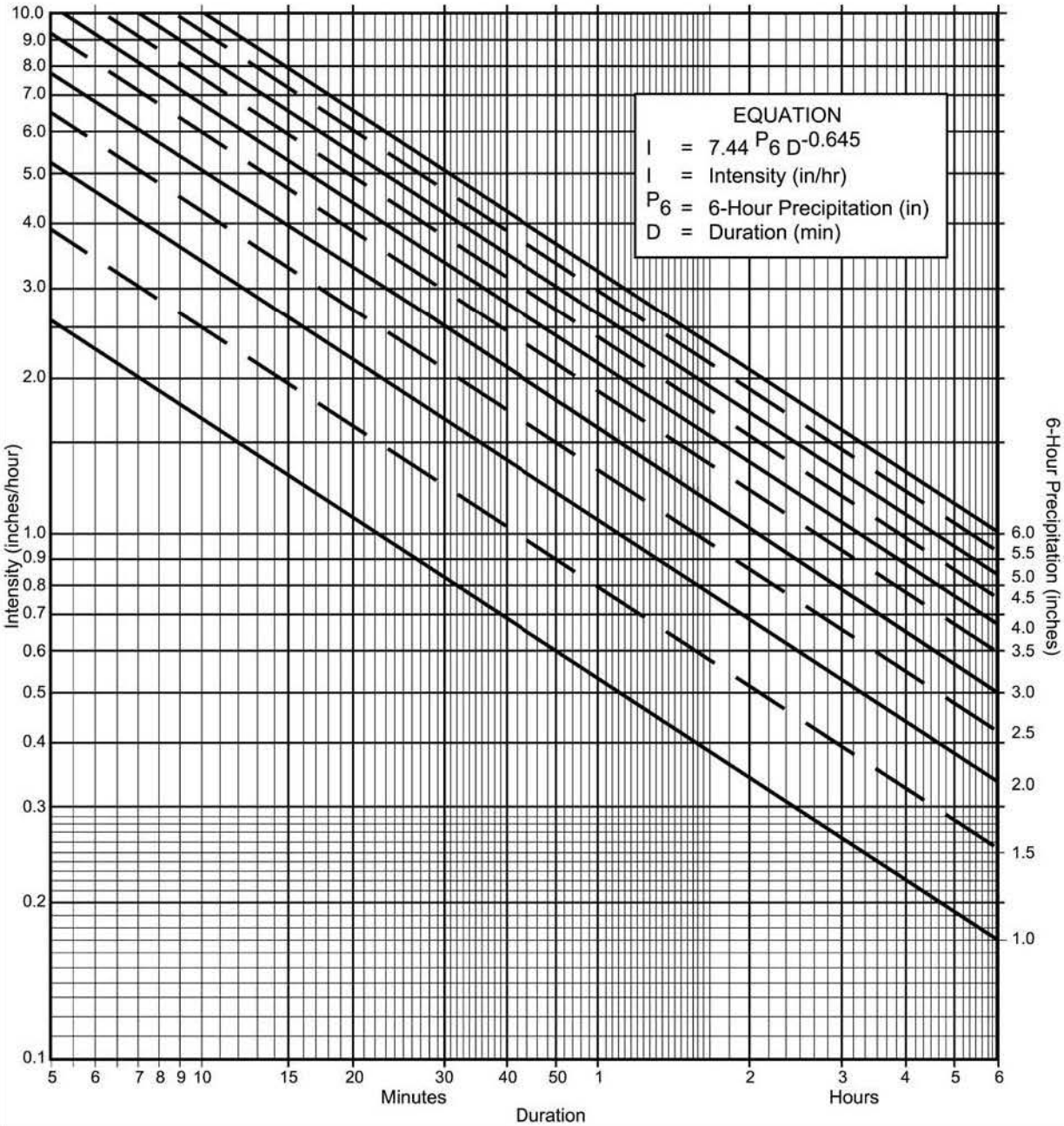


Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 10 year

(b) P_6 = 1.95 in., P_{24} = 3.4, $\frac{P_6}{P_{24}}$ = 57 %(2)

(c) Adjusted P_6(2) = 1.95 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

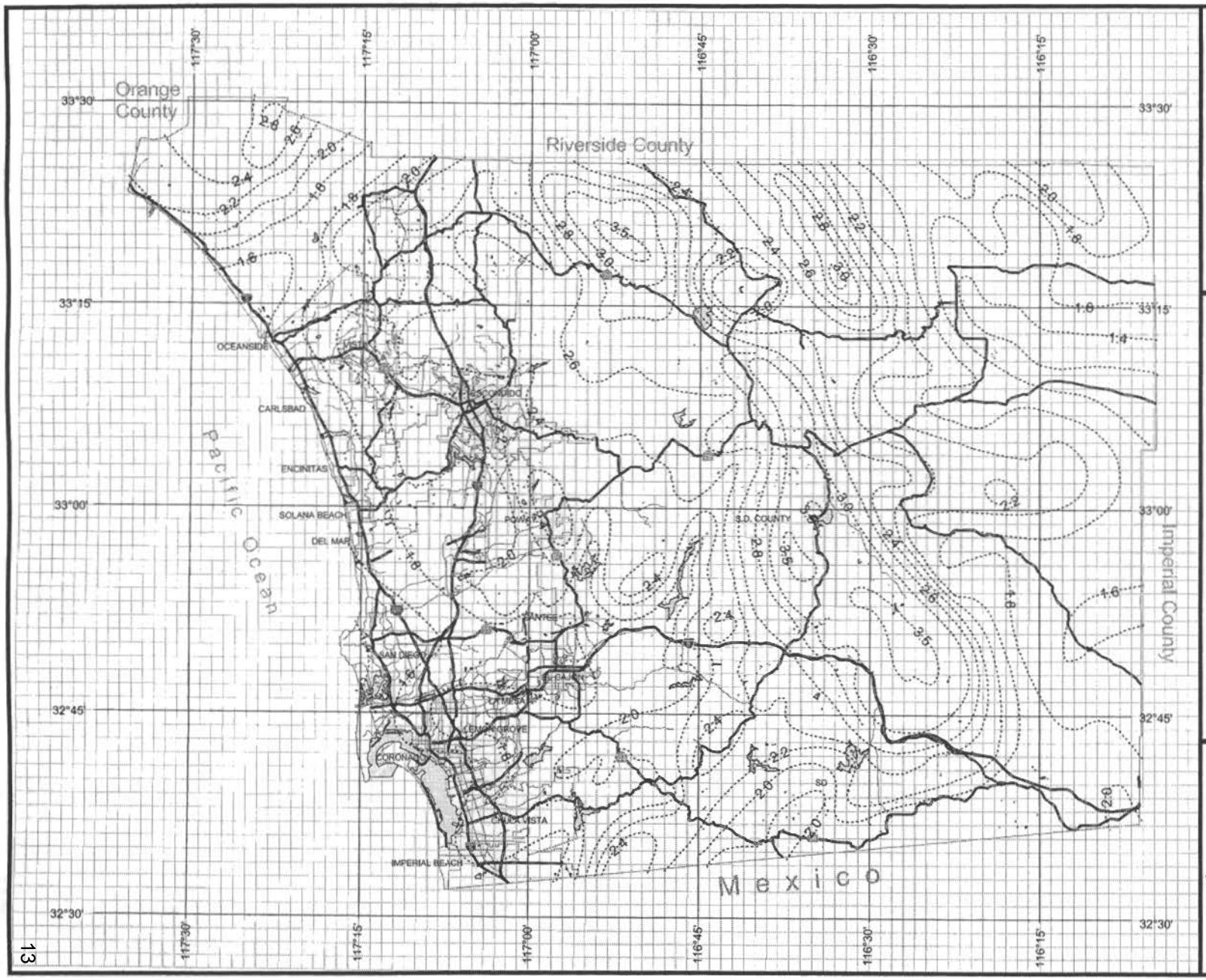
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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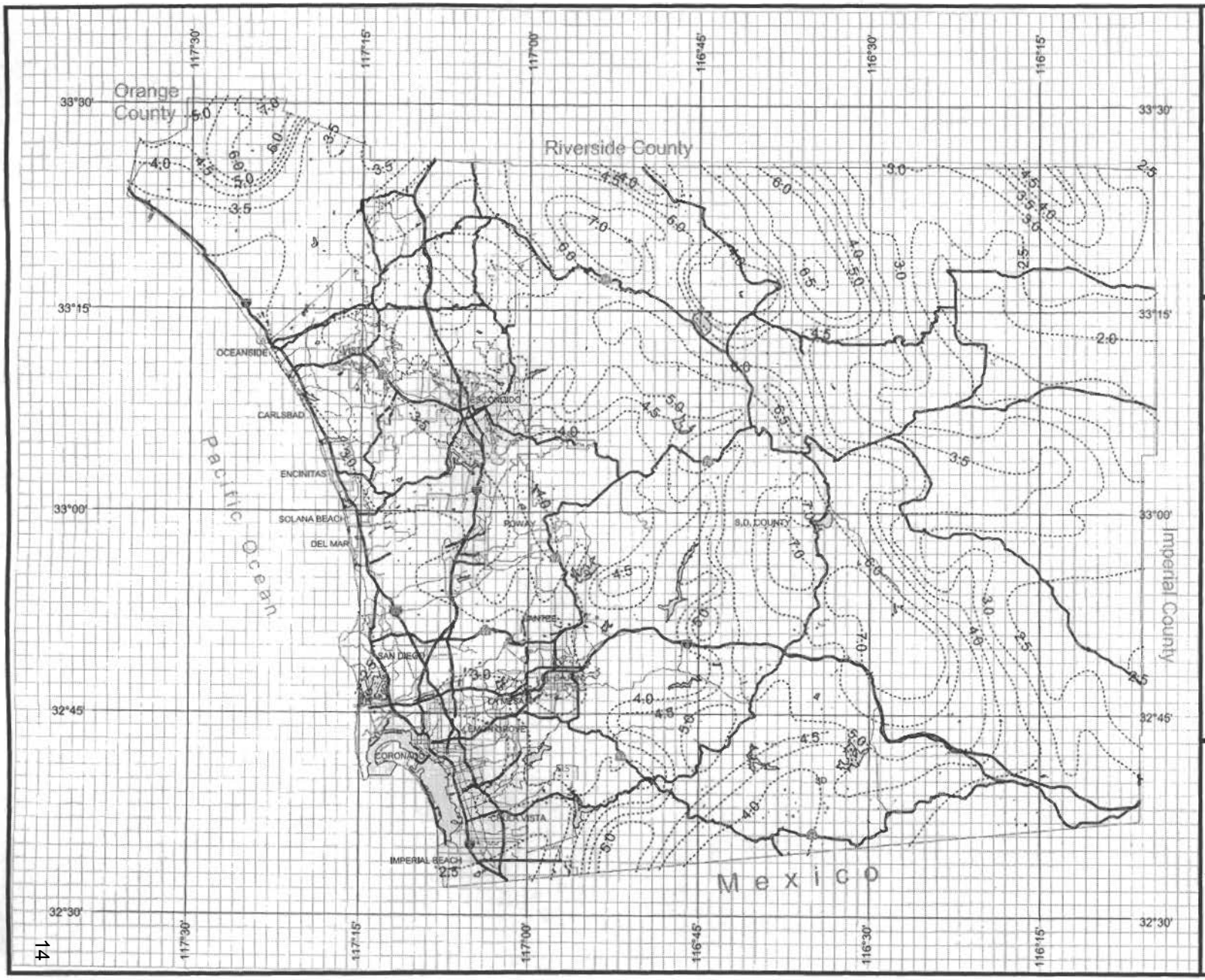

County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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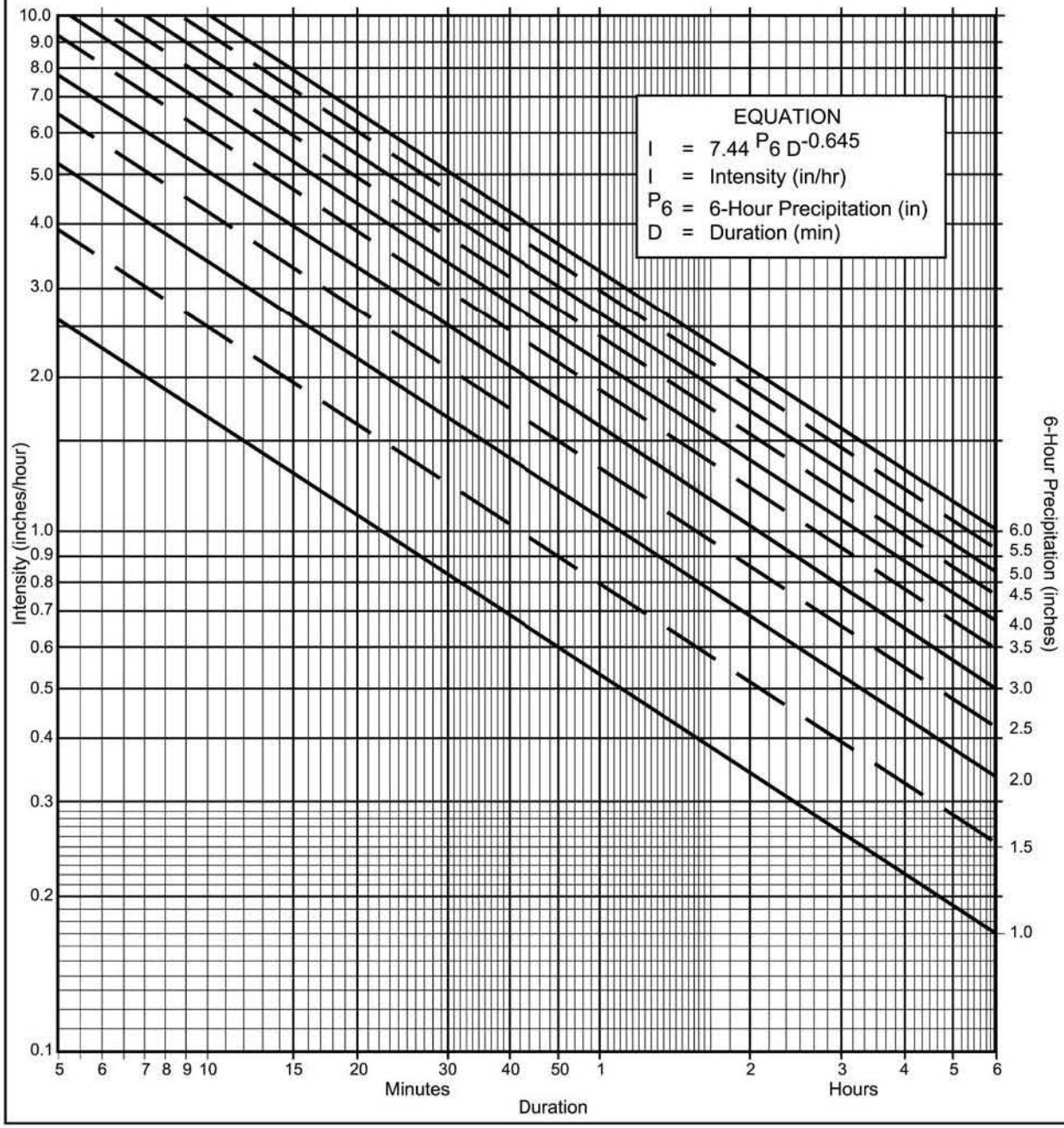

Directions for Application:

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(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 2 year

(b) P_6 = 1.35 in., P_{24} = 1.95, $\frac{P_6}{P_{24}}$ = 69 %(2)

(c) Adjusted P_6(2) = 1.27 in.

(d) t_x = _____ min.

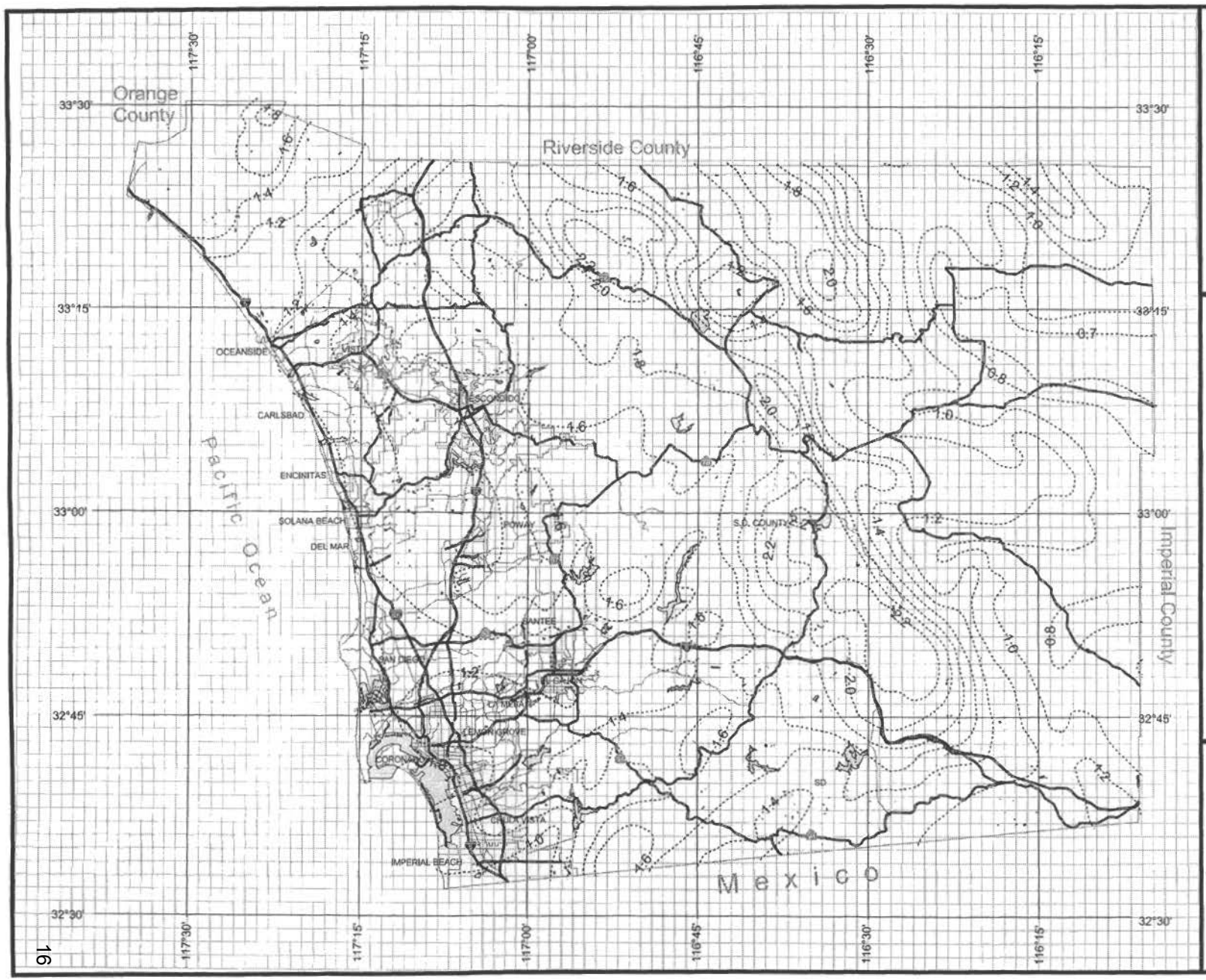
(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE
3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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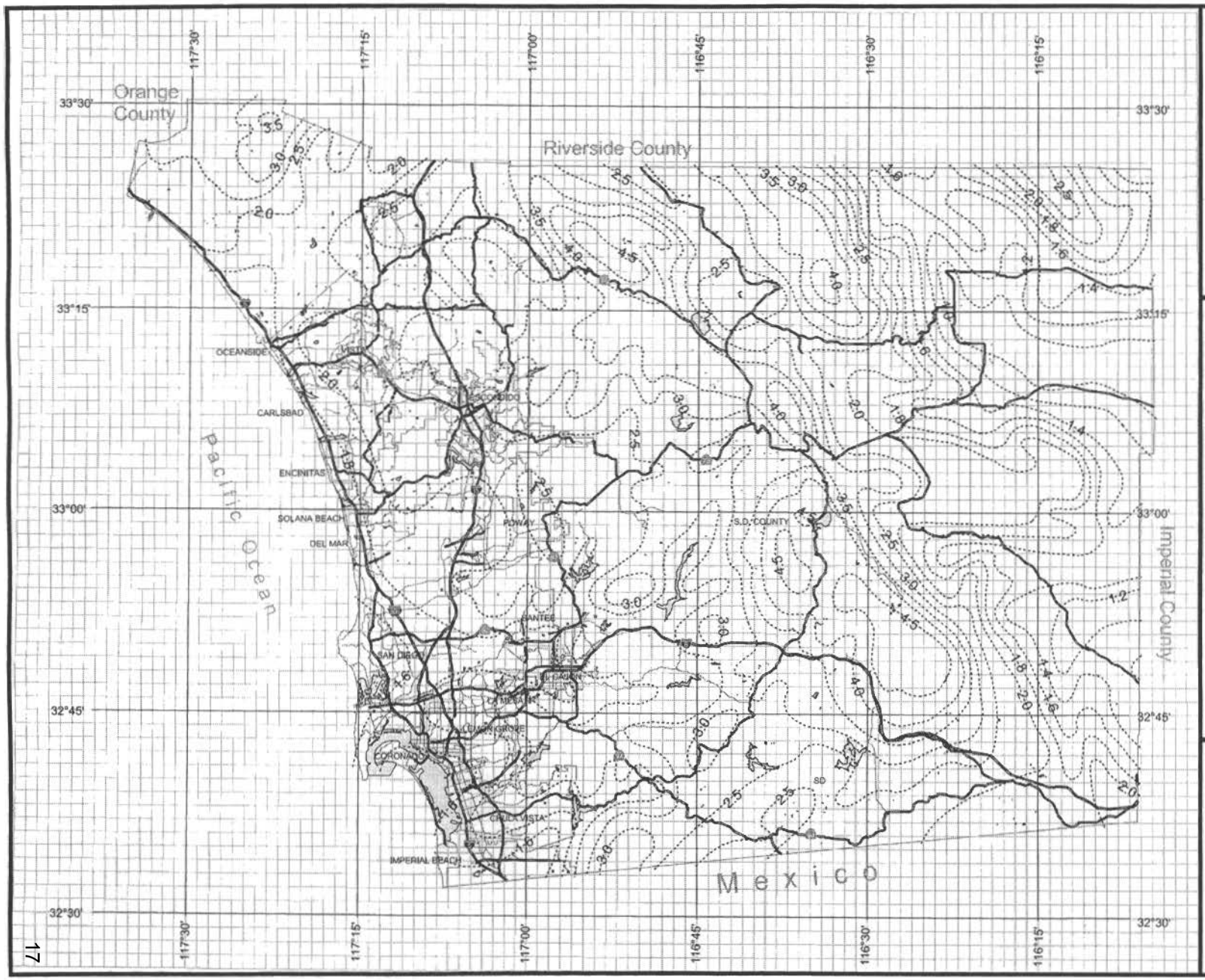

County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 24 Hours

Isopluvial (inches)

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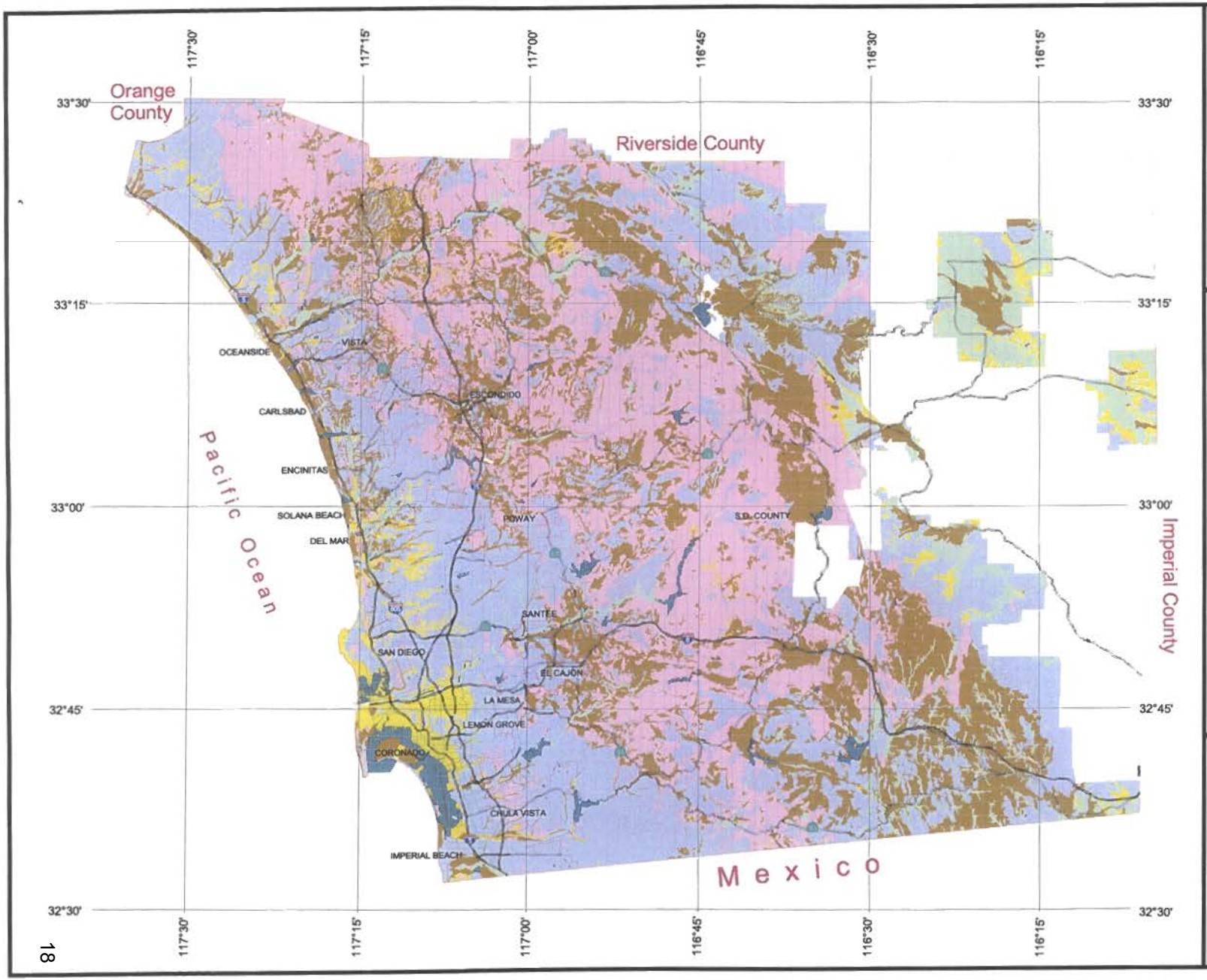
County of San Diego Hydrology Manual

Soil Hydrologic Groups



Legend

Soil Groups

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

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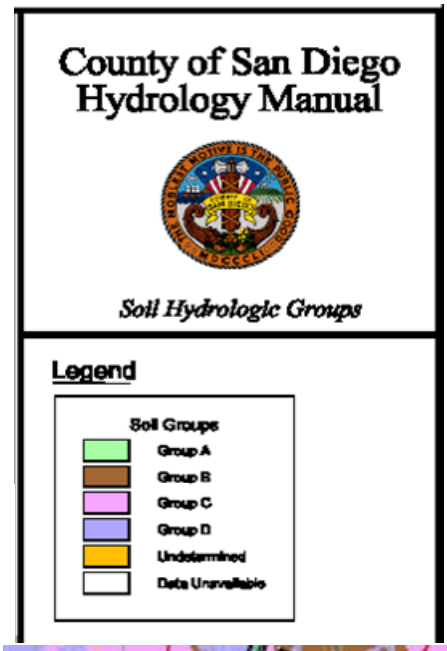
Hydraulic Soil Group Detail for

Project Name: ***North City Presbyterian Church***

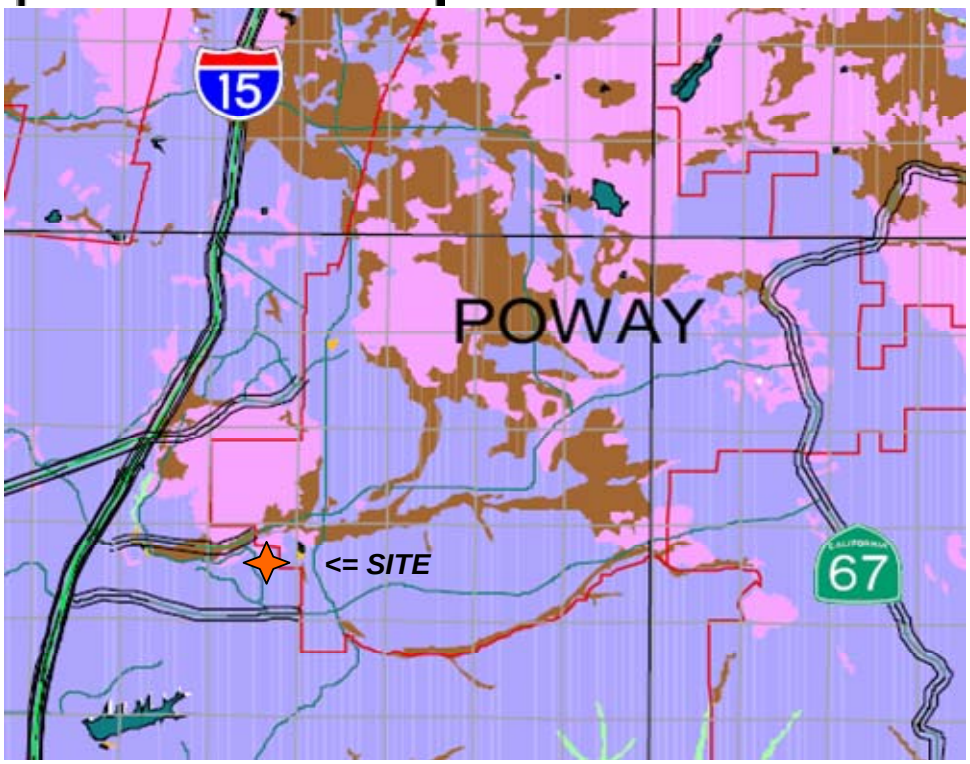
Project Location: Address: ***11717 Poway Road***
San Diego, CA 92128

Coordinates of Project: Latitude 32°56'48"N
Longitude 117°4'35"W



**exerts from the Soils Group Map (per SDCHM = San Diego County Hydrology Manual, June 2003)*

Soil Type = **C**



SPEAR & ASSOCIATES, INC.
CIVIL ENGINEERING & LAND SURVEYING

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CIVIL ENGINEERING & LAND SURVEYING

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
Residential:	D
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C $= \frac{50}{80} \times 0.85 = 0.53$

Runoff Coefficient Adjustment

Tabulated Runoff Coefficient C 0.85
Tabulated % Impervious 80%

Revised C = (Tabulated Runoff C) x (Actual Imperviousness) / (Tabulated % Impervious)

Total Disturbed Area A & B1 2.85

Post Development Area

Total Area 2.85
Post Development Imperv. Area 1.86
Actual % Impervious 65.3%
Revised C 0.69

Pre Development Area (Partially Developed)

Total Area A & B1 2.85
Pre Development Existing Impervious Area 1.6

Actual % Impervious 56.1%
Revised C 0.60

Undisturbed Area B2

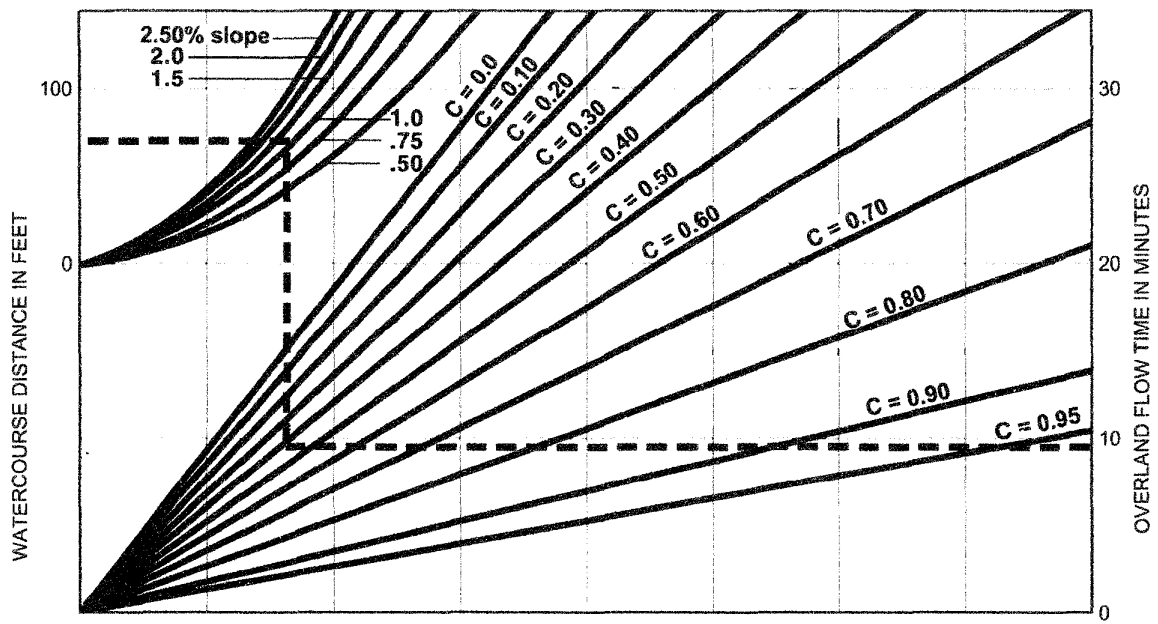
Total Area B2 0.63
Existing Impervious Area 0.41

Actual % Impervious 65.1%
Revised C 0.69

Offsite Area B3

Total Area B3 0.47
Impervious Area 0.21

Actual % Impervious 45.5%
Revised C 0.48



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

Rational Formula - Overland Time of Flow Nomograph

FIGURE

3-3

Time of Concentration

Location	Initial Average slope %	Initial L (ft)	**Initial TC Initial T (min)**	Add'l L (ft)	Average slope %	area (ac)	Q (cfs)	Mannings V (ft/s)	**Additional TC (travel time) Inc. T (min)**	**total T (min)**
										(5 minutes min)
							* Est. Average Q			
Offsite										
Area B3	6	80	5.5	370	5		0.6	1.7	3.6	9.1
Undisturbed										
Area B2	2.5	60	7.1	60	2.5			1.4	0.7	7.8
Pre Dev.										
Area A	3.8	80	4.5	85	3.8		3.00	2.5	0.6	5.1
Area B1	4	80	4.4	430	4		2.50	2.5	2.9	7.3
Post Dev.										
Area A	0.6	60	6.8	240	0.6		2.0	1	4.0	10.8
Area B1	1.8	60	4.7	490	4		2.5	2.5	3.3	8.0

Initial TC
(Figure 3-3)

$$T\ min = \frac{1.8(1.1-C)D^{1/2}}{S^{1/3}}$$

Initial TC	Pre-Dev Area A	Pre-Dev Area B1	Undisturbe Area B2	Offsite Area B3	Post-Dev Area A1	Post-Dev Area A2
C =	0.6	0.6	0.41	0.48	0.69	0.69
D ft =	60	60	60	80	60	60
S % =	3.8	4	2.5	6	0.6	1.8
T =	**4.47**	**4.39**	**7.09**	**5.49**	**6.78**	**4.70**

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Area A Pre Development Initial TC Average Q

Triangular

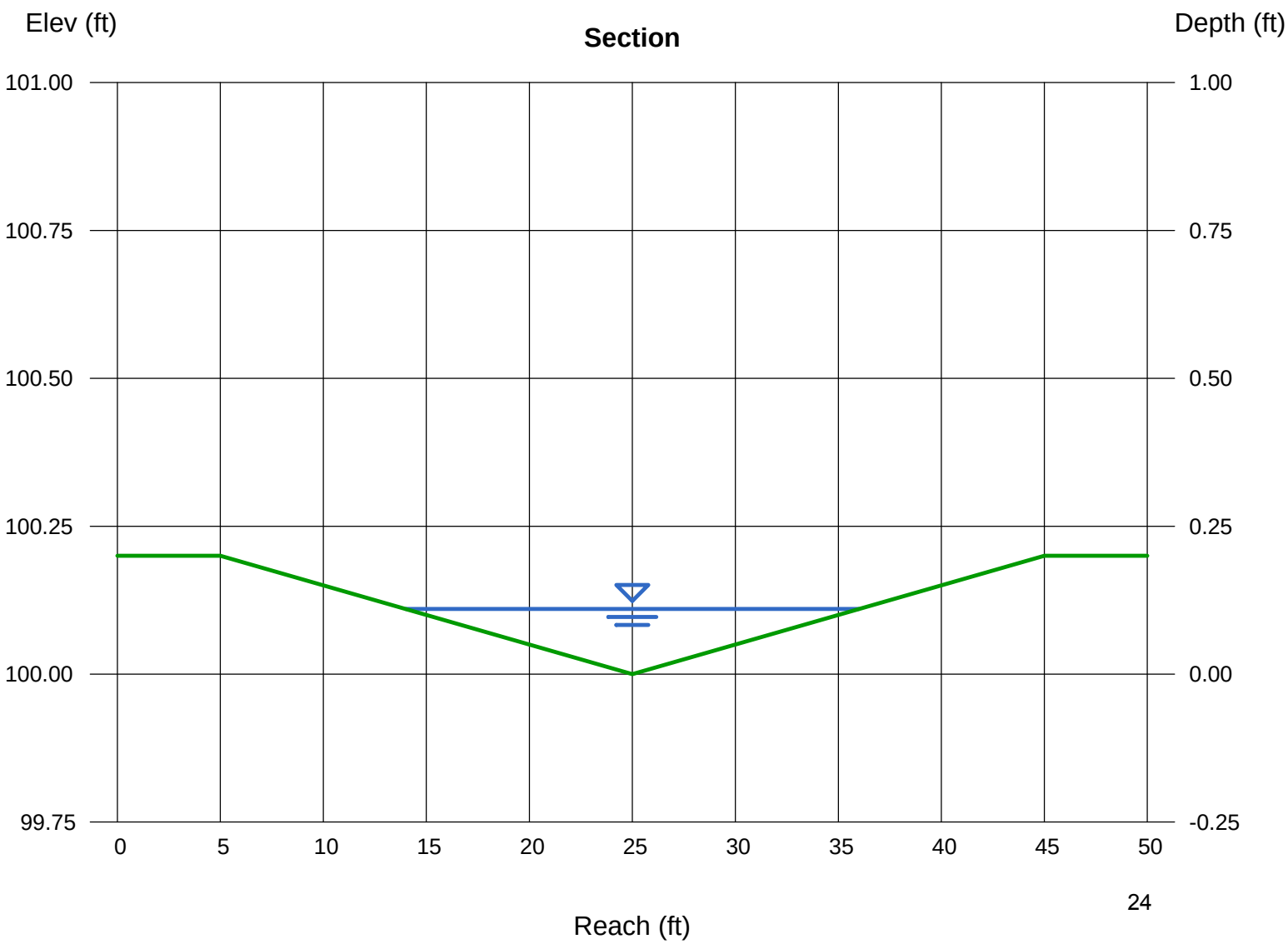
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	3.80
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	3.00

Highlighted

Depth (ft)	=	0.11
Q (cfs)	=	3.000
Area (sqft)	=	1.21
Velocity (ft/s)	=	2.48
Wetted Perim (ft)	=	22.00
Crit Depth, Yc (ft)	=	0.15
Top Width (ft)	=	22.00
EGL (ft)	=	0.21



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Area B1 Pre Development Initial TC Average Q

Triangular

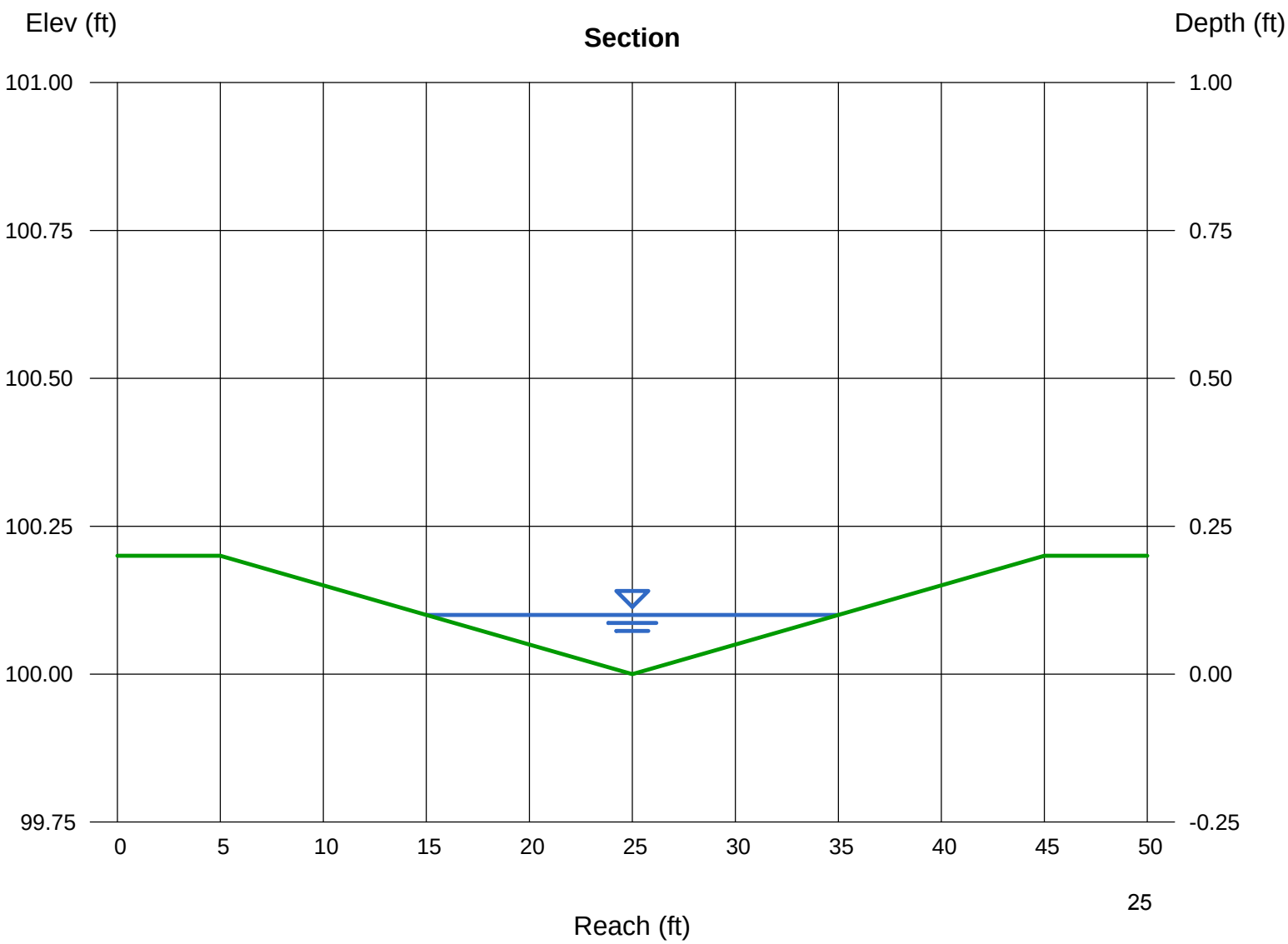
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	4.00
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	2.50

Highlighted

Depth (ft)	=	0.10
Q (cfs)	=	2.500
Area (sqft)	=	1.00
Velocity (ft/s)	=	2.50
Wetted Perim (ft)	=	20.00
Crit Depth, Yc (ft)	=	0.14
Top Width (ft)	=	20.00
EGL (ft)	=	0.20



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Undisturbed Area B2 Post Development Initial TC Average Q

Triangular

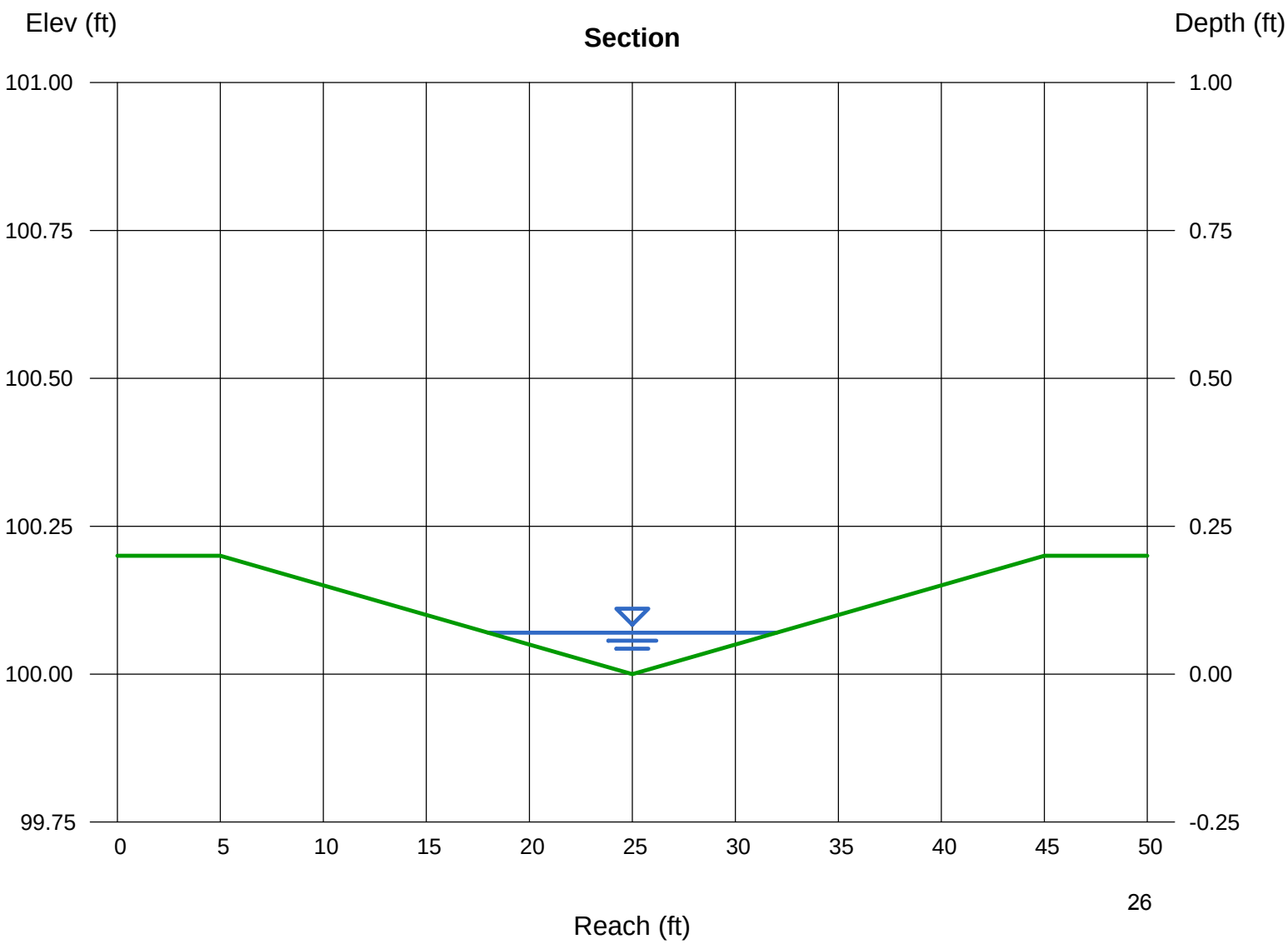
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	2.50
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	0.70

Highlighted

Depth (ft)	=	0.07
Q (cfs)	=	0.700
Area (sqft)	=	0.49
Velocity (ft/s)	=	1.43
Wetted Perim (ft)	=	14.00
Crit Depth, Yc (ft)	=	0.08
Top Width (ft)	=	14.00
EGL (ft)	=	0.10



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Offsite Area B3 Post Development Initial TC Average Q

Triangular

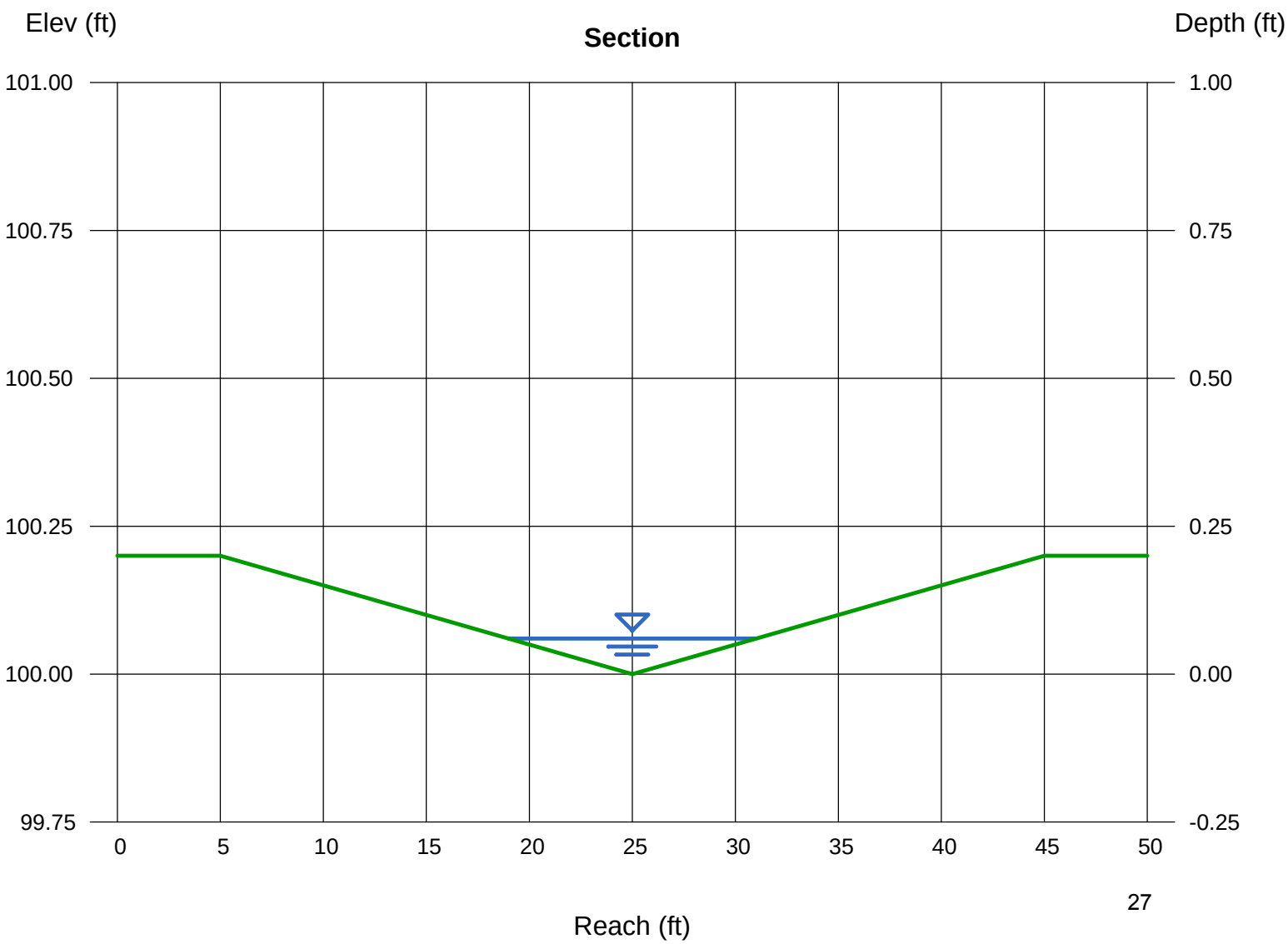
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	5.00
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	0.60

Highlighted

Depth (ft)	=	0.06
Q (cfs)	=	0.600
Area (sqft)	=	0.36
Velocity (ft/s)	=	1.67
Wetted Perim (ft)	=	12.00
Crit Depth, Yc (ft)	=	0.08
Top Width (ft)	=	12.00
EGL (ft)	=	0.10



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Area A Post Development Initial TC Average Q

Triangular

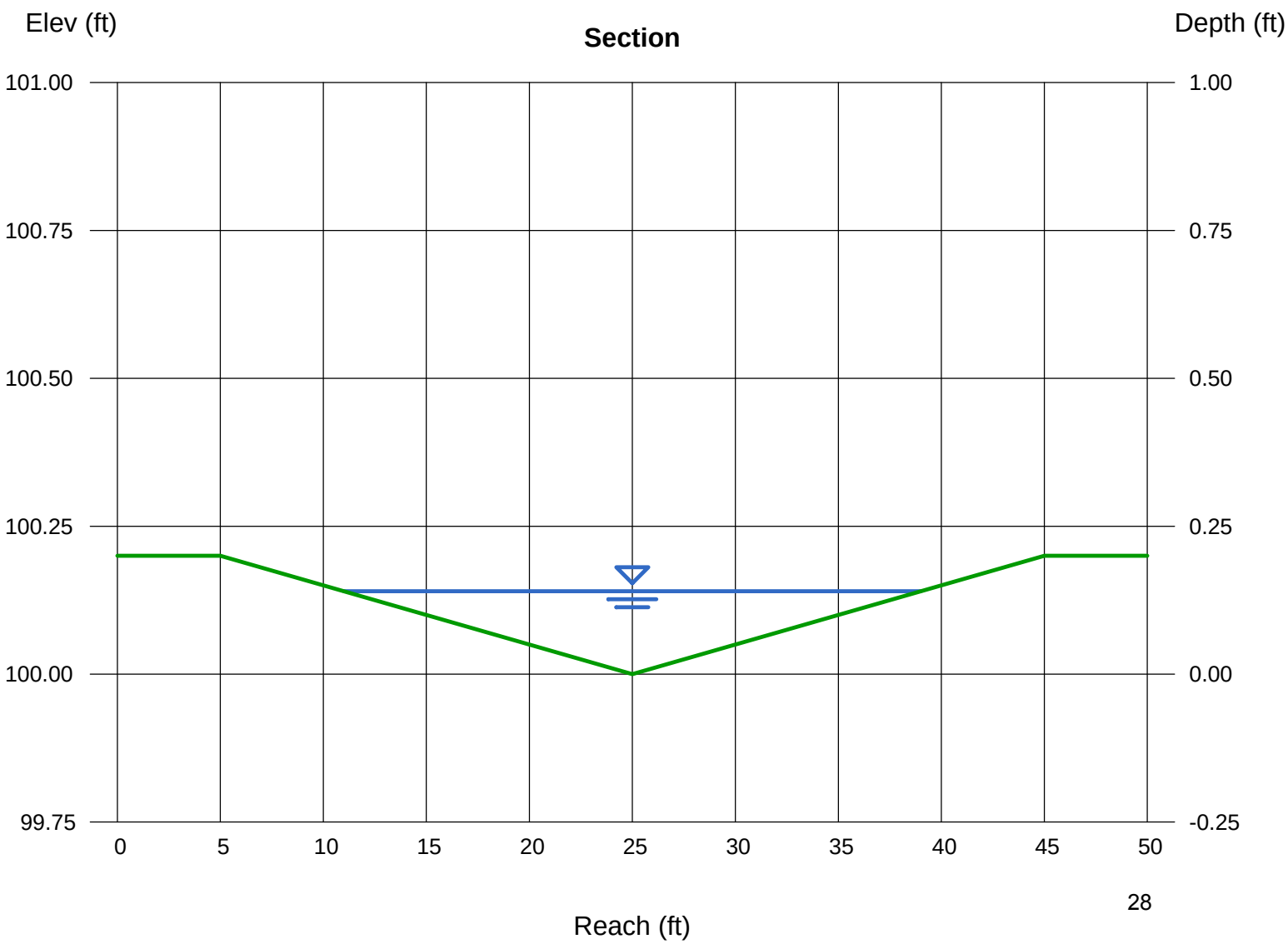
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	0.60
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	2.00

Highlighted

Depth (ft)	=	0.14
Q (cfs)	=	2.000
Area (sqft)	=	1.96
Velocity (ft/s)	=	1.02
Wetted Perim (ft)	=	28.00
Crit Depth, Yc (ft)	=	0.12
Top Width (ft)	=	28.00
EGL (ft)	=	0.16



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Area B1 Post Development Initial TC Average Q

Triangular

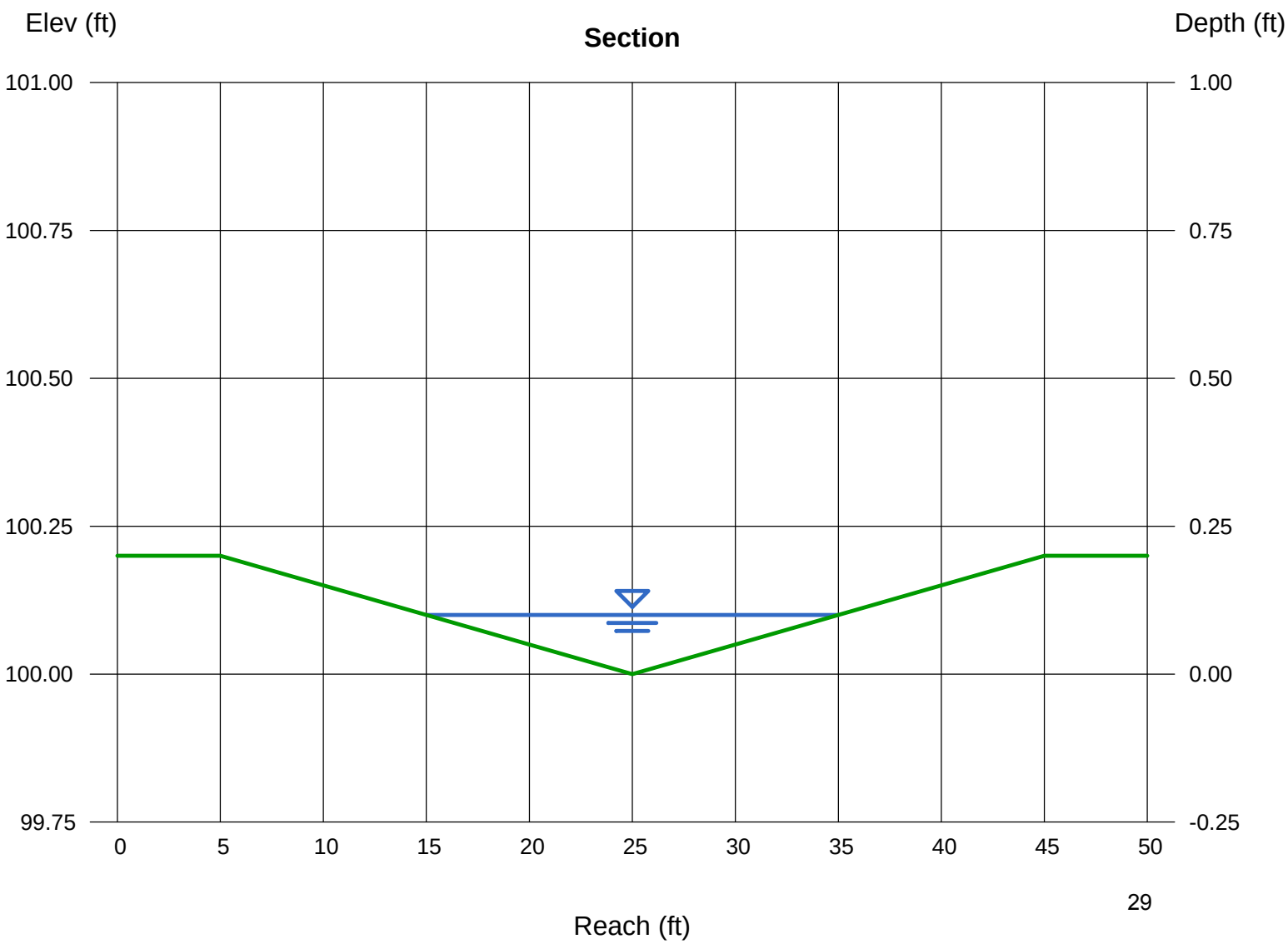
Side Slopes (z:1)	=	100.00, 100.00
Total Depth (ft)	=	0.20
Invert Elev (ft)	=	100.00
Slope (%)	=	4.00
N-Value	=	0.016

Calculations

Compute by:		Known Q
Known Q (cfs)	=	2.50

Highlighted

Depth (ft)	=	0.10
Q (cfs)	=	2.500
Area (sqft)	=	1.00
Velocity (ft/s)	=	2.50
Wetted Perim (ft)	=	20.00
Crit Depth, Yc (ft)	=	0.14
Top Width (ft)	=	20.00
EGL (ft)	=	0.20



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, May 25 2016

Area B2 Pipe Flow

Circular

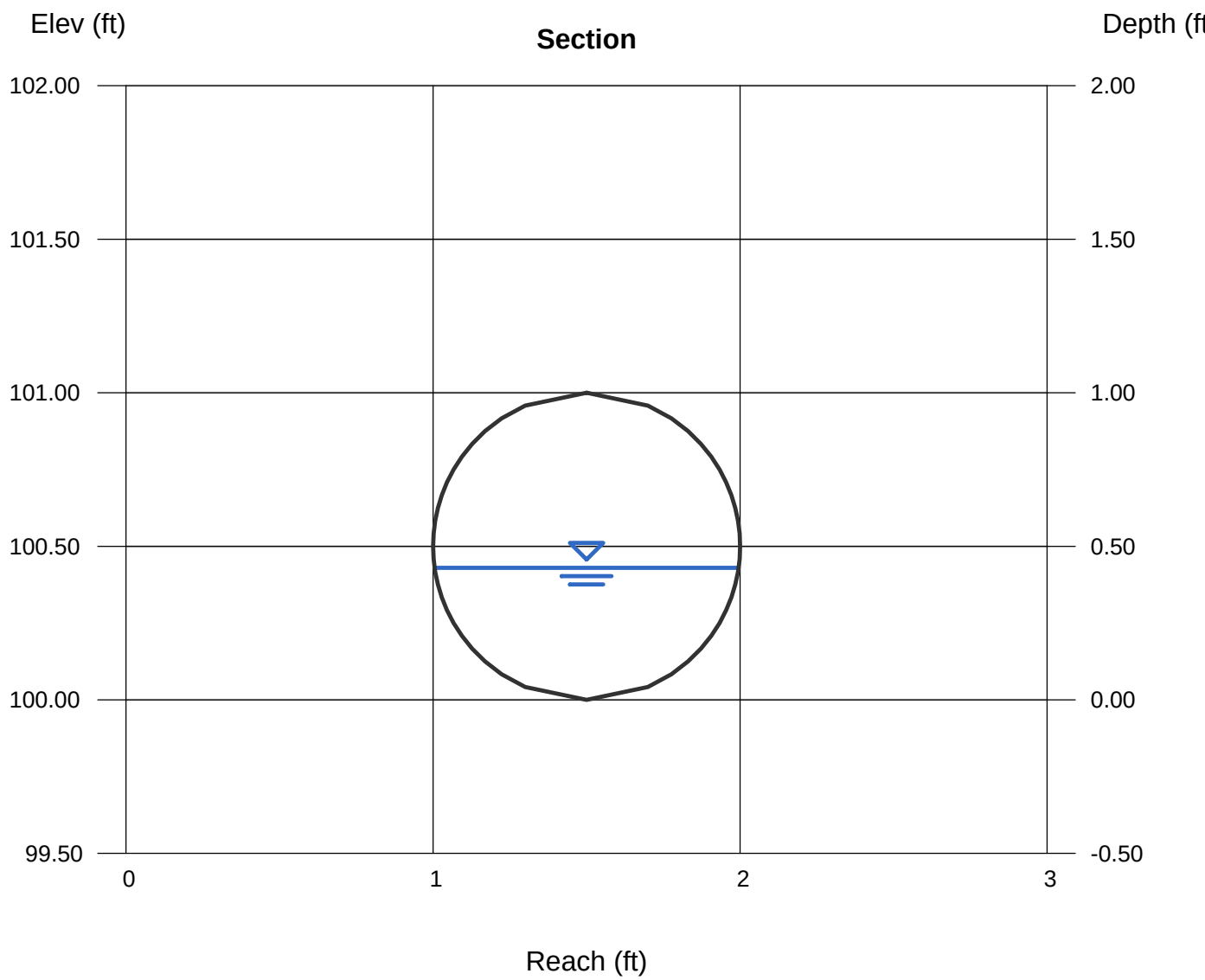
Diameter (ft)	=	1.00
Invert Elev (ft)	=	100.00
Slope (%)	=	0.50
N-Value	=	0.009

Calculations

Compute by:		Known Q
Known Q (cfs)	=	1.40

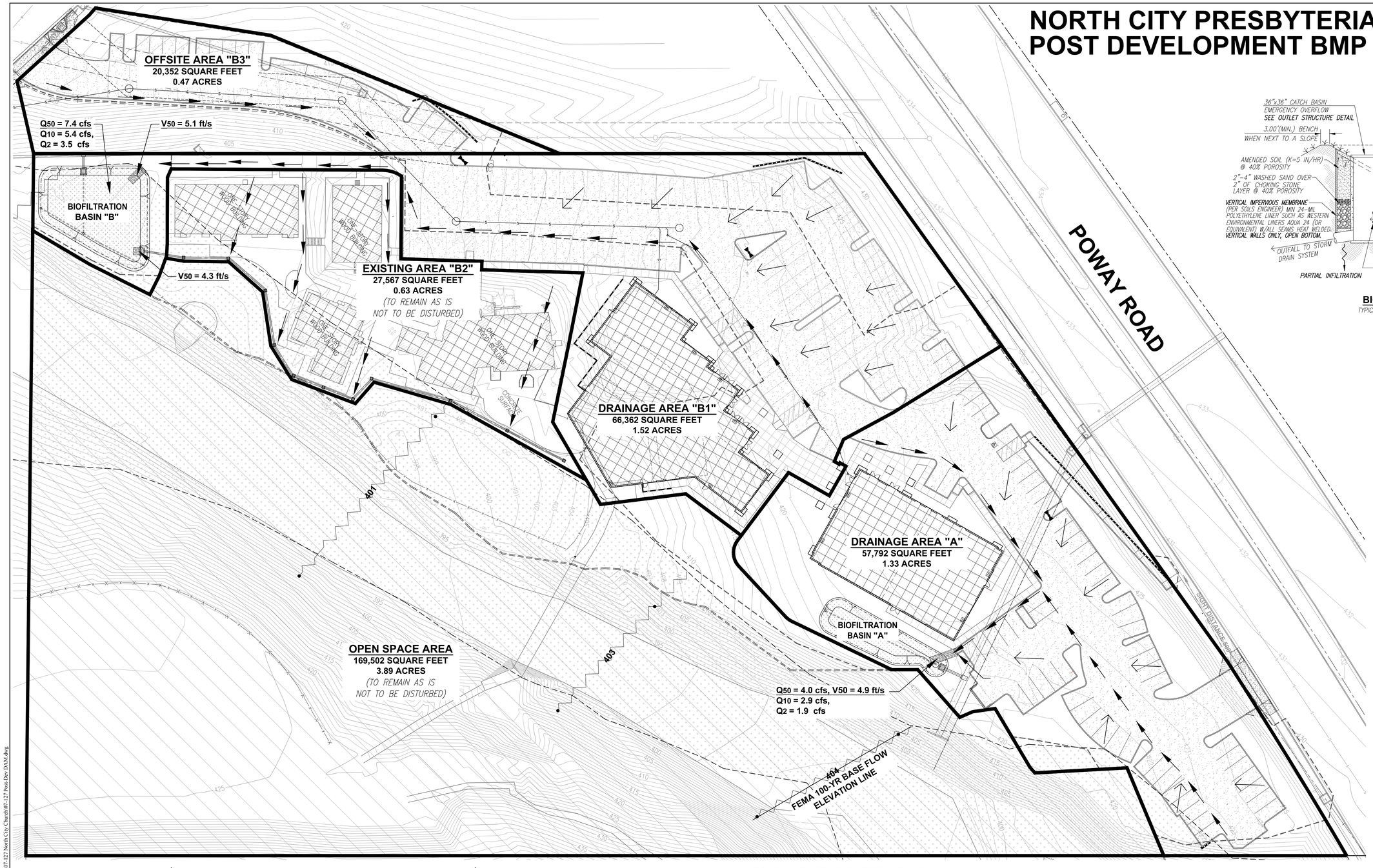
Highlighted

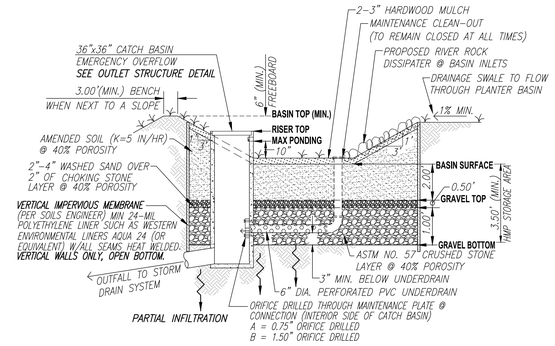
Depth (ft)	=	0.43
Q (cfs)	=	1.400
Area (sqft)	=	0.33
Velocity (ft/s)	=	4.30
Wetted Perim (ft)	=	1.43
Crit Depth, Yc (ft)	=	0.50
Top Width (ft)	=	0.99
EGL (ft)	=	0.72



ATTACHMENT C

NORTH CITY PRESBYTERIAN CHURCH
POST DEVELOPMENT BMP OVERVIEW MAP





BIOFILTRATION BASIN

TYPICAL SECTION & OUTLET CONNECTION
NOT-TO-SCALE

BIOFILTRATION BASIN MEDIA

PER COUNTY OF SAN DIEGO 2014 LID HANDBOOK, APPENDIX C FACT SHEETS.

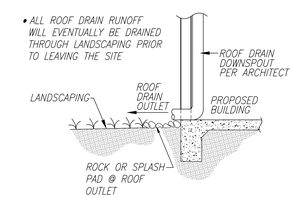
24" AMENDED SOIL LAYER
COMPOSITION AND TEXTURE:
65% SAND, 20% SANDY LOAM, & 15% COMPOST (FROM VEGETATION-BASED FEEDSTOCK). ANIMAL WASTES OR BY-PRODUCTS SHOULD NOT BE APPLIED.

PERMEABILITY:
5 IN/HR INFILTRATION RATE FOR THE FLOW-BASED SUSMP METHOD (1-6IN/HR FOR ALTERNATIVE DESIGNS, AS APPROVED BY LOCAL JURISDICTION).

CHEMICAL COMPOSITION: TOTAL PHOSPHORUS < 15 PARTS PER MILLION (PPM); PH 6-8; CATION EXCHANGE CAPACITY > 5 MILLIEQUIVALENTS PER 100 GRAMS (MEQ/100 G) OF SOIL; ORGANIC MATTER CONTENT < 5 PERCENT BY WEIGHT.

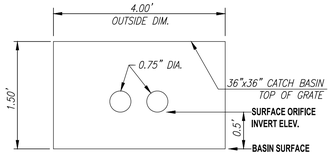
18" DRAINAGE LAYER
SEPARATE SOIL MEDIA FROM UNDERDRAIN LAYER WITH 2 TO 4 INCHES OF WASHED SAND, FOLLOWED BY 2 INCHES OF CHOKING STONE (ASTM NO. 8) OVER 1.0-FOOT OF ASTM NO. 57 STONE.

SURFACE VEGETATION
AS SPECIFIED BY THE LANDSCAPE ARCHITECT PLANS.



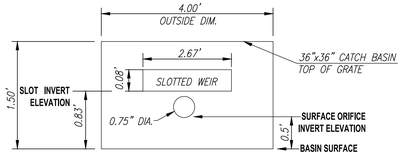
ROOF DRAIN OUTLET

TYPICAL ROOF DRAIN OUTLET AT LANDSCAPED AREAS
NO SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN A

36" CATCH BASIN'S OUTSIDE WALL,
(2) ORIFICES TO BE INSTALLED ON SOUTH WALL
NOT-TO-SCALE



BIOFILTRATION OUTLET STRUCTURE DETAIL FOR BASIN B

36" CATCH BASIN'S OUTSIDE WALL,
(3) SLOTTED WEIR TO BE INSTALLED ON NORTH, EAST, AND SOUTH WALLS
NOT-TO-SCALE

DRAINAGE AREA DMA BREAKDOWN

SYMBOL	DRAINAGE AREA SURFACE	SOIL TYPE	'A' (EAST SIDE)	'B1' (WEST SIDE)	EXISTING AREA 'B2' (TO REMAIN AS IS & UNDISTURBED)	OPEN SPACE (TO REMAIN AS IS & UNDISTURBED)	OFFSITE 'B3' PRIVATE ACCESS & PARKING EASEMENT
	BUILDING ROOFTOP	TYPE 'C'	7,310 SQ FT	10,498 SQ FT	9,392 SQ FT	0 SQ FT	0 SQ FT
	PARKING/DRIVE AISLE IMPERVIOUS AREA	TYPE 'C'	23,332 SQ FT	30,574 SQ FT	0 SQ FT	0 SQ FT	9,268 SQ FT
	HARDSCAPING/SIDEWALK	TYPE 'C'	3,162 SQ FT	6,290 SQ FT	8,548 SQ FT	0 SQ FT	0 SQ FT
	LANDSCAPING AREA	TYPE 'C'	23,988 SQ FT	19,000 SQ FT	9,627 SQ FT	169,502 SQ FT	11,084 SQ FT
	TOTAL =		57,792 SQ FT	66,362 SQ FT	27,567 SQ FT	169,502 SQ FT	20,352 SQ FT
	TOTAL LOT AREA = 321,223 SQ FT						

30 15 0 30 60 90

SCALE: 1" = 30'

LEGEND

EXISTING CONTOURS (380)
DRAINAGE AREA
FEMA MAP NO. 06073C1354-F 100 YR FLOODWAY BOUNDARY
DIRECTION OF DRAINAGE
SHEET FLOW

PLOT DATE: 10/26/2017 8:36 AM S:\AutoCad Projects\2007\07-127 North City Church\07-127 Post-Dev DAM.dwg

SPEAR & ASSOCIATES, INC. JOB NO. 07-127 NJD

ATTACHMENT 6
GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

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

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Construction Testing & Engineering, Inc.
Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

June 8, 2016 CTE Job No. 10-13128G

C/O: Kenneth D. Smith Architect & Associates, Inc.
Attention: Mr. Ken Smith
500 Fesler Street, Suite 102
El Cajon, California 92020
Telephone: (619) 444-2182 Via Email: KSmith@kdsarch.com

Subject: Preliminary Percolation Test Results and Update Geotechnical Recommendations
Proposed Improvements at North City Presbyterian Church
1280 Springhurst Drive
Poway, California

References: Preliminary Geotechnical Investigation
Proposed Improvements at North City Presbyterian, Phases 1 and 2
11717 Poway Road, San Diego, California
Prepared by CTE, Job No. 10-9617G, dated September 5, 2008.

Mr. Smith:

As requested, Construction Testing and Engineering, Inc. (CTE) provides the following update geotechnical recommendations and percolation test results for the proposed development at the subject site. Update recommendations are based on prior site documentation (CTE, 2008), new and/or updated regulatory requirements, review of the current site conditions, and the scope of work we agreed to perform at this time.

Based on the project improvement plans provided, the proposed construction is to include two new structures, parking lots, two biofiltration basins, flatwork, landscaping, and utilities.

The recent field investigation consisted of four percolation tests and three additional geotechnical borings. The excavations were advanced utilizing a track-mounted limited-access drill rig. The geotechnical borings were performed to collect laboratory samples for the proposed parking lot and to provide additional coverage for the Phase II structure. The limited-access rig was able to mobilize to areas the truck-mounted rig could not reach during the previous investigation.

Based on document review, it appears that the referenced report was prepared in general accordance with standard geotechnical engineering practice, and that site conditions have remained generally consistent to those described in the original report. Therefore, the referenced report is considered to be suitable for the proposed development from a geotechnical standpoint provided the updated information herein is included in the design and construction of the proposed improvements. However, we anticipate issuing a complete update report once pending laboratory results are available and final engineering analyses are complete.

1.0 PERCOLATION TESTING

As requested, four percolation tests were performed within the bioretention basins in general accordance with the County of San Diego Department of Environmental Health (SD DEH) procedures. The percolation test holes were excavated with a limited-access drill rig on June 6, 2016 to depths ranging from approximately 4.0 to 6.5 feet below existing grade. The percolation tests were performed in accordance with SD DEH Case III method, which is performed when all the presoak water infiltrates through the hole overnight. The approximate percolation test locations are presented on Figure 1. The percolation test results are presented in the table below.

TABLE 3.3
PERCOLATION TEST RESULTS

TEST DESIGNATION	DEPTH (feet)	GEOLOGIC UNIT	PERCOLATION RATE (minutes/inch)
P-1	6.5	Kgd	480
P-2	6.0	Kgd	480
P-3	4.0	Qal	160
P-4	5.0	Qal	30

Test location/hole P-4 and associated percolation results appear to be an anomaly that could have resulted from localized disturbance at the test hole depth.

2.0 GRADING

The site should be cleared of any existing debris and deleterious materials. Objectionable materials, such as existing foundations, construction debris, and vegetation are not suitable for structural backfill and should be properly disposed of offsite. Overexcavation in structure areas should extend a minimum of three feet below bottom of proposed foundations, to a minimum depth equal to 1/3 of the maximum fill depth beneath the proposed structure, or to the depth of dense native soil materials, whichever is deepest. Overexcavations should extend at least five feet laterally beyond the limits of the proposed building structure or the distance resulting from a 1:1 (horizontal: vertical) extending from the outer edge of the footings to suitable material, whichever is greater and where feasible.

Due to the anticipated depth of the bottom level of the proposed structure, the recommended overexcavations could be difficult or uneconomical along the northern/northwestern limits of the proposed building. Therefore, in order to reduce preparatory grading and if desired, the building could be founded upon deep foundations such as drilled piers or similar extended a minimum three feet into competent dense granitic materials, which would be anticipated to be on the order of 10 to 20 feet maximum beneath the southern portion of the proposed building. If deep foundations are selected for building support, overexcavation should extend to competent native

materials and to a minimum two feet below proposed rough building pad elevations, whichever is deeper, prior to placement of compacted fill to construct the building pad.

Overexcavations in proposed pavement, flatwork, or other minor improvement areas should be conducted to a minimum depth of two feet below proposed or existing grades, or to suitable underlying materials, whichever depth is greatest.

Suitability of the bottom of all overexcavations should be verified by the CTE geotechnical representative during grading. Once approved, excavation bottoms are to be scarified, where feasible, to a depth of eight inches prior to fill placement/compaction. Overexcavation should extend a minimum of five feet laterally beyond the limits of the proposed improvements. Where overexcavation is required to depths greater than five feet below adjacent grade, lateral removals beyond the limits of proposed building improvements shall be as recommended by CTE personnel based on actual conditions encountered.

Upon approval of the excavation bottoms and subsequent scarification, soils should be brought to a minimum two percent above optimum moisture content and compacted to a minimum of 90 percent relative compaction (per ASTM D-1557). Minimum relative compaction of 95 percent (per ASTM D-1557) should be conducted in the upper 12 inches of subgrade beneath proposed pavement and drive areas, and any fills to be located more than four feet below proposed rough grade (excluding retaining wall backfill).

Existing below-ground utilities should be redirected around the proposed structures. Existing utilities at an elevation to extend through the proposed footings should generally be sleeved and caulked to minimize the potential for moisture migration below the building slabs. Abandoned pipes exposed by grading should be securely capped to prevent moisture from migrating beneath foundation and slab soils or should be filled with minimum two-sack cement/sand slurry.

3.0 FOUNDATIONS AND SLAB RECOMMENDATIONS

The following recommendations are for preliminary design purposes only. These recommendations should be reviewed after completion of earthwork to document that conditions exposed are as anticipated and that the recommended structure design parameters are appropriate.

3.1 Foundations

Following the recommended preparatory grading, continuous and isolated spread footings or deepened pier footings are anticipated to be suitable for use at this site. It is anticipated that standard building footings would be founded entirely in properly compacted fill with very low to low expansion potential placed as recommended herein. Footings should not span cut/fill transitions.

If deep foundation such as drilled piers are selected in order to reduce preparatory grading per Section 2.0, spread foundations could be used in areas where they can be deepened to reach competent granitic materials. If deep foundations are used and extend

to granitic materials, any and all spread foundations for the building should also bear in competent granitic materials.

Foundation dimensions and reinforcement should be based on an allowable bearing value of 2,500 pounds per square foot for footings founded entirely upon properly placed compacted fill materials embedded a minimum of 18 inches below the lowest adjacent subgrade elevation. If utilized, continuous footings should be at least 15 inches wide; isolated footings should be at least 24 inches in least dimension. If deepened spread or pier footings are proposed, the bearing value may be increased by 500 psf for each additional 12 inches of embedment up to a maximum static value of 3,500 psf. The bearing pressure for miscellaneous site retaining walls and other at grade improvements should be limited to 3,000 psf. The above bearing values may also be increased by one third for short duration loading which includes the effects of wind or seismic forces.

Minimum reinforcement for continuous footings should consist of four No. 5 reinforcing bars; two placed near the top and two placed near the bottom or as per the project structural engineer. The structural engineer should design isolated footing reinforcement. Footing excavations should generally be maintained above optimum moisture content until concrete placement.

If drilled pier foundations are utilized, we recommend they measure a minimum 18-inches in diameter and bear a minimum of three feet into competent granitic materials, with a minimum distance to daylight of 12 feet. Drilled piers may utilize an allowable bearing value of 6,000 psf, plus a 1/3 increase for short duration loadings, and an additional 500 psf skin friction for the portion of the piers in competent granitic materials.

3.2 Foundation Settlement

The maximum total static settlement is expected to be on the order of one inch and the maximum differential static settlement is expected to be on the order of 1/2 inch over a distance of approximately 50 feet. Due to the absence of a shallow groundwater table and the dense nature of underlying materials, dynamic settlement is not expected to adversely affect the proposed improvements.

3.3 Foundation Setback

Footings for structures should be designed such that the horizontal distance from the face of adjacent slopes to the outer edge of the footing is at least 12 feet. In addition, footings should bear beneath a 1:1 plane extended up from the nearest bottom edge of adjacent trenches and/or excavations. Deepening of affected footings may be a suitable means of attaining the prescribed setbacks.

3.4 Interior Concrete Slabs

Lightly loaded concrete slabs should be a minimum of 4.5 inches in thickness. Minimum slab reinforcement should consist of #3 reinforcing bars placed on 18-inch centers each way, at above mid-slab height, but with proper concrete cover. Subgrade materials should generally be maintained near or above optimum moisture content until slab underlayment and concrete are placed.

Slabs subjected to heavier loads may require thicker slab sections and/or increased reinforcement. A 120-pci subgrade modulus is considered suitable for elastic design of minimally embedded improvements such as slabs-on-grade.

In moisture-sensitive floor areas, a suitable vapor retarder of at least 15-mil thickness (with all laps or penetrations sealed or taped) overlying a four-inch layer of consolidated crushed aggregate or gravel (with SE of 30 or more) should be installed, as per the 2013 CBC/Green Building Code. An optional maximum two-inch layer of similar material may be placed above the vapor retarder to help protect the membrane during steel and concrete placement. This recommended protection is generally considered typical in the industry. If proposed floor areas or coverings are considered especially sensitive to moisture emissions, additional recommendations from a specialty consultant could be obtained. CTE is not an expert at preventing moisture penetration through slabs. A qualified architect or other experienced professional should be contacted if moisture penetration is a more significant concern.

4.0 SEISMIC DESIGN CRITERIA

The seismic ground motion values listed in the table below were derived in accordance with the ASCE 7-10 Standard and 2013 CBC. This was accomplished by establishing the Site Class based on the soil properties at the site, and then calculating the site coefficients and parameters using the United States Geological Survey Seismic Design Maps application using the site coordinates of 32.9471 degrees latitude and -117.0764 degrees longitude. These values are intended for the design of structures to resist the effects of earthquake ground motions.

TABLE 4.0 SEISMIC GROUND MOTION VALUES		
PARAMETER	VALUE	CBC REFERENCE (2013)
Site Class	D	ASCE 7, Chapter 20
Mapped Spectral Response Acceleration Parameter, S_S	0.904	Figure 1613.3.1 (1)
Mapped Spectral Response Acceleration Parameter, S_1	0.353	Figure 1613.3.1 (2)
Seismic Coefficient, F_a	1.138	Table 1613.3.3 (1)
Seismic Coefficient, F_v	1.694	Table 1613.3.3 (2)
MCE Spectral Response Acceleration Parameter, S_{MS}	1.029	Section 1613.3.3
MCE Spectral Response Acceleration Parameter, S_{M1}	0.598	Section 1613.3.3
Design Spectral Response Acceleration, Parameter S_{DS}	0.686	Section 1613.3.4
Design Spectral Response Acceleration, Parameter S_{D1}	0.399	Section 1613.3.4
Peak Ground Acceleration PGA_M	0.393	ASCE 7, Section 11.8.3

5.0 PAVEMENTS

If proposed at near grade elevations, pavement sections provided are based on preliminary Resistance "R"-Value results, estimated traffic indices, and the assumption that the upper foot of compacted fill subgrade and overlying aggregate base materials are properly compacted to a minimum 95% relative compaction at a minimum of two percent above optimum moisture content (as per ASTM D 1557).

TABLE 5.0
RECOMMENDED AC OR PCC PAVEMENT SECTION THICKNESSES

Traffic Area	Assumed Traffic Index	Preliminary Subgrade "R"-Value	Asphalt Pavements		Portland Cement Concrete Pavements On Subgrade (INCHES)
			AC Thickness (INCHES)	CalTrans Class II or Crushed Miscellaneous Aggregate Base Thickness (INCHES)	
Auto Parking and Light Drive Areas	5.0	25+	3.0	6.0	6.0
Moderate to Heavy Drive Areas	6.0	25+	3.0	9.0	7.0

Asphalt paved areas should be designed, constructed, and maintained in accordance with, for example, the recommendations of the Asphalt Institute, or other widely recognized authority. Concrete paved areas should be designed and constructed in accordance with the recommendations of the American Concrete Institute or other widely recognized authority, particularly with regard to thickened edges, joints, and drainage. The Standard Specifications for Public Works construction ("Greenbook") or Caltrans Standard Specifications may be referenced for pavement materials specifications.

6.0 WALLS BELOW GRADE

If retaining walls are to be constructed in association with the proposed development, the following parameters are considered to be applicable. For the design of subterranean walls where the surface of the backfill is level, it may be assumed that the soils will exert a lateral pressure equal to that developed by a fluid with a density of 35 pcf. The active pressure should be used for walls free to yield at the top at least 0.2 percent of the wall height. For walls restrained so that such movement is not permitted, an equivalent fluid pressure of 65 pcf should be used, based on at-rest soil conditions. The recommended equivalent fluid pressures should be increased by 20 pcf for walls retaining soils inclined at 2:1 (horizontal: vertical). Walls below the water level are not anticipated for the subject site.

In addition to the recommended earth pressure, subterranean structure walls adjacent to traffic loads should be designed to resist a uniform lateral pressure of 100 psf. This is the result of an assumed 300-psf surcharge behind the walls due to normal street traffic. If the traffic is kept back at least 10 feet or a distance equal to the retained soil height from the subject walls, whichever is less, the traffic surcharge may be neglected. The project architect or structural engineer should determine the necessity of waterproofing retaining walls to reduce moisture infiltration.

Retaining wall backfill located within a 45-degree wedge extending up from the heel of the wall should consist of soil having an Expansion Index of 30 or less (ASTM D 4829) with less than 30 percent passing the No. 200 sieve. Some onsite soils are not anticipated to be suitable for use as wall backfill and, therefore, import of granular backfill materials may be required. The upper 12 to 18 inches of wall backfill should consist of lower permeability soils, in order to reduce surface water infiltration behind walls. The project structural engineer and/or architect should detail proper wall backdrains, including gravel drain zones, fills, filter fabric and perforated drain pipes.

Lateral pressures on cantilever retaining walls (yielding walls) due to earthquake motions may be calculated based on work by Seed and Whitman (1970). The total lateral thrust against a properly drained and backfilled cantilever retaining wall above the groundwater level can be expressed as:

$$P_{AE} = P_A + \Delta P_{AE}$$

For non-yielding (or "restrained') such walls, the total lateral thrust may be similarly calculated based on work by Wood (1973):

$$P_{KE} = P_K + \Delta P_{KE}$$

Where:

P_A = Static Active Thrust
P_K = Static Restrained Wall Thrust
ΔP_{AE} = Dynamic Active Thrust Increment = $(3/8)\ k_h\ \gamma H^2$
ΔP_{KE} = Dynamic Restrained Thrust Increment = $k_h\ \gamma H^2$
k_h = 2/3 Peak Ground Acceleration = $2/3(PGA_M)$
H = Total Height of the Wall
γ = Total Unit Weight of Soil ≈ 130 pounds per cubic foot

The increment of dynamic thrust in both cases should be distributed triangularly, with a line of action located at H/3 above the bottom of the wall.

7.0 LIMITATIONS

The updated recommendations herein are based on our review of available documents and, where applicable, supersede recommendations in the referenced previous geotechnical reports. Variations may exist and conditions not observed or described in this, and previous, reports may be encountered during grading and excavation. However, a complete update geotechnical report will be issued once laboratory testing and final engineering analyses have been completed.

The recommendations presented herein have been developed in order to reduce the potential adverse effects of hillside grading and differential fill thickness. However, even with the design and construction precautions provided, some post-construction movement and associated distress may occur.

CTE should review any updated project foundation and grading plans before commencement of earthwork to identify potential conflicts with the intent of the recommendations provided.

We appreciate the opportunity to be of service on this project. Should you have any questions or need further information please do not hesitate to contact this office.

Respectfully submitted,

CONSTRUCTION TESTING & ENGINEERING, INC.

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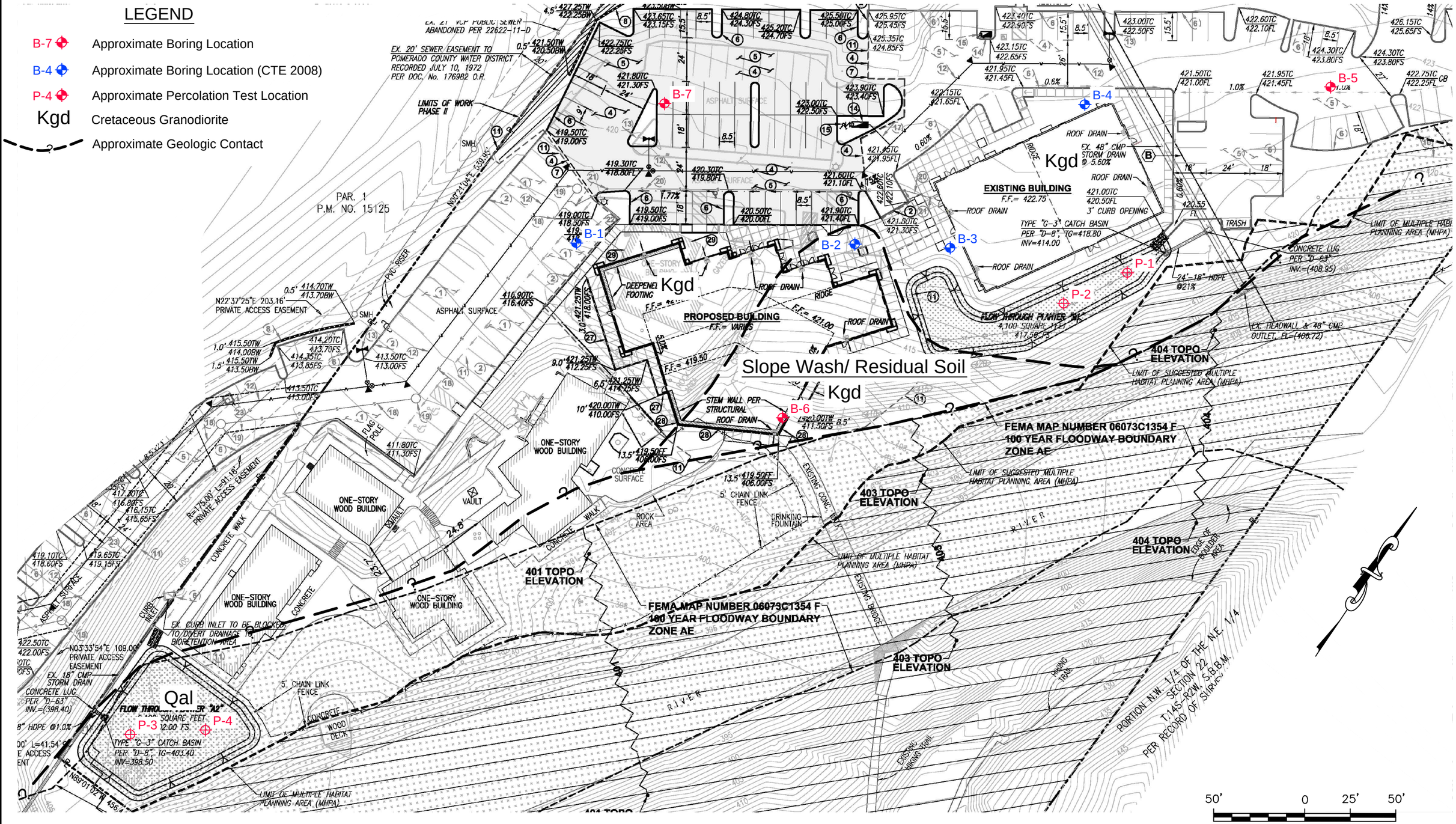
AJB/JFL/DTM:nri

Attachments:

Figure 1 Geologic/Exploration Location Map
Boring Logs



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GEOLOGIC/EXPLORATION LOCATION MAP
PROPOSED NORTH CITY PRESBYTERIAN CHURCH IMPROVEMENTS
17717 POWAY ROAD
POWAY, CALIFORNIA

CTE JOB NO:	10-13128G
SCALE:	1" = 50'
DATE: 6/16	FIGURE: 1

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DEFINITION OF TERMS

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

GRAIN SIZES

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

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

CLEAR SQUARE SIEVE OPENING U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed

PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded

PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

FIGURE: BL1

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PROJECT:	DRILLER:	SHEET: of
CTE JOB NO:	DRILL METHOD:	DRILLING DATE:
LOGGED BY:	SAMPLE METHOD:	ELEVATION:

BORING LEGEND

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

FIGURE: BL2

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PROJECT:	N. COUNTY PRESBYTERIAN CHURCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13128G	DRILL METHOD:	HOLLOW-STEM AUGER (LAR)	DRILLING DATE:	6/6/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~423 FEET

BORING: B-5

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**RESIDUAL SOIL:** Medium dense, moist, brown to reddish brown, clayey fine to medium grained SAND.	
						"SC"		**CRETACEOUS GRANODIORITE:** Very dense, slightly moist, reddish gray granodiorite that excavates to clayey fine to medium grained SAND, oxidized, severely weathered.	RV
5			50/5"						
								Total Depth: 5.5' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	N. COUNTY PRESBYTERIAN CHURCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13128G	DRILL METHOD:	HOLLOW-STEM AUGER (LAR)	DRILLING DATE:	6/6/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~406 FEET

BORING: B-6

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					CL		**RESIDUAL SOIL:** Stiff, moist, dark brown, fine grained sandy CLAY.	EI
5		/	14 34 40			"SC"		**CRETACEOUS GRANODIORITE:** Very dense, slightly moist, reddish gray granodiorite that excavates to clayey fine to medium grained SAND, oxidized, severely weathered.	DS
								Total Depth: 7.0' (Refusal in dense granodiorite) No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	N. COUNTY PRESBYTERIAN CHURCH	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13128G	DRILL METHOD:	HOLLOW-STEM AUGER (LAR)	DRILLING DATE:	6/6/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~421 FEET

BORING: B-7

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		Asphalt: 0-3" **RESIDUAL SOIL:** Medium dense, moist, brown to reddish brown, clayey fine to medium grained SAND.	RV
	X					"SC"		**CRETACEOUS GRANODIORITE:** Very dense, slightly moist, reddish gray granodiorite that excavates to clayey fine to medium grained SAND, oxidized, severely weathered.	
5								Total Depth: 5.0' No Groundwater Encountered	
10									
15									
20									
25									