Tier II & Tier III Storm Water Best Management Practices Conceptual Designs

VOLUME 1

JULY 28, 2008

City of San Diego

think BLUE San Diego

Tier II and Tier III Storm Water Best Management Practices Conceptual Designs

Final Report

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LIST OF ACRONYMS

AC	asphalt and concrete
ADA	Americans with Disabilities Act
amsl	above mean sea level
ASBS	Area of Special Biological Significance
BMP	best management practice
cfs	cubic feet per second
City	City of San Diego
CValdo	CValdo Corporation
LID	low impact development
MS4	municipal separate storm sewer system
O&M	operations and maintenance
PCC	plain cement concrete
PVC	polyvinyl chloride
RCP	reinforced concrete pipe
SDPD	San Diego Police Department
SDRSD	San Diego Regional Standard Drawing
SUSUMP	Standard Urban Stormwater Management Plan
TDML	total daily maximum load
UST	underground storage tank
Weston	Weston Solutions, Inc.

1.0 INTRODUCTION

The current Municipal Storm Water Permit for the City of San Diego (City), Final Order dated January 24, 2007, requires each copermittee to implement no less than two watershed water quality activities and two watershed education activities each year that result in a "significant pollutant load reduction, source abatement, or other quantifiable benefits to discharge or receiving water quality in relation to the watershed's high-priority water quality issues." The City is planning to implement best management practices (BMPs) to address this permit requirement and to meet total daily maximum load (TMDL) pollution reduction schedules for the Chollas Creek Watershed (pesticides and dissolved metals), the Ocean Plan discharge requirements into the La Jolla Shores area of special biological significance (ASBS), and projected reduction goals for the coastal watersheds under the pending bacteria TMDL. The City's Storm Water Pollution Prevention Division is preparing concept designs for these BMPs as the first step in the implementation process. The purpose of these concept designs is to define the pollution reduction goals (performance specifications), critical system components (conceptual design plans), and construction cost estimates for completion of the full design, capital project approval, and implementation.

The City's Storm Water Pollution Prevention Division contracted Weston Solutions, Inc. (Weston) to prepare the conceptual designs for a set of BMPs that address these regulatory requirements and meet the type, timeline, and number of BMPs recommended in the City's *5-Year Strategic Plan for Watershed Activity Implementation*. The design team for this project includes CValdo Corporation (CValdo) and Ninyo and Moore. With Weston, CValdo conducted the reconnaissance surveys of the top selected sites and completed the drainage analysis and conceptual design drawings for the selected sites. Ninyo and Moore conducted the geotechnical investigations of the sites where infiltration type BMPs were proposed.

As outlined in the *5-Year Strategic Plan for Watershed Activity Implementation*, the City is taking an integrated tiered and phased approach to BMP implementation as shown on Figure 1. The integrated approach considers the current and potential future priority water quality problems and TMDL load reductions in the design and implementation of BMPs. BMPs therefore need to address multiple pollutants to meet current and future load reduction goals. The tiered approach includes the initial focus on the implementation and effectiveness assessment of Tier I non-structural pollution prevention and source control BMPs. The tiered approach is then implemented in phases in order to assess the effectiveness of the BMPs in meeting the pollutant load reduction goals. In this initial phase, Tier II structural BMPs are also implemented and assessed. Tier II BMPs target the reduction of the volume of runoff and/or a portion of the pollutant load through runoff diversion/capture and infiltration and evaporation (low impact development (LID) techniques) as well as aggressive street sweeping. Tier III treatment BMPs are then implemented in a second phase where the Tier I and II BMPs are not sufficiently effective in meeting target load reductions. Tier I and II BMPs are implemented before Tier III BMPs because they address the source and cause of the pollutants which is more cost effective and sustainable than capital and land-intensive treatment BMPs. As part of this initial phase, "pilot" Tier III treatment BMPs will be implemented on City-owned properties to assess their effectiveness in combination with Tier II runoff reduction techniques. Full scale Tier III BMPs will then be implemented in subsequent phases based on the effectiveness of the pilot projects.

The scope of this BMP conceptual design project was based on the recommendations on the type, number, location, and timeline presented in the *5-Year Strategic Plan for Watershed Activity Implementation*. The seven BMPs types and locations recommended for the conceptual designs presented in this report include the following:

- San Diego Bay Watershed Management Area – Chollas Watershed – Large Infiltration BMP implemented at a dual use park facility;
- San Diego Bay Watershed Management Area – Chollas Watershed – Trash Segregation Devices in combination with Aggressive Street Sweeping;
- Mission Bay Watershed Management Area – Tecolote Creek Watershed – Combination LID Green Street and Bacteria "Pilot" Treatment BMP;
- Los Peñasquitos Watershed – Peak Runoff and Erosion Control BMP;
- Los Peñasquitos Watershed – Green Lot;
- San Diego River Watershed – Green Mall; and
- San Diego River Watershed – Bacteria "Pilot" Treatment BMP.

The site selection process for these conceptual designs used the priority sector maps in the *5-Year Strategic Plan for Watershed Activity Implementation* and the inventory of City-owned properties provided by the City. For this set of conceptual designs, the site selection was facilitated under the *Parcel Evaluation for BMP Implementation Study* completed concurrently by Weston under Purchase Order 5102395-0. Weston completed an evaluation of City-owned properties for Tier II infiltration type BMPs and potential future Tier III treatment BMPs as part of this study. Site selection for the BMPs listed above used this study to identify the top three sites for which site reconnaissance surveys were completed. The top site was then selected based on these surveys of site conditions for geotechnical investigation. The results of the geotechnical investigations for the sites where infiltration type BMPs were proposed were then considered for the concept design of the system components and performance specifications.

This Tier II and III Storm Water BMP Conceptual Design Report includes a discussion of the site selection process, the results of the geotechnical and site reconnaissance surveys, and the conceptual designs for the BMPs that are listed above and defined in the scope for Purchase Order 5102655-0. These BMPs are projected to be implemented in fiscal years 2010 and 2011. As requested by the City, the conceptual designs completed under a previous purchase order for implementation in fiscal years 2009 and 2010 are also discussed and included in the appendices of this report. A preliminary "report card" for these BMPs designs based on the site conditions and investigation/survey findings is also presented in this report as a basis for planning for future BMPs designs and effectiveness assessments.

Volume I contains all sections of this report as well as the report appendices, excluding Appendix I (Concept Designs D Sheets – 2010 BMPs) which is included as Volume II.

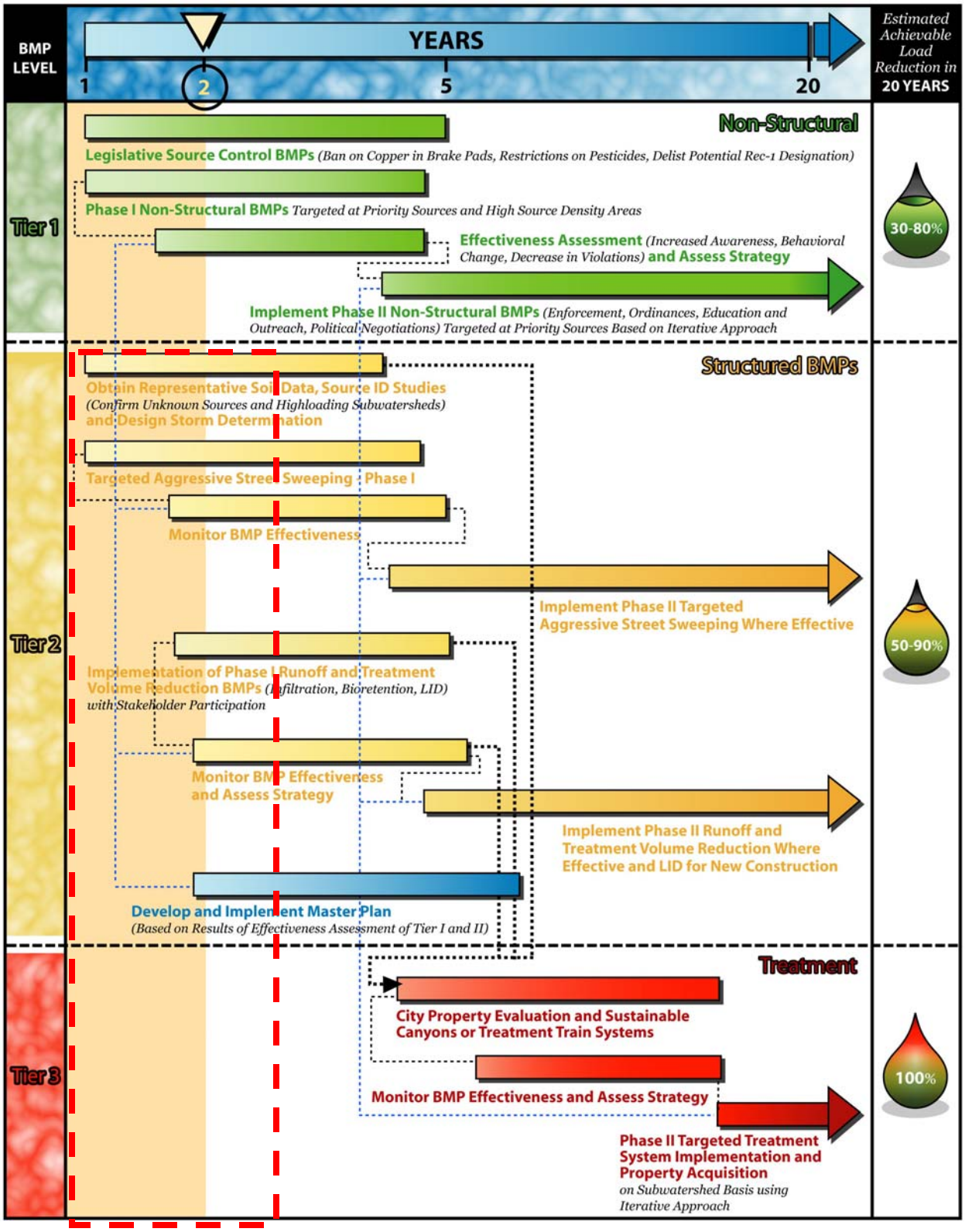


Figure 1. Tiered BMP Implementation Strategy[1]

[1] Source: *5-Year Strategic Plan for Watershed Activity Implementation*

2.0 RESULTS OF SITE SELECTION PROCESS AND GEOTECHICAL INVESTIGATIONS

The development of the conceptual designs presented in this report is part of the overall BMP implementation process to meet the regulatory requirements under the Storm Water Permit and current and future TMDLs. The implementation strategy for these BMPs is presented in the 5-*Year Strategic Plan for BMP Implementation* which provides a guideline for meeting the pollution reduction goals of these regulatory drivers. Selecting the sites for BMP implementation that meets the prioritization defined in the Strategic Plan is important in this process. Figure 2 presents the overall BMP implementation process that is consistent with *5-Year Strategic Plan for BMP Implementation*.

As shown on Figure 2, the BMP implementation process begins with the selection of the priority sites. These watershed and priority sub watersheds are provided in the *5-Year Strategic Plan for BMP Implementation*. The site selection process uses results obtained from the *Parcel Evaluation for BMP Implementation Study* which is based on the City-owned property inventory of municipal sites and parcels that have been provided by the Real Estate Department that are under consideration for transfer. The database of inventoried sites created from this evaluation process is then used to identify the top three sites based on the site attributes and ranking system. The database includes the results of the site reconnaissance surveys of the top 10% sites and previous surveys.

The top three sites undergo further analysis to select the site for conceptual design. These analyses include a drainage analysis to verify the drainage area and location of the municipal storm sewer system. A site reconnaissance survey of each site is also conducted to verify site attributes and identify site constraints that may impact the effectiveness of the BMP. Based on these analyses and surveys, the top site is selected. Sites that are proposed for infiltration type BMPs will then undergo a geotechnical investigation to assess the subsurface conditions. Criteria layer definitions used in this evaluation process appear in Appendix A.

The results of the drainage analysis, site survey, and geotechnical investigation are then used to develop the conceptual design. The conceptual design includes the development of performance specifications that define the required pollutant reduction goals and key system components. The conceptual drawing and performance specifications are the basis for the cost estimate and design package that is then provided to Engineering Capital Project for completion of the construction design and bid package. In order to meet the targeted goals of the *5-Year Strategic Plan for BMP Implementation*, it is important to adhere to the performance requirements in this construction design process.

The final steps of the BMP implementation process, as shown on Figure 2, include the integration of this project with the phased approach of the *5-Year Strategic Plan for BMP Implementation* which includes the assessment of the first phase of BMPs implemented. Selected BMPs are monitored to assess their cost effectiveness in meeting the targeted pollutant reduction goals. Based on the results of effectiveness assessment, the next phase of BMPs will be modified, dropped, or expanded through the watershed as needed to improve effectiveness of the overall program. The findings of the design, implementation, and effectiveness assessment steps are fed back into the process in a continuous cycle with the long-term goal of meeting the pollutant reductions in a cost-effective manner.

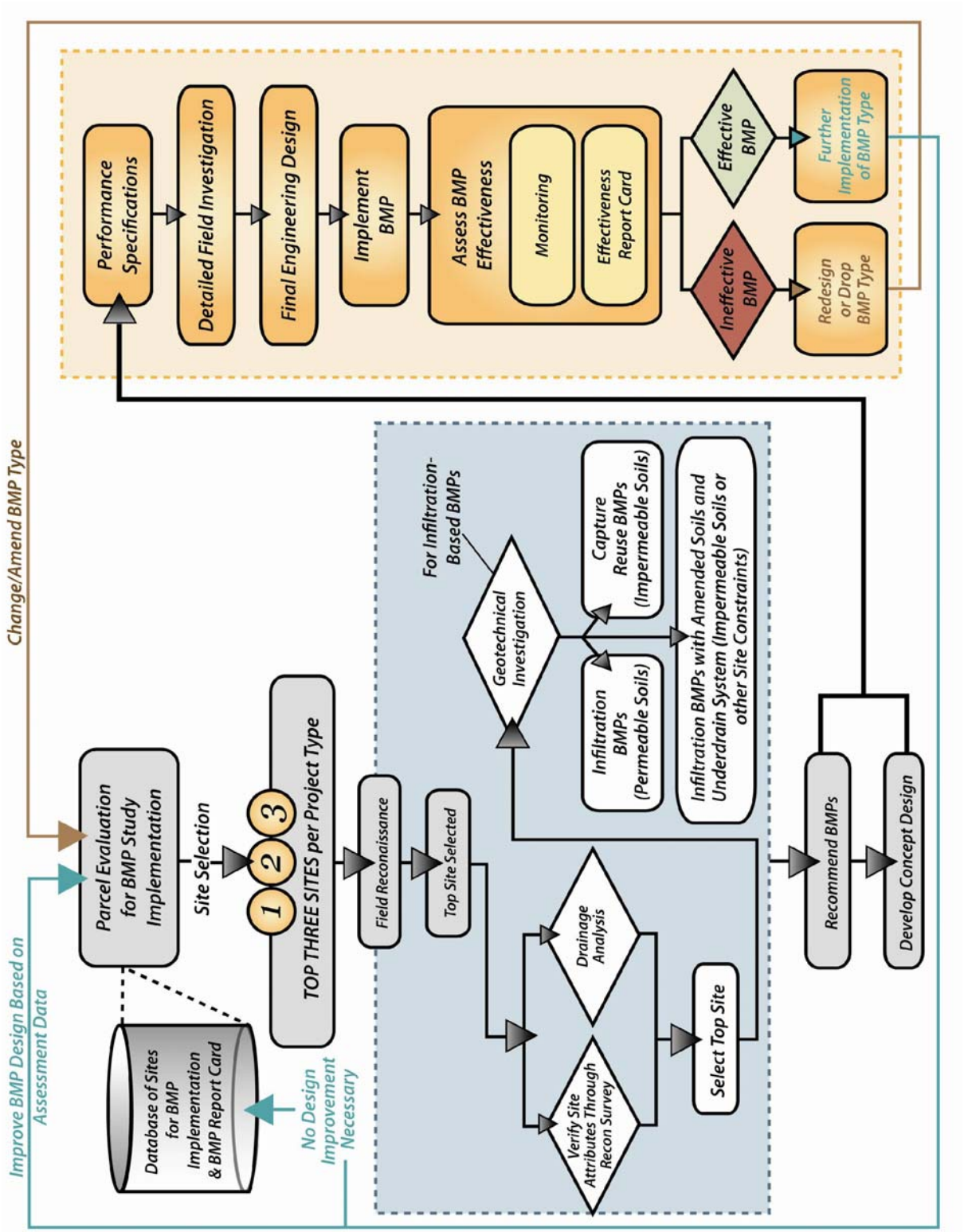


Figure 2. Site Selection Process and Concept Design Development

2.1 Site Reconnaissance

The *Parcel Evaluation for BMP Implementation Study* presents the sites evaluated, the criteria used to assess the sites, and the results of the desktop assessment. The initial desktop screening of the parcel evaluation identified a top 10% set of sites for further evaluation. These preliminary results were further evaluated through site reconnaissance for BMP implementation. The top three sites were then identified based on the desktop and site reconnaissance surveys of this top 10%. Table 1 presents the top three sites for the six BMPs proposed for implementation in fiscal years 2010 and 2011. The selected sites from the previous year's conceptual design project that are planned for implementation in fiscal years 2009–2010 are also presented in Table 1. The location of the top three priority sites (Figure 3) are further designated by sites that were selected for BMP implementation in fiscal years 2009–2010, sites that were selected for conceptual designs for BMPs to be implemented in fiscal years 2010–2011, and sites for consideration of future BMP implementation.

Based on the further analysis (drainage and municipal separate storm sewer system (MS4) assessment) and comprehensive reconnaissance surveys of the top three sites, the top site was selected. In addition to surveys, meetings were also held with the City representative for each of the sites to identify any further issues in the implementation of the designated BMPs. During these surveys and site meetings, issues of site operations, environmental issues, and potential additional flows and pollutants were identified. Based on this further assessment, the top site selection was verified. These sites are presented in Table 2 and include BMPs proposed for implementation in fiscal years 2010 and 2011 as well as BMPs for implementation in fiscal years 2009–2010. Figure 4 presents the locations of the selected BMP sites and types of BMPs to be implemented in fiscal years 2010–2011 and also the BMP sites proposed for implementation in fiscal year 2009–2010.

A geotechnical investigation was conducted on sites chosen for the implementation of infiltration-based BMPs. The results of these geotechnical investigations are presented in Subsection 2.2.

Table 1. List of Top Three Sites for BMP Implementation[2]

WATERSHED	TYPE OF BMP	ADDRESS	SITE DESCRIPTION	PARCEL NUMBER (APN)	LATITUDE	LONGITUDE	SECTORS	IMPLEMENTA-TION DATE	OWNER	DRAINAGE AREA (AC.)	QUALIFIER
San Diego Bay Watershed – Chollas Creek	Green Mall	Dalbergia Street, San Diego, Ca 92113	Dalbergia Street	–	32°41'17.07"N	117°7'1.27"W	Sector 1	FY 2009–2010	–	–	Selected site
	Large LID and Green Lot	Ocean View Boulevard and S. 30th Street, San Diego, Ca 92113	Memorial Park	–	32°42'4.23"N	117°7'46.18"W	Sector 1	FY 2009–2010	–	–	Selected site
	Large LID	4149 Newton Street, San Diego, Ca 92113	Southcrest Park and Public right-of-way	551-210-29, 551-050-11, 551-150-29	32°41'42.19"	117° 6'14.97"W	Sector 1	FY 2010–2011	City of San Diego	22	Selected site
	Large LID	3901 Landis Street, San Diego, Ca 92105	Youth Center at Park De La Cruz	–	32°44'45.42"N	117° 6'38.08"W	Sector 1	Future Potential	–	–	–
	Large LID	641 S. Boundary Street, San Diego, Ca 92113	Mountain View Park	–	32°41'58.50"	117° 6'22.90"W	Sector 1	Future Potential	–	–	–
Mission Bay Watershed – Tecolote Creek	Green Street	Mt Abernathy Avenue, San Diego, Ca 92117	Mt Abernathy Avenue	–	32°49'33.72"N	117°10'23.12"W	Sector 2	FY 2009–2010	–	–	Selected site
	Green Street	3170 Armstrong Street, San Diego, Ca 92111	Mesa College Drive at Armstrong St.	–	32°48'12.52"	117° 9'46.86"W	Sector 2	Future Potential	–	–	–
	Green Street	4421 Bannock Avenue San Diego, Ca 92117	North Clairemont Park and public right-of-way	360-220-01	32°49'58.92"	117°11'50.26"W	Sector 1	FY 2010–2011	City of San Diego	65	Selected site
	Green Street	Clairemont Mesa Boulevard intersection with Clairemont Drive – tributary water	Clairemont Mesa Boulevard	–	32°49'58.68"N	117°12'3.21"W	Sector 1	Future Potential	–	–	–
	Treatment Train System	3170 Armstrong Street San Diego, Ca 92111	Mesa College Drive at Armstrong Street	–	32°48'12.52"	117° 9'46.86"W	Sector 2	Future Potential	–	–	–
	Treatment Train System	4421 Bannock Avenue, San Diego, Ca 92117	North Clairemont Park and public right-of-way	360-220-01	32°49'58.92"	117°11'50.26"W	Sector 1	FY 2010–2011	City of San Diego	65	Selected site
	Treatment Train System	Crossing between Acworth Avenue and Boyd Avenue, San Diego, Ca 92111	APN 427-010-27	–	32.8040000	-117.1789000	Sector 1	Future Potential	–	–	–
Mission Bay Watershed – La Jolla	Green Lot	Kellogg Park parking lot (west) La Jolla, Ca	Kellogg Park	–	32°51'28.1"N	117°15'23.86"W	Sector 1	FY 2009–2010	City of San Diego	–	Selected site

[2] Results from *Parcel Evaluation for BMP Implementation Study*

WATERSHED	TYPE OF BMP	ADDRESS	SITE DESCRIPTION	PARCEL NUMBER (APN)	LATITUDE	LONGITUDE	SECTORS	IMPLEMENTA-TION DATE	OWNER	DRAINAGE AREA (AC.)	QUALIFIER
Los Peñasquitos Watershed	Green Lot	8405 New Salem Street, San Diego, Ca 92126	Mira Mesa Library and public right-of-way	311-320-55, 311-320-56	32°54'56.53"	117° 8'33.77"W	Sector 1	FY 2010–2011	City of San Diego	1.5	Selected Site
	Green Lot	10152 Rancho Carmel Drive, San Diego, Ca 92128	Carmel Mountain Ranch Community Park	–	32°57'58.01"	117° 5'24.92"W	Sector 2	Future Potential	–	–	–
	Green Lot	1219 World Trade Drive, San Diego, Ca 92128	Highland Ranch Park	–	32°58'59.84"	117° 4'25.54"W	Sector 2	Future Potential	–	–	–
	Peak and Erosion Control	8323-29 Miramar Place, San Diego, Ca 92121	San Diego Environmental Services	–	32°52'42.30"	117°10'42.36"W	Sector 1	Future Potential	–	–	–
	Peak and Erosion Control	Roselle Street, San Diego, Ca 92121	APN 340-080-64	343-121-01, 340-080-64	32°53'56.20"	117°13'23.10"W	Sector 1	FY 2010–2011	City of San Diego	625	Selected Site
	Peak and Erosion Control	Campus Point Drive	APN 343-230-06	–	32°53'11.92"	117°13'18.22"W	Sector 1	Future Potential	–	–	–
San Diego River Watershed	Green Mall	5214 Gaines Street, San Diego, Ca 92110	San Diego Police Department (SDPD) West Division	436-520-06, 436-540-07, 436-540-08	32°45'51.07"	117°11'43.36"W	Sector 1	FY 2010–2011	City of San Diego	2.2	Selected Site
	Green Mall	2123 Fenton Parkway, San Diego, Ca 92108	Mission Valley Library	–	32°46'44.25"	117° 7'37.05"W	Sector 1	Future Potential	–	–	–
	Green Mall	4121 Adams Avenue, San Diego, Ca 92116	Kensington – Normal Heights Library	–	32°45'47.69"	117° 6'24.47"W	Sector 1	Future Potential	–	–	–
	Green Mall	4985 La Cuenta Drive, San Diego, Ca 92124	Tierrasanta Library	–	32°49'16.23"	117° 5'52.79"W	Sector 2	Future Potential	–	–	–
	Green Mall	5155 Greenbrier Avenue, San Diego, Ca 92120	Allied Garden Park	–	32°47'45.05"	117° 4'46.89"W	Sector 2	Future Potential	–	–	–
	Green Mall	5188 Zion Avenue, San Diego, Ca 92120	Benjamin Library	–	32°47'34.28"	117° 4'51.75"W	Sector 2	Future Potential	–	–	–
	Treatment Train System	Colina Dorada Drive, San Diego, Ca	APN 456-520-03	–	32°48'59.60"	117° 4'40.84"W	Sector 2	Future Potential	–	–	–
	Treatment Train System	Intersection of Mission Gorge Road and Jackson Drive, San Diego, Ca	APN 371-031-05	–	32°49'1.11"N	117° 3'34.27"W	Sector 2	Future Potential	–	–	–
	Treatment Train System	Intersection of Mission Gorge Road and Deerfield Street, San Diego, Ca	APN 456-011-10	–	32°48'57.69"	117° 3'43.19"W	Sector 2	Future Potential	–	–	–
	Treatment Train System	Intersection of Park Ridge Boulevard and Murray Park Drive	Park Ridge Boulevard and public right-of-way	673-011-01	32°48'1"N	117°2'57.21"W	Sector 2	FY 2010–2011	City of San Diego	25	Selected Site

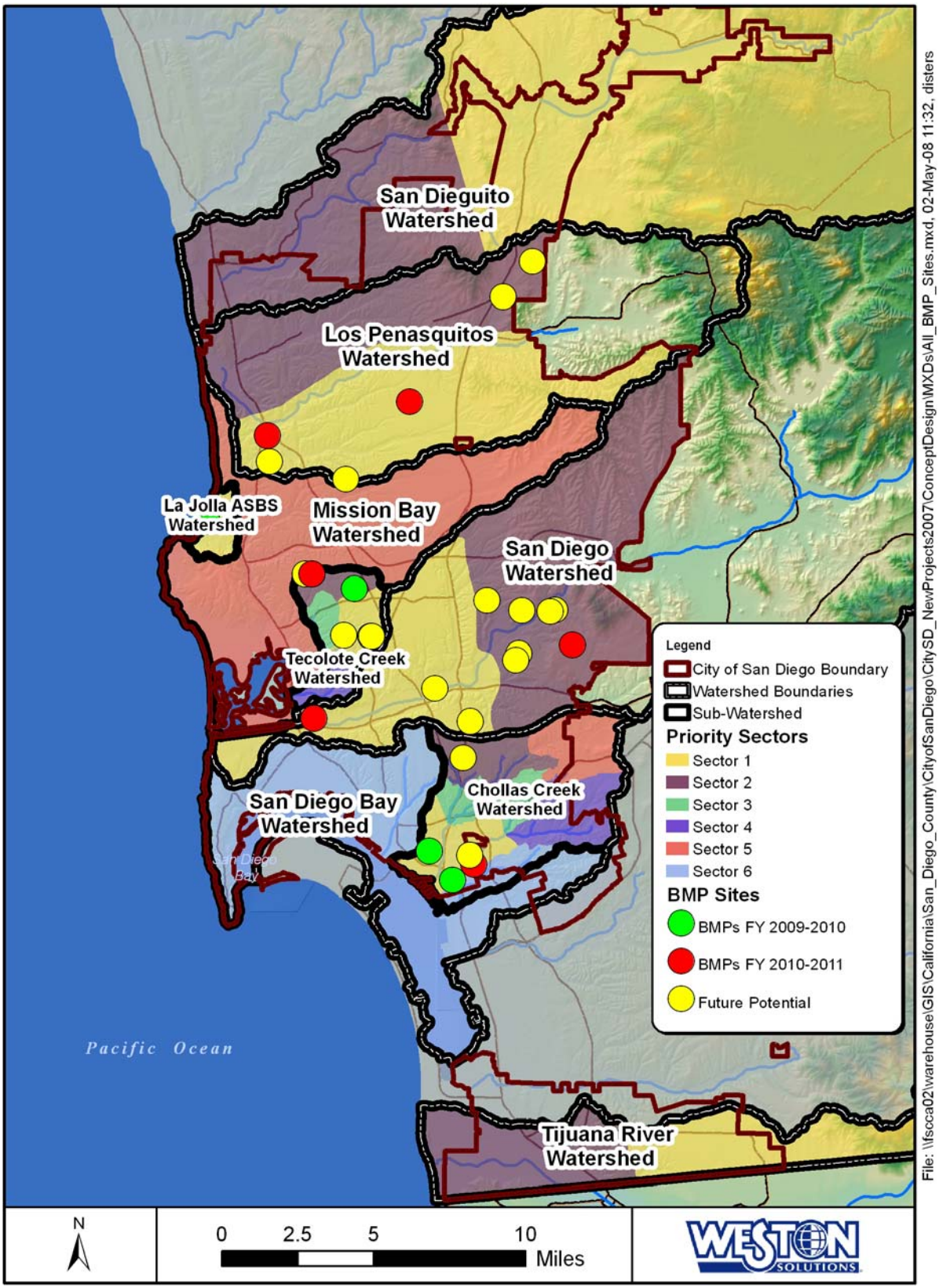


Figure 3. Location Map for Top Three Priority Sites for BMP Implementation

Table 2. Final Selected Sites for BMP Implementation

WATERSHED	PROJECT NAME*	SECTORS	TYPE OF BMP	SITE DESCRIPTION	ADDRESS	POTENTIAL YEAR TO BE IMPLEMENTED
San Diego Bay Watershed – Chollas Creek	Dalbergia and Thor Streets BMP Retrofit	Sector 1	Green Mall	Dalbergia Street	Dalbergia Street, San Diego, Ca 92113	FY 2009–2010
	Memorial Park Storm Water Infiltration	Sector 1	Large LID and Green Lot	Memorial Park	Ocean View Boulevard and S. 30th Street, San Diego, Ca 92113	FY 2009–2010
	Southcrest Park Infiltration for Chollas Creek Watershed Protection	Sector 1	Large LID	Southcrest Park and public right-of-way	4149 Newton Street, San Diego, Ca 92113	FY 2010–2011
	El Cajon Boulevard Storm Drain Inlet Retrofit for Chollas Creek Watershed Protection	Sector 1	Catchbasin Inserts	Intersections along El Cajon Boulevard	El Cajon Boulevard, San Diego, 92113	FY 2010–2011
Mission Bay Watershed – Tecolote Creek	Tecolote Creek Subwatershed BMP Retrofit	Sector 2	Green Street	Mt Abernathy	Mt Abernathy Avenue, San Diego, Ca 92117	FY 2009–2010
	Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection	Sector 1	Green Street	North Clairemont Park and public right-of-way	4421 Bannock Avenue, San Diego, Ca 92117	FY 2010–2011
	Bannock Avenue Bacteria Treatment for Tecolote Creek Watershed Protection	Sector 1	Treatment Train System	North Clairemont Park and public right-of-way	4421 Bannock Avenue, San Diego, Ca 92117	FY 2010–2011
Mission Bay Watershed – La Jolla	Kellogg Park Parking Lot BMP Retrofit	Sector 1	Green Lot	Kellogg Park	Kellogg Park parking lot (west) La Jolla, Ca	FY 2009–2010
Los Peñasquitos Watershed	Mira Mesa Library Bioretention for Los Penasquitos Watershed Protection	Sector 1	Green Lot	Mira Mesa Library and public right-of-way	8405 New Salem Street, San Diego, Ca 92126	FY 2010–2011
	Roselle Street Flow Control for Los Penasquitos Watershed Protection	Sector 1	Peak and Erosion Control	Vacant Land	Roselle Street, San Diego, Ca 92121	FY 2010–2011
San Diego River Watershed	SDPD Western Division Porous Pavement for San Diego River Watershed Protection	Sector 1	Green Mall	SDPD Western Division	5214 Gaines Street San Diego, Ca 92110	FY 2010–2011
	Park Ridge Boulevard Bacteria Treatment for San Diego River Watershed Protection	Sector 2	Treatment Train System	Park Ridge Boulevard and public right-of-way	Intersection of Park Ridge Boulevard and Murray Park Drive	FY 2010–2011

* Projects described in the text of this report were renamed according to the new City convention "Location/Description/Watershed." It was not feasible to use the new naming convention for all documents presented in the appendices because these documents predate the creation of the naming convention. Therefore a naming Key may be found in Appendix B.

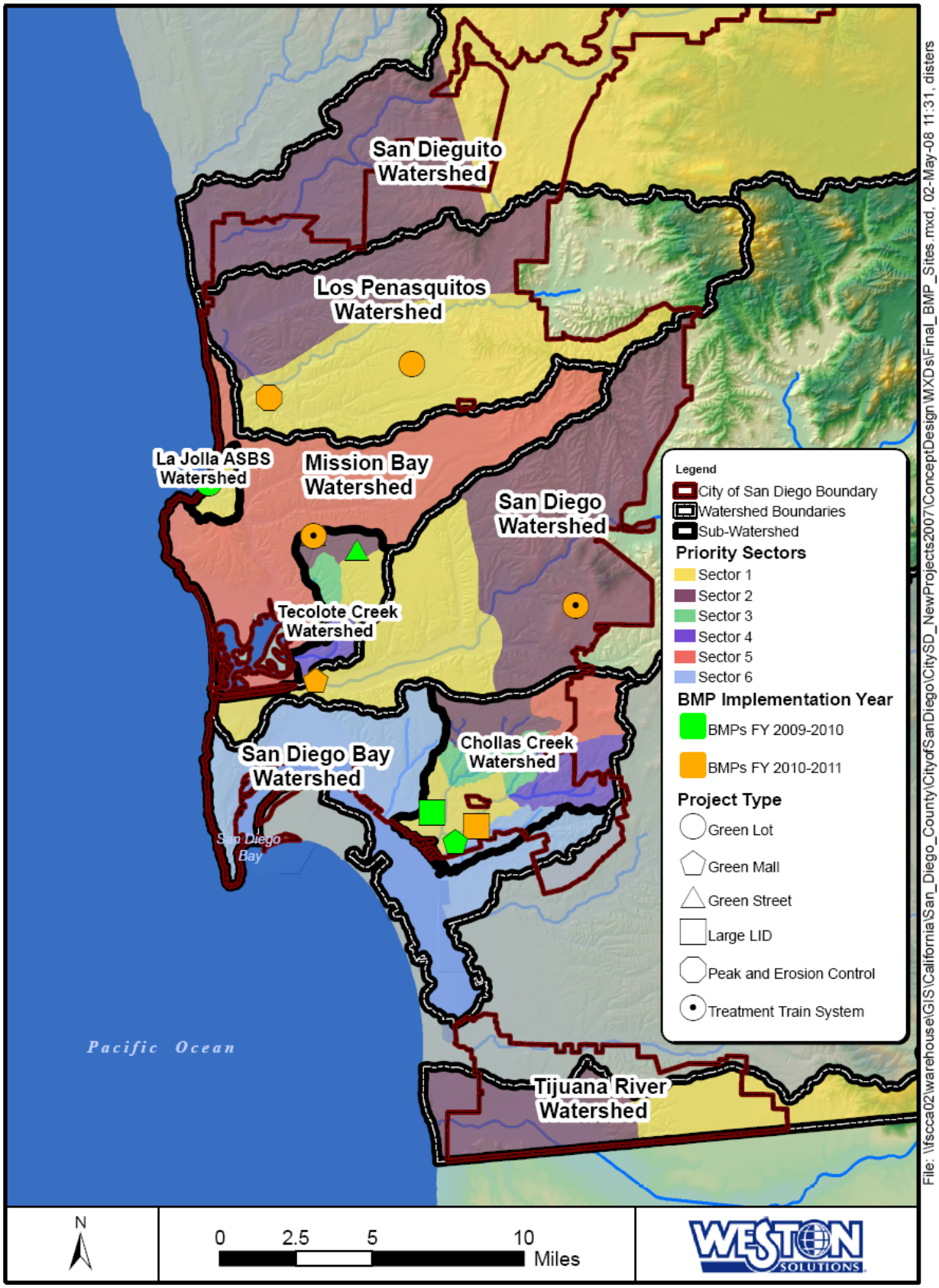


Figure 4. Location Map of Selected Sites for BMP Implementation

2.2 Geotechnical Investigation

Geotechnical investigations were conducted to determine whether the existing conditions were suitable for the implementation of infiltration BMPs.

Each selected site underwent a subsurface geotechnical exploration that consisted of drilling, logging, and sampling small-diameter borings to depths of up to approximately 19.5 feet below ground surface. The borings were advanced using a truck-mounted, hollow-stem auger drill rig. The purpose of the borings was to perform a subsurface evaluation within the project area and collect bulk and relatively undisturbed soil samples for laboratory testing.

Percolation testing was conducted at each site. Test holes were excavated to depths of up to approximately 8 to 8.5 feet deep and 7 inches in diameter. Approximately 2 inches of gravel was placed on the bottom of each hole. Varying lengths of 3-inch perforated pipe was installed in an upright position on top of the gravel layer, and the outer area was backfilled with additional gravel. Presoaking was performed by filling each test hole with approximately 12 inches of clean water. The water level was maintained for four hours and was then allowed to drop overnight. The following day, the remaining water in the test holes was adjusted to approximately 6 inches, and testing was performed for one additional hour with readings taken every 30 minutes. The drop that occurred during the last 30 minutes of testing was used to calculate the percolation rate for each location.

The provided percolation rates are for information purposes only and do not represent design percolation rates. The percolation tests that were performed provide an estimation of the relative capacity of the in-situ soils to infiltration storm water from the defined drainage area. The concept designs presented in this report are based on these preliminary results. This relative infiltration capacity (scale: little to no observed percolation; low to medium percolation; high percolation) was used to determine the need for additional engineering components such as under drains and amended soils, or to determine that the site conditions were not suitable for infiltration. The general results indicated that the soils encountered on the sites have little or no percolation capacity (typically soils from the Linda Vista paralic formation in the mesa areas of the City). Therefore many of the concept designs in this report include an alternative solution, such as evapotranspiration, that will reduce pollutant loads without infiltrating storm water. Specific infiltration rates for the sub-soils shall be based on in-situ permeability tests as part of the final design process. These types of tests (ASTM D2434-68) may be integrated into future concept design efforts to develop site specific infiltration rates.

The complete boring logs, laboratory results, and percolation test results are presented in Appendix B and provided in electronic form on compact disk.

2.2.1 Southcrest Park Infiltration for Chollas Creek Watershed Protection

The site at Southcrest Park at 4149 Newton Avenue in San Diego, California is relatively flat with an elevation of approximately 30 to 50 feet above mean sea level (MSL). The south branch of Chollas Creek runs adjacent to the northwest portion of the site and serves as a drainage point for a majority of the site. The site is generally underlain by topsoil and alluvium. Old paralic deposits (site formerly mapped as Baypoint Formation) were encountered at six bore hold locations at depths up to 19.5 feet, underlying the alluvium layer. Negligible percolation was observed at PT-5, but adjusted percolation rates ranging from 16.1 to 120 minutes per inch (mpi) were observed at the remaining five test bore holes. The slowest percolation rates were considered during final design of infiltration BMPs. Excavation will be necessary for the projects. Existing materials on site should be excavated with conventional heavy-duty, earth-moving construction equipment, but strongly cemented, old paralic deposits may be more difficult to excavate. No groundwater was discovered during the geotechnical investigation. Figure 5 shows the location of boreholes and percolation tests used for a preliminary geotechnical investigation. Table 3 provides a summary of the geotechnical investigation.

Table 3. Table of Geotechnical Results for Infiltration BMPs

Project Name	Type of BMP	Soil Characterization	Relative Infiltration Capacity	Recommendation	Site Constraints
Southcrest Park Infiltration for Chollas Creek Watershed Protection	Large LID	Topsoil Alluvium Old paralic deposits	low to medium percolation	Use lowest infiltration rate when designing infiltration BMPs	Excavating old, compacted paralic deposits may be significantly more difficult
SDPD Western Division Porous Pavement for San Diego River Watershed Protection	Green Mall	Fill Alluvium	little to no observed percolation*	Infiltration BMP not feasible	Excavating old, compacted paralic deposits may be significantly more difficult
Mira Mesa Library Bioretention for Los Peñasquitos Watershed Protection	Green Lot	Old fill Old paralic deposits	little to no observed percolation*	Infiltration BMP not feasible	Excavating old, compacted paralic deposits may be significantly more difficult
Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection	Green Street	Fill Old paralic deposits	low to medium percolation	Use lowest infiltration rate when designing infiltration BMPs	Excavating old, compacted paralic deposits may be significantly more difficult

* Estimated from detailed bore log and percolation tests conducted in field. Refer to Appendix B.

Figure 5. Boring and Percolation Testing Locations for Southcrest Park

2.2.2 SDPD Western Division Porous Pavement for San Diego River Watershed Protection

The site occupied by the San Diego Police Department (SDPD), Western Division at 5214 Gaines Street in San Diego, California is relatively flat with an elevation of approximately 20 feet above MSL. The site is generally underlain by fill and alluvium. The results of percolation testing indicate a negligible percolation rate. The site is therefore not suitable for a standard porous pavement approach. The design recommendations include considerations of the over-excavation of existing low-permeability soils and replacement with amended soils. Underdrains should be placed within this amended soil layer to allow for drainage under the porous pavement. These design recommendations were evaluated and incorporated into the conceptual design. The implementation of these components to address the site constraints increased the cost of the BMP. The implementation of additional BMPs of this type for these site constraints should be based on the results of the effectiveness assessment of this BMP. The on-site materials should be generally excavated with conventional heavy-duty, earth-moving construction equipment. Groundwater was encountered at two bore locations approximately 16.5 to 17.5 feet below the existing grade. Figure 6 shows the location of boreholes and percolation tests used for a preliminary geotechnical investigation. Table 3 provides a summary of the geotechnical investigation.

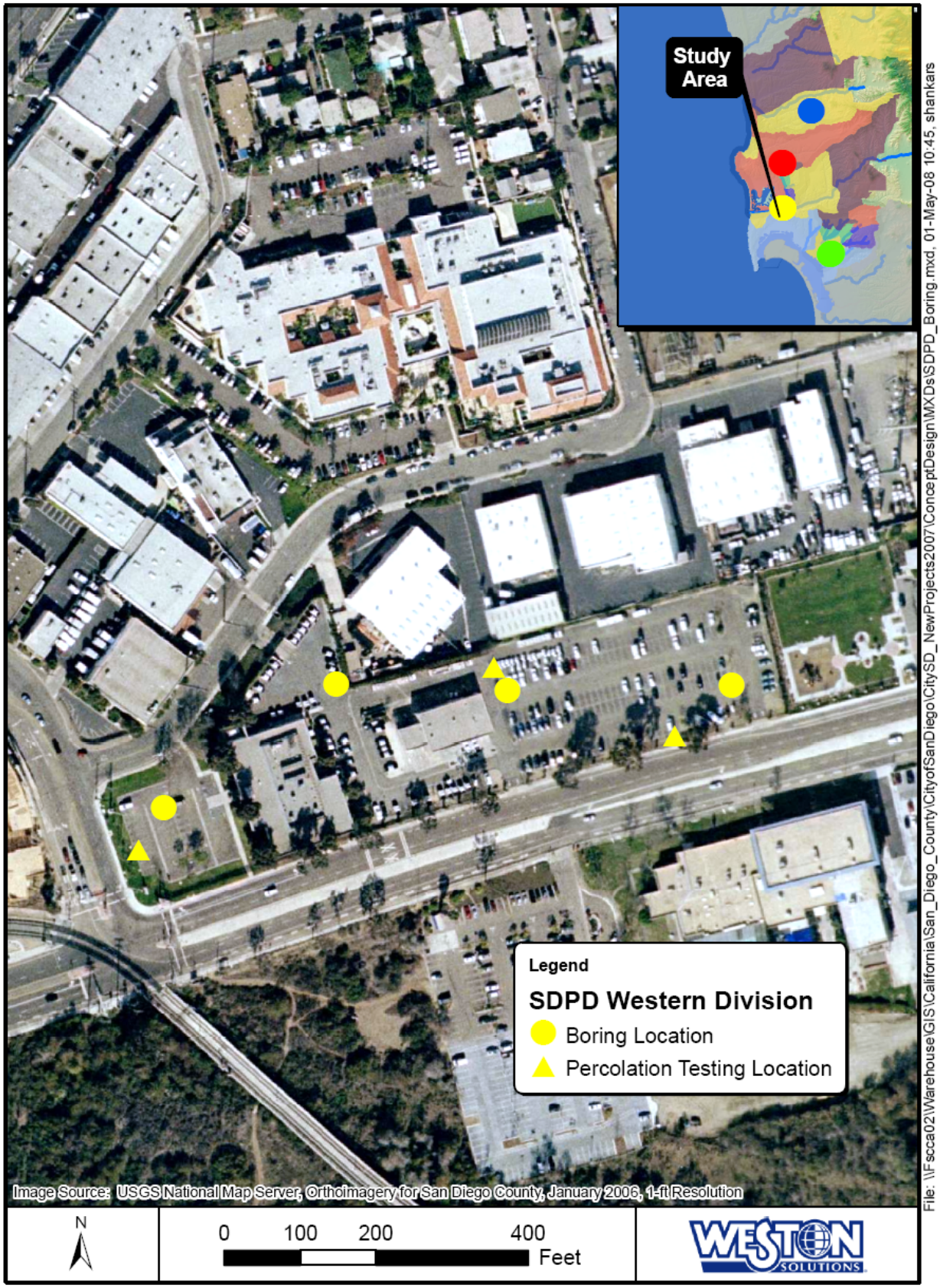


Figure 6. Boring and Percolation Testing Locations for SDPD Western Division

2.2.3 Mira Mesa Library Bioretention for Los Peñasquitos Watershed Protection

The site adjacent to the Mira Mesa Library at 8405 New Salem Street in San Diego, California is relatively flat with an elevation of approximately 435 feet above MSL. The site is generally underlain by fill and very old paralic deposits (site formerly mapped as Lindavista Formation). The results of percolation testing indicate a negligible percolation rate. Due to these site constraints, several design approaches were considered. Conventional porous pavement techniques are not suitable for this site. Design considerations include the use of amended soils and underdrains to replace the existing soils and the use of a bioretention area within the existing planter area. Because the design for the SDPD site has to include amended soil and underdrain components to address similar low percolation rates, it is recommended that a different approach for this site be used so the City can assess the cost effectiveness of different approaches given the site constraints. The design includes the use of the existing landscapes area for the implementation of a bioretention cell.

The fill material was encountered to depths of approximately 7 feet below the existing grade and should be generally excavated with conventional heavy-duty, earth-moving construction equipment. Strongly cemented paralic deposits were encountered between 7 and 19.5 feet. More difficult excavation of the very old paralic deposits should be anticipated. No groundwater was discovered during the geotechnical investigation. Figure 7 shows the location of boreholes and percolation tests used for a preliminary geotechnical investigation. Table 3 provides a summary of the geotechnical investigation.

Figure 7. Boring and Percolation Testing Locations for Mira Mesa Library

2.2.4 Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection

The site in the general vicinity of 4421 Bannock Avenue in San Diego, California, including Bannock Avenue, Dubois Drive, Manitou Way, and Clairemont Mesa Boulevard, is relatively flat. The elevation is approximately 365 to 371 feet above MSL. The site is generally underlain by fill and very old paralic deposits (site formerly mapped as Linda Vista Formation). Negligible percolation was observed at PT-1, but adjusted percolation rates ranging from 45.6 to 760.0 mpi were observed at the remaining two test bore holes. The slowest percolation rates were considered during final design of infiltration BMPs. The fill material should be generally excavated with conventional heavy-duty, earth-moving construction equipment. Strongly cemented paralic deposits were encountered at bore hold B-4 at depths between 2 and 19.5 feet. More difficult excavation of the very old paralic deposits should be anticipated. No groundwater was discovered during the geotechnical investigation. Figure 8 shows the location of boreholes and percolation tests used for a preliminary geotechnical investigation. Table 3 provides a summary of the geotechnical investigation.

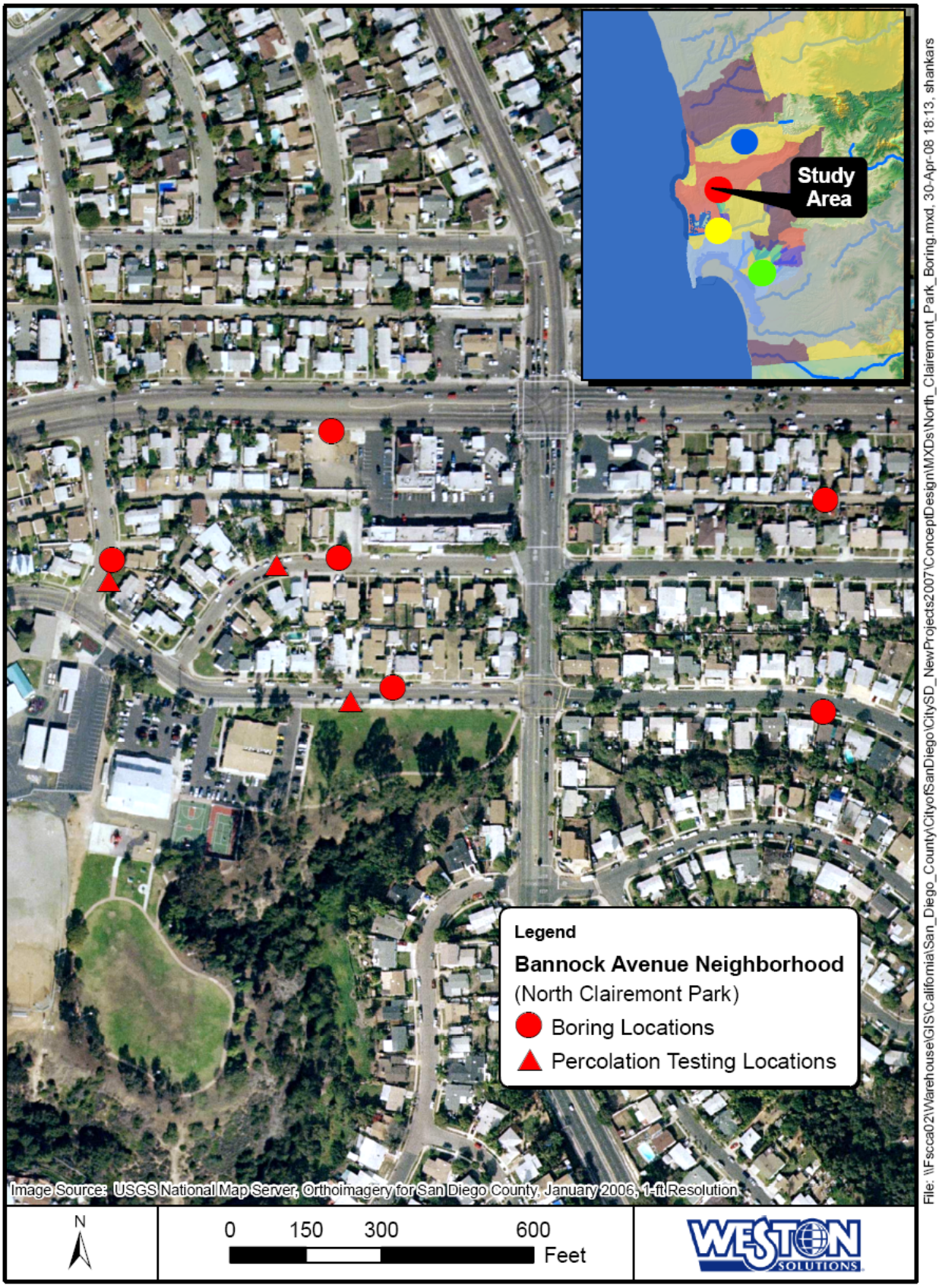


Figure 8. Boring and Percolation Testing Locations for Bannock Avenue Neighborhood

2.3 Preliminary BMP Report Card

As part of the overall BMP implementation process, the City is documenting the information and results obtained during the site selection, geotechnical investigations, conceptual design development, construction, and finally, the effectiveness assessment phases. These data are then used to guide the process forward with the goal of implementing cost-effective BMPs that meet the target reduction goals. As a tool for capturing these data for assessment and design guidance purposes, a preliminary BMP Report Card has been developed and is presented in Table 4. This preliminary report card can form the basis of guiding future site selection, BMP type, conceptual design, and modifications to the Strategic Plan.

To demonstrate the importance of this tool, the design approach as first used for the conceptual designs completed last fiscal year (implementation proposed for fiscal year 2009–2010) was modified for this current set of conceptual designs by including geotechnical investigations. These investigations were critical for the design of the infiltration type BMPs and provide data on the suitability of these types of BMPs throughout the City's watersheds. The results of these investigations indicate that many of the sites that are targeted for BMP on City-owned properties are characterized with subsurface conditions that are not suitable for infiltration projects. These results provide direction for future BMP implementation. The City has developed designs that address site constraints for the current set of selected sites in order to evaluate the cost effectiveness of these designs in meeting reduction goals. These designs include the use of amended soils, underdrains, and bioretention cells that have increased the cost of the projects to address these site constraints. The cost-effectiveness assessment for these sites will therefore guide the City in future BMP implementations. This preliminary report card highlights these types of site constraints, the design solutions implemented, and the effectiveness assessment results. This tool can therefore be the basis for future BMP planning, design, and implementation.

Table 4. BMP Report Card

TYPE OF BMP/ FY IMPLEMENTATION	WATERSHED/ PRIORITY SECTOR	TOP SITE(S)	SITE SELECTION	SITE CONTRAINTS AND GEOTECH RESULTS	DESIGN ELEMENTS AND PERFORMANCE REQUIREMENTS	ESTIMATED COSTS	EFFECTIVE MONITORING
Green Lot – Construction planned for FY2009 per Strategic Plan	Mission Bay – La Jolla Shores ASBS – Sector 1	Kellogg Park	Kellogg Park – West Side of Lot (only half of lot). Parking lot discharges directly to ocean – Ocean Plan requirements prioritize this site for pollution reduction	The parking lot is heavily used by public year round. The lot is graded away from existing planters to a concrete channel in the access lane between the parking spaces. No geotechnical investigation was performed. The site was assumed to be underlain with sandy soil.	Only half of the lot is to be retrofit to allow for public use of other half. Porous concrete pavement is to replace existing asphalt pavement using existing grading and concrete channels. Subsoils are assumed to possess high infiltration. The sub-base is to drain directly into subsoil.	$1,800,000	Baseline water quality monitoring was conducted during the wet season of FY07-08. An additional year of monitoring is to be conducted following implementation of porous pavement.
Green Street – Construction in FY2009	Mission Bay – Tecolote – Sector 1	Mt. Abernathy Neighborhood	The Mt. Abernathy Neighborhood site was selected after several site reconnaissance visits. This community of approximately 90 homes was selected because the City right-of-way has not been improved with landscaping by homeowners or City. Also, the community drains to one catchment that can be readily monitored for effectiveness.	Existing underground utilities within the streets precluded use of porous pavement in the street. Absent utilities form the cul-de-sacs which allow for use of porous pavement on the outer parking area of the street which is subject to less traffic loads. Due to existing utilities and existing roadway, extensive infiltration was not feasible. Potential for trash and debris from the roadway was considered in the design of the curb cuts to the bioretention/planter areas. No geotechnical investigation was performed. The soils may be of low permeability, and design considered this potential.	Pollution reduction is to be achieved by directing runoff from the residential property and low flows from the street into the bioretention/planter areas within the right-of-way between the residential property and street. This system is design to collect and infiltrate runoff from the residences and the first-flush portion of storm events from the street through the curb cuts. The use of porous sidewalks and bioretention/planters will increase the porous area and infiltration, thereby reducing the storm flows and pollutant loads.	$2,000,000	Baseline water quality monitoring was conducted during the wet season of FY07-08. An additional year of monitoring is to be conducted following implementation of porous pavement.
Green Mall	San Diego Bay – Chollas Creek – Sector 1	Dalbergia Street	The Dalbergia Street site was selected.	This site is located in an industrial/commercial area. Traffic loading is likely high due to commercial businesses. Extensive underground utilities are within right-of-way. The site is a wide commercial street that allows for implementation of LID features (planters) within the street.	The use of planter boxes (bioretention areas) does not impact current use of street. Americans with Disabilities Act (ADA) and fire hydrant access needs to be addressed in the street planter box. Traffic loading and existing underground utilities shall be included in design considerations.	$1,500,000	Baseline Effectiveness Monitoring Plan for 2008/2009 – Access Permit is required for monitoring.
Large Infiltration BMP – Dual Park Use – Construction planned for FY2009 per Strategic Plan. This project was originally targeted for a Green Lot – Strategy modified to achieved greater load reduction with large infiltration BMP – Dual Park Use Strategy Developed	San Diego Bay – Chollas Creek – Sector 1	Memorial Park	The Memorial Park site was selected.	The parking lot drains into a grate inlet, and the storm drain carries flow directly across the field into a main drain.		$3,000,000	Baseline water quality monitoring was conducted during the wet season of FY07-08. An additional year of monitoring is to be conducted following implementation of porous pavement.

TYPE OF BMP/ FY IMPLEMENTATION	WATERSHED/ PRIORITY SECTOR	TOP SITE(S)	SITE SELECTION	SITE CONTRAINTS AND GEOTECH RESULTS	DESIGN ELEMENTS AND PERFORMANCE REQUIREMENTS	ESTIMATED COSTS	EFFECTIVE MONITORING
Green Lot – Construction Planned for FY2010	Los Peñasquitos	1) Mira Mesa Library 2) Carmel Mountain Ranch Community park – Sector 1 3) Highland Ranch Park – Sector 2	The Mira Mesa Library site was selected.	The parking lot flow is a sheet flow and channelized and it flows into catchbasins on the Camino Ruiz. The roof runoff drains into the parking lot.	Design shall include a bioretention cell with diversions from the parking lot. Rain barrels shall be implemented to collect roof runoff.	$1,000,000	Effective monitoring for this site has yet to be assessed.
Large Infiltration BMP – Construction Planned for FY2010	San Diego Bay – Chollas Creek – Sector 1	1) Southcrest Park 2) Youth Center at park De La Cruz – Sector 1 3) Mountain View Park – Sector 1	The Southcrest Park site was selected.	This site was selected for its likely higher permeability soils and location next to the creek. Infiltration from the underground units will seep into the creek and will not impact down-gradient structures.	Underground infiltration units are sized for the TMDL design storm of 1.5 inches. Site design has incorporated various LID approaches in an integrated manner. These approaches include replacing existing asphalt roads and parking lot with porous pavement as well as rain barrels and planters to collect roof drainage.	$3,900,000	Effectiveness monitoring is recommended to assess the large infiltration pollutant reduction and the integrated LID approach
Green Street and AbTech (bacterial treatment BMP) Construction Planned for FY2010	Mission Bay – Tecolote – Sector 1	1) Mesa College 2) Bannock Avenue Site. APN 427-010-27 – Sector 1 3) Crossing between Acworth Avenue and Boyd Avenue	The Bannock Avenue site was selected. The Mesa College site was not selected after site reconnaissance identified construction by the college at this site. The college is extending the MS4 outfall further into the canyon and building a parking garage. Access to the AbTech unit would have been very difficult.	The drainage area that would be treated by the AbTech unit would require treatment of large storm flows. The geotechnical investigation indicated very low permeability soils underlying most of the area proposed for the Green Street. Existing underground utilities were identified through out the project area within the streets.	Discussions with the AbTech vendor and the City concluded that the treatment unit would be a pilot project that would treat a smaller design storm than originally recommended to fully meet the Bacteria TMDL. The TMDL design storm is 1.5 inches. The design storm for this unit is the 86% SUSMP design storm. The low permeability soils and utilities limit the infiltration.	5,800,000	Effective monitoring for this site has yet to be assessed.
AbTech Unit – Pilot Bacteria Treatment Unit	San Diego River – Sector 2	1) APN 456-520-03 (Preferred Site) – Sector 2 2) Colina Dorada Drive, San Diego, Ca. 3) APN 371-031-05 – Sector 2 4) Intersection of Mission Gorge Road and Jackson Drive, San Diego, Ca. 5)Intersection of Murray Park Drive and Park Ridge Boulevard	This site is at the intersection of Murray Park Drive and Park Ridge Boulevard The other two sites were not suitable.		The BMP is designed to treat a smaller design storm than originally recommended to fully meet the Bacteria TMDL. The TMDL design storm is 1.5 inches. The design storm for this unit is the 86% SUSMP design storm.	$1,150,000	
Erosion and Sediment Control Project	Los Peñasquitos – Sector 1	1) Miramar Environmental Services Solid Waste Truck Staging Site 2) APN 343-080-06 (Roselle Street) 3) APN 343-230-06 (Campus Point Drive)	The Roselle Street site was selected. The Miramar site was not selected because of dry weather flows that may be impacted. This site was recommended for implementation of a dry		Dry weather diversion is proposed for the Miramar site (approximately $800,000).	$1,750,000	

TYPE OF BMP/ FY IMPLEMENTATION	WATERSHED/ PRIORITY SECTOR	TOP SITE(S)	SITE SELECTION	SITE CONTRAINTS AND GEOTECH RESULTS	DESIGN ELEMENTS AND PERFORMANCE REQUIREMENTS	ESTIMATED COSTS	EFFECTIVE MONITORING
			weather diversion.				
Green Mall – FY2010 as per Strategic Plan	San Diego River – Sector 1 and Sector 2	1) SDPD (Western Division) – Sector 1 2) Mission Valley Library – Sector 1 3) Kensington – Normal Heights Library – Sector 1 4) Tierrasanta Library 5) Allied Garden Park 6) Benjamin Library	The SDPD Western Division site was selected.	The presence of underground storage tanks (USTs) reduces the area of treatment. Geotechnical studies show that percolation rates are very low.	Underground infiltration units are sized for the TMDL design storm of 1.5 inches. Site design has incorporated various LID approaches in an integrated manner. These approaches include replacing existing asphalt roads and parking lot with porous pavement as well as rain barrels and planters to collect roof drainage.	$3,036,540	
Trash Segregation Devices with Aggressive Street Sweeping	San Diego Bay – Chollas Creek – Sector 2	1) University Avenue and El Cajon Avenue – consistent with the Aggressive Street sweeping Chollas route 2) Orange Avenue and Fairmont Avenue	Several site reconnaissance visits were performed, including a meeting with the vendors to select locations for pilot trash segregation devices. Use of the bioretention planter inlet devices (Filterra product) as pilot for several locations was also considered.		Catchbasin inserts shall be installed into the catchbasins in the aggressive street sweeping areas. Increased maintenance and trash removal from the inserts will be necessary. Alternatively, a unit similar to that of filterra may be installed before the catchbasins. The surface flow may be diverted through the filterra into the storm drains. The filterra unit acts as filter.	$ 500,000 (approximately)	

3.0 CONCEPT DESIGNS

This section provides an overview of the proposed concepts for implementation of BMPs in the years 2009 and 2010. The project descriptions are provided and corresponding concept designs are furnished below.

Since the conceptual designs described below are pilot projects, it was determined that they would be sized to accommodate an 85th percentile storm. This design storm was selected because pilot projects will be used to evaluate the actual water quality improvement(s) of the different BMP technologies. Should these technologies prove cost effective for 85th percentile storms, these systems may be expanded to accommodate larger design storms.

The following index table (Table 5) shows the proposed concepts, a brief description of the concept design, potential year of implementation, and the location of the selected sites for implementation of BMP. A summary of the priority water quality problems and constituents of concern, which the final engineered projects will be designed to address, appears in Appendix D.

Table 5. Concept Design Index Table

WATERSHED	TYPE OF BMP	PROJECT NAME	ADDRESS	SECTORS	POTENTIAL IMPLEMENTATION YEAR
San Diego Bay Watershed – Chollas Creek	Green Mall	Dalbergia and Thor Streets BMP Retrofit	Dalbergia Street, San Diego, Ca 92113	Sector 1	2009
	Large LID and Green Lot	Memorial Park	Ocean View Boulevard and S. 30th Street, San Diego, Ca 92113	Sector 1	2009
	Large LID	Southcrest Park Infiltration for Chollas Creek Watershed Protection	4149 Newton Street, San Diego, Ca 92113	Sector 1	2010
	Catchbasin Inserts	El Cajon Boulevard Storm Drain Inlet Retrofit for Chollas Creek Watershed Protection	El Cajon Boulevard, San Diego, Ca 92113	Sector 1	2010
Mission Bay Watershed – Tecolote Creek	Green Street	Tecolote Creek Subwatershed BMP Retrofit	Mt Abernathy Avenue, San Diego, Ca 92117	Sector 2	2009
	Green Street	Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection	4421 Bannock Avenue, San Diego, Ca 92117	Sector 1	2010
	Treatment Train System	Bannock Avenue Bacteria Treatment for Tecolote Creek Watershed Protection	4421 Bannock Avenue, San Diego, Ca 92117	Sector 1	2010
Mission Bay Watershed – La Jolla	Green Lot	Kellogg Park Parking Lot BMP Retrofit	Kellogg Park parking lot (west) La Jolla, Ca	Sector 1	2009
Los Peñasquitos Watershed	Green Lot	Mira Mesa Library Bioretention for Los Peñasquitos Watershed Protection	8405 New Salem Street, San Diego, Ca 92126	Sector 1	2010
	Peak and Erosion Control	Roselle Street Flow Control for Los Peñasquitos Watershed Protection	Roselle Street, San Diego, Ca 92121	Sector 1	2010
San Diego River Watershed	Green Mall	SDPD Western Division Porous Pavement for San Diego River Watershed Protection	5214 Gaines Street, San Diego, Ca 92110	Sector 1	2010
	Treatment Train System	Park Ridge Boulevard Bacteria Treatment for San Diego River Watershed Protection	Intersection of Park Ridge Boulevard and Murray Park Drive	Sector 2	2010

Southcrest Park Infiltration for Chollas Creek Watershed Protection

Concept Design

A below grade storage and infiltration basin will be installed within the grassy areas of Southcrest Park. Diversion structures will divert runoff from the existing storm drain system that runs through the parking area to the infiltration areas. Peak runoff rates in excess of the five-year, six-hour storm event will pass through the diversion structure and flow to the creek as in existing conditions. Prior to entering the infiltration areas, flows will pass through a hydrodynamic separator. When the infiltration basin is full, additional flows will pass through the system *via* an outflow pipe at the downstream end of the infiltration basin. This overflow pipe will connect to the existing storm drain system and convey flows downstream as in existing conditions. Existing lines, finished grades, and vegetation within the park will be restored after construction. Manholes will be constructed at several locations to be determined during final design. These locations should minimize impacts to the playing fields.

Asphalt concrete paving will be removed at several locations. Existing curb and gutters will be protected in place where possible. New pervious concrete paving and base will be installed in place of the old asphalt paving. Existing lines and grades will be maintained, as will existing parking striping to the extent that it complies with current code.

This project also has the option for restoration including approximately 500 linear feet of the reach of South Chollas Creek passing through the western portion of the site. This work would involve realignment of one of the park access roads, possible realignment of an existing sewer system, loss of a portion of turf covered park area, and extensive soil excavation but would result in new riparian habitat area, slowing of creek velocities through the 500-foot reach, and a new creek-side public trail similar to that constructed along other areas of South Chollas Creek. Project cost does not include this restoration work.

Drainage Area Limits – The project drainage area is the tributary watershed which includes Southcrest Park and storm drain system to which the project BMPs are connected. The drainage area has been delineated as shown in the drainage area drawings in Appendix E.

Project Coordination – Generally, the level of coordination required for this project was limited to gaining access to the site for geotechnical investigations. Weston coordinated with the City Park and Recreation Department to obtain facility access during the geotechnical investigations. Additional information regarding coordination and project contacts may be found in Appendix F.

Performance Specification – The project goal is to capture and infiltrate a volume from the tributary watershed equal to runoff from the five-year, six-hour storm event, with an additional goal of infiltrating runoff from impervious areas throughout the park *via* pervious pavement or routing flows to infiltration basins. Refer to detailed Performance Specifications below.

Operations and Maintenance (O&M) – It is anticipated that O&M will include regular maintenance of the hydrodynamic separator units. Maintenance requirements for these units may be lessened if they are designed so low flows can drain from the bottom of the units to either an infiltration area, the sanitary sewer, or further downstream in the storm drain system. This may not be possible in all circumstances. Maintenance on a less frequent basis may be required of the infiltration areas, although consistent maintenance of the hydrodynamic separators will greatly

decrease the trash and sediment reaching the infiltration areas, thus greatly reducing associated maintenance. Maintenance of the entire system will vary year to year based upon rainfall frequency.

The estimated construction cost is $2,276,000. Refer to detailed cost estimates below.

Performance Specifications

The goal of the Southcrest Park Infiltration for Chollas Creek Watershed Protection Project is to reduce the pollutant load and runoff volume entering Chollas Creek. This goal will be achieved by capturing and infiltrating a volume from the tributary watershed approximately equal to runoff from the five-year, six-hour storm event through pervious pavement, rerouting flow to infiltration basins, and capturing, holding, and utilizing water in rain barrel / downspout disconnect systems.

GENERAL

Unless otherwise indicated herein, work shall be done in accordance with the San Diego Regional Standard Drawings (SDRSD) latest approved edition.

Existing utilities shall be protected in place unless otherwise noted in construction drawings as directed by the Design Engineer.

It is recommended that, as part of the final design, in-situ permeability tests be performed to establish a BMP-specific infiltration rate. Due to percolation rates observed during a preliminary geotechnical investigation, it may be undesirable to locate projects where old paralic deposits were encountered.

Potential clogging issues will need to be addressed in the final design. Clogging issues will need to be monitored after the project has been constructed.

Project components shall be designed to remove pollutants and priority constituents of concern in the Chollas Creek Watershed, including bacteria, heavy metals, pesticides, and sediment (Appendix D). The system shall be designed to achieve a 99% reduction in bacteria for the treated flow in accordance with the final wet weather objective in the TMDL for Indicator Bacteria Project I – Beaches and Creeks in the San Diego Region (Bact-I TMDL). The system shall be designed to meet or exceed the Chollas Creek TMDL requirements for dissolved copper, lead, and zinc, and comply with the water quality objectives of the California Toxics Rule.

LOCATION 1 – ADJACENT TO NEWTON STREET

1. PERVIOUS PAVEMENT

The purpose of the pervious pavement is to reduce the volume of storm runoff entering the storm drain and reduce the pollutant load to the Chollas Creek from the drainage area. The pervious pavement shall be designed to infiltrate the rain that falls directly onto the paved area.

The project shall require demolition of existing asphalt and concrete (AC) paving and base as indicated on Sheet 4 of the concept designs. Existing curbs, gutters, sewers, storm drains, cleanouts, and utilities shall be protected in place. Existing cross gutters shall be removed and replaced in kind.

The pervious pavement shall:

- Be designed to allow maximum infiltration;
- Match existing grade lines;
- Have pervious concrete and crushed gravel aggregate base layer thickness sufficient to bear standard traffic loads without reducing structural integrity (layers designed in order to minimize clogging – final layer thickness determined during final engineering); and
- Be installed as indicated on Sheet 4 of the concept designs.

2. HYDRODYNAMIC SEPARATOR UPSTREAM OF INFILTRATIONS AREA 1 AND AREA 2

A hydrodynamic separator is a flow-through structure with a separation unit to remove trash and coarse sediment. The purpose of the hydrodynamic separator is to remove trash and sediment before design storm flow reaches cleanout (Detail C) and clogs the system.

The hydrodynamic separator shall:

- Have a hydraulic capacity sufficient to treat the design flow of no less than 40 cubic feet per second (cfs);
- Be designed for gravity flow (the central separation unit will result in significant head loss; therefore the hydraulic design of the hydrodynamic separator shall incorporate sufficient head to allow gravity flow – a mechanical pump system shall not be included in the hydraulic design); and
- Be installed as indicated on Sheet 5 of the concept designs.

3. CLEANOUT (DETAIL C)

The purpose of cleanout (Detail C) is to direct design flow from the upstream residential area and hydrodynamic separator into Infiltration Area 1 and Infiltration Area 2. It directs design storm flow exceeding the design flow through the existing storm drain to Chollas Creek. The existing storm drain shall act as a flow bypass for flows exceeding the 85th percentile Standard Urban Stormwater Management Plan (SUSUMP) storm event used for project design.

The cleanout (Detail C) shall:

- Incorporate into design diversions to Infiltration Area 1 and Infiltration Area 2 which accommodate a five-year storm event;
- Have a flow through hydraulic capacity sufficient to direct an 85th percentile SUSUMP storm event that ties into the existing storm drain (existing storm drain protected in place);
- Be designed for gravity flow in order to avoid system flooding and back up (objective achieved through the incorporation of sufficient pipe offsets); and
- Be designed in accordance with Sheet 5 of the concept designs, Detail C.

4. INFILTRATION AREA 1

The purpose of the grassy infiltration area is to reduce the volume of storm runoff entering the storm drain and reduce the pollutant load to the Chollas Creek.

Existing utilities and storm drains shall be protected in place. Playing field lines, grades, landscaping, striping, and irrigation shall be restored to existing conditions.

Infiltration Area 1 shall include (1) clean outs and (2) a stormwater infiltration system.

The cleanout shall:

- Provide maintenance access to Infiltration Area 1;
- Be designed for gravity flow such that the system does not cause flooding or backs up in the system. This objective shall be achieved through the incorporation of sufficient pipe offsets, diversion structures, or other structural solutions;
- Be designed in accordance with the specifications of SDRSD-D9, Type A cleanout; and
- Be installed as indicated on Sheet 5 of the concept designs.

The stormwater infiltration system shall:

- Be Storm Tank (Sheet 5 of the concept designs, Option 1: Detail A), Storm Chamber (Sheet 5 of the concept designs, Option 1: Detail B), or equivalent;
- Be designed to accommodate an approximate storage volume of 72,000 cubic feet (cf) (final storage volume, product type, and system footprint to be determined during the final engineering design); and
- Be installed as indicated on Sheet 5 of the concept designs.

5. STORM DRAIN

The purpose of the storm drain is to direct design flow from cleanout (Detail C) to Infiltration Area 2.

The storm drain shall:

- Be designed for gravity flow such that the system does not cause flooding;
- Be polyvinyl chloride (PVC) or reinforced concrete pipe (RCP) storm drain pipe (pipe shall be designed in accordance with the specifications of SDRSD-D60);
- Include a cleanout designed in accordance with the specifications of SDRSD-D9, Type A cleanout, approximately 175 feet of pipe downstream of cleanout (Detail C) and approximately 77 feet of pipe upstream of Infiltration Area 2; and
- Be installed as indicated on Sheet 5 of the concept designs.

6. INFILTRATION AREA 2

The purpose of the infiltration area is to reduce the volume of storm runoff entering the storm drain and reduce the pollutant load to the Chollas Creek.

Existing utilities and storm drains shall be protected in place. Playing field lines, grades, landscaping, striping, and irrigation shall be restored to existing conditions.

Infiltration Area 2 shall include (1) clean outs and (2) a stormwater infiltration system.

The cleanout shall:

- Provide maintenance access to Infiltration Area 2;
- Be designed for gravity flow such that the system does not cause flooding or backs up in the system. This objective shall be achieved through the incorporation of sufficient pipe offsets, diversion structures, or other structural solutions;
- Be designed in accordance with the specifications of SDRSD-D9, Type A cleanout; and
- Be installed as indicated on Sheet 5 of the concept designs.

The stormwater infiltration system shall:

- Be Storm Tank (Sheet 5 of the concept designs, Option 1: Detail A), Storm Chamber (Sheet 5 of the concept designs, Option 1: Detail B), or equivalent;
- Be designed to accommodate an approximate storage volume of 72,000 cf. (final storage volume, product type, and system footprint shall be determined during the final engineering design); and
- Be installed as indicated on Sheet 5 of the concept designs.

7. STORM DRAIN INLET (DETAIL D)

The purpose of the storm drain inlet (Detail D) is to direct design flow into the hydrodynamic separator and then to Infiltration Area 3. It also directs design storm flow exceeding the design flow through the existing storm drain to Chollas Creek.

The storm drain inlet (Detail D) shall:

- Have a flow through hydraulic capacity sufficient to direct an 85th percentile SUSUMP storm event which ties into the existing storm drain (existing storm drain shall be protected in place);
- Incorporate into design a diversion to Infiltration Area 3 which accommodates a five-year storm event;
- Be designed for gravity flow such that the system does not cause flooding or backs up in the system. This objective shall be achieved through the incorporation of sufficient pipe offsets, diversion structures, or other structural solutions; and
- Be designed in accordance with Sheet 5 of the concept designs, Detail D.

8. HYDRODYNAMIC SEPARATOR UPSTREAM OF INFILTRATION AREA 3

A hydrodynamic separator is a flow-through structure with a separation unit which removes trash and coarse sediment. The purpose of the hydrodynamic separator is to remove trash and sediment before design flow reaches Infiltration Area 3.

The hydrodynamic separator shall:

- Have a hydraulic capacity sufficient to treat the design flow of no less than 10 cfs;
- Be designed for gravity flow. The central separation unit will result in significant head loss; therefore the hydraulic design of the hydrodynamic separator shall incorporate

sufficient head to allow gravity flow – mechanical pump system not included in the hydraulic design;
- Connect into the Infiltration Area 3 (downstream) and storm drain inlet (Detail D) with approximately 44 feet of PVC or RCP storm drain pipe (pipe to be designed in accordance with the specifications of SDRSD-D60 – final pipe design and connection elevations shall be determined during the final engineering design); and
- Be installed as indicated on Sheet 5 of the concept designs.

9. INFILTRATION AREA 3

The purpose of the pervious pavement is to reduce the volume of storm runoff entering the storm drain and reduce the pollutant load to the Chollas Creek. The tributary drainage area for this project is southeast of Chollas Creek Park. The off-site storm drain empties to the ribbon gutter which drains to the catchbasin indicated on Sheet 5 of the conceptual design drawings.

Existing utilities and storm drains shall be protected in place. Playing field lines, grades, landscaping, striping, and irrigation shall be restored to existing conditions.

Infiltration Area 3 shall include (1) clean outs and (2) a stormwater infiltration system.

The cleanout shall:
- Provide maintenance access to Infiltration Area 3;
- Be designed for gravity flow such that the system does not cause flooding or backs up in the system. This objective shall be achieved through the incorporation of sufficient pipe offsets or other structural solutions;
- Be designed in accordance with the specifications of SDRSD-D9, Type A cleanout; and
- Be installed as indicated on Sheet 5 of the concept designs.

The stormwater infiltration system shall:
- Be Storm Tank (Sheet 5 of the concept designs, Option 1: Detail A), Storm Chamber (Sheet 5 of the concept designs, Option 1: Detail B), or equivalent;
- Be designed to accommodate an approximate storage volume of 10,500 cf. (final storage volume, product type, and system footprint shall be determined during the final engineering design); and
- Be installed as indicated on Sheet 5 of the concept designs.

LOCATION 2 – ALONG S. 40TH STREET

1. PERVIOUS PAVEMENT

The purpose of the pervious pavement is to reduce the volume of storm runoff entering the storm drain and reduce the pollutant load to the Chollas Creek. The pervious pavement shall be designed to infiltrate rain that falls directly onto the paved area.

The project shall require the demolition of existing AC paving and base as indicated on Sheet 2 of the concept designs. Existing curbs, gutters, sewers, manholes, and utilities shall be protected in place.

The pervious pavement shall:

- Be designed to allow maximum infiltration;
- Match existing grade lines;
- Have pervious concrete and crushed gravel aggregate base layer thickness sufficient to bear standard traffic loads without reducing structural integrity (layers shall be designed in order to minimize clogging – final layer thickness shall be determined during final engineering); and
- Be installed as indicated on Sheet 2 of the concept designs.

The walkway connecting the three pervious pavement parking lots may be realigned in order to widen Chollas Creek and restore habitat. In the event that the walkway is realigned, existing cross gutters shall be removed and replaced in kind.

LOCATION 3 – RECREATION CENTER AREA

1. PERVIOUS PAVEMENT

The purpose of the pervious pavement is to reduce the volume of storm runoff entering the storm drain and reduce the pollutant load to the Chollas Creek. The pervious pavement shall be designed to infiltrate rain that falls directly onto the paved area.

The project shall require the demolition of existing AC paving and base as indicated on Sheet 3 of the concept designs. Existing curbs, gutters, and utilities shall be protected in place. Pervious pavement shall be re-stripped to match existing conditions.

The pervious pavement shall:

- Be designed to allow maximum infiltration;
- Have pervious concrete and crushed gravel aggregate base layer thickness sufficient to bear standard traffic loads without reducing structural integrity (layers shall be designed in order to avoid clogging – final layer thickness shall be determined during the final engineering design);
- Be installed as shown on Sheet 3 of the concept designs (AC paving of poor structural integrity within 10 feet of the Southcrest Recreation Center shall be replaced in kind);
- Not be installed within 1 foot of the footprint of existing rain barrel / downspout disconnect systems on the northeast side of the Southcrest Recreation Center;
- Match existing grade lines;
- Incorporate a plain cement concrete (PCC) cutoff wall which shall run between the pervious pavement and existing AC pavement adjacent to the Southcrest Recreation Center in accordance with Section B-B on Sheet 3 of the concept designs (cutoff wall shall be at least 6 inches thick and designed to match the total final depth of the pervious concrete and aggregate base (the sum of final layer thicknesses)); and
- Be installed as indicated on the map on Sheet 3 of the concept designs and in Section B-B.

2. RAIN BARREL / DOWNSPOUT DISCONNECT SYSTEMS

Rain barrel / downspout disconnect systems are flow reduction structures which capture, hold, treat, and utilize roof runoff from the Southcrest Recreation Center for irrigation. The purpose of these systems is to reduce the volume of design storm runoff flowing to the Chollas Creek and provide a level of treatment.

The rain barrel / downspout disconnect systems shall:

- Be retrofitted into existing roof downspouts at the locations indicated on the map on Sheet 3 of the concept designs (engineer shall coordinate with the City of San Diego Storm Water Department regarding the location and design specifications of installed rain barrel / downspout disconnect systems).

Estimated Costs

Southcrest Park Construction Cost Estimate CValdo Corporation J# 07-021 April 21, 2008				
Item	**Quantity**	**Unit**	**Unit Price**	**Cost**
Demolition				
AC pavement and base removal – assumes 4 over 6	73,900	SF	$0.50	$36,950.00
Haul and dispose material – assumes 4 inches of asphalt concrete, 3 inches of base material – remainder of base material assumed reusable	1,600	CY	$50.00	$80,000.00
Miscellaneous soil and material export	1	LS	$10,000.00	$10,000.00
			Subtotal	$126,950.00
Improvements				
Excavate and export – assumes 6 feet of excavation	7,200	CY	$30.00	$216,000.00
Infiltration/storage device	82,500	CF	$6.00	$495,000.00
1.5–2 inches of gravel for infiltration area	2,610	CY	$35.00	$91,350.00
Cleanout – type A per SDRSD D-9	8	EA	$5,000.00	$40,000.00
RCP storm drain	310	LF	$126.00	$39,060.00
Curb inlet type B per SDRSD D-2	1	EA	$5,000.00	$5,000.00
8-inch thick pervious concrete	74,000	SF	$8.00	$592,000.00
4-inch thick permeable base	74,000	SF	$0.30	$22,200.00
PCC ribbon gutter	280	LF	$10.00	$2,800.00
Striping	150	Stall	$20.00	$3,000.00
Hydrodynamic separator unit at catchbasin	4	EA	$40,000.00	$160,000.00
Miscellaneous landscaping and irrigation	1	LS	$50,000.00	$50,000.00
Informative sign	1	EA	$5,000.00	$5,000.00
Rain barrels	7	EA	$500.00	$3,500.00
			Subtotal	$1,724,910.00
Miscellaneous				
Erosion control	1	LS	$5,000.00	$5,000.00
Traffic control	1	LS	$10,000.00	$10,000.00
			Subtotal	$15,000.00
			Construction subtotal	$1,866,860.00
			Mobilization – 6% of construction subtotal	$112,011.60
			Contingency – 15% of construction subtotal plus mobilization	$296,830.74
			Construction Total	**$2,275,702.34**

SOUTHCREST PARK INFILTRATION FOR CHOLLAS CREEK WATERSHED PROTECTION – CONCEPT PLAN

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- EXISTING SEWER LINE
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- EXISTING SEWER MANHOLE
- EXISTING STORM DRAIN INLET/OUTLET
- PROPOSED PERVIOUS PAVEMENT
- PROPOSED STORM DRAIN CLEANOUT
- PROPOSED STORM DRAIN
- PROPOSED HYDRODYNAMIC SEPARATOR
- PROPOSED CURB INLET
- PROPOSED INFILTRATION BASIN AREA

SHEET INDEX

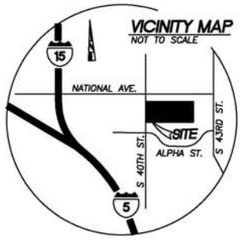
TITLE SHEET	1
PERVIOUS PAVEMENT	2–4
STORM WATER INFILTRATION DETAILS	5

NOTES

1. STRUCTURAL SECTION OF PERVIOUS CONCRETE AND BASE TO BE DETERMINED DURING FINAL DESIGN. SECTION CALLED OUT IS FOR COST ESTIMATING PURPOSES ONLY.
2. INFILTRATION LIMITS AND LOCATION TO BE DETERMINED DURING FINAL DESIGN. AREAS SHOWN ON THIS PLAN SETS ARE FOR COST ESTIMATING PURPOSES ONLY. INFILTRATION STORAGE VOLUME TO BE BASED ON FIVE-YEAR, SIX-HOUR STORM EVENT.

KEY MAP 1"=100'

LEGEND SHEET NUMBER 2



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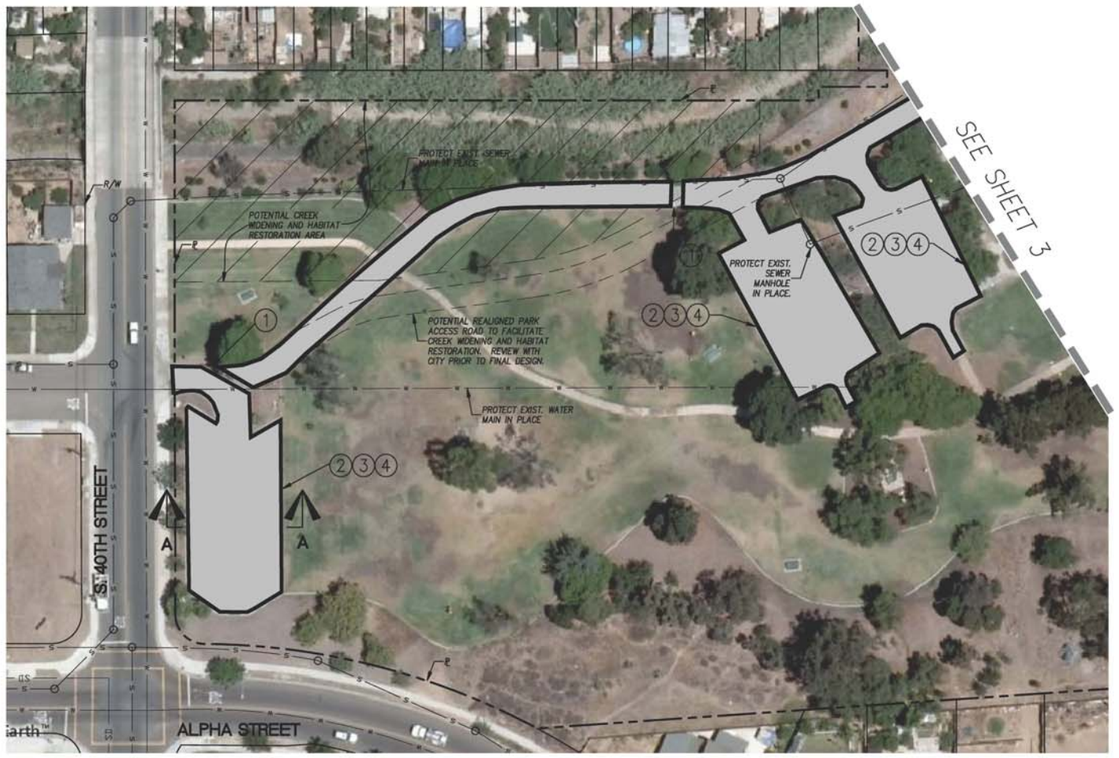
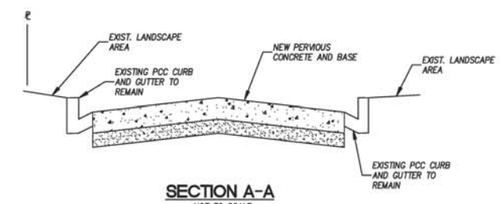
SHEET 1 OF 5

SOUTHCREST PARK INFILTRATION FOR CHOLLAS CREEK WATERSHED PROTECTION – CONCEPT PLAN



WORK TO BE DONE

1. REMOVE AND REPLACE EXISTING CROSS GUTTER IN KIND.
2. REMOVE EXISTING AC PAVING AND BASE IN SHADED AREA – PROTECT EXISTING PCC CURBS AND GUTTERS IN PLACE.
3. PLACE NEW 8 INCH THICK PERVIOUS CONCRETE PAVEMENT OVER 4 INCHES OF PERMEABLE CRUSHED AGGREGATE BASE IN SHADED AREA – MAINTAIN EXISTING LINES AND GRADES. PERVIOUS CONCRETE THICKNESS AND BASE THICKNESS PROVIDED FOR COST ESTIMATING PURPOSES ONLY. FINAL PERVIOUS CONCRETE AND BASE THICKNESS TO BE DETERMINED DURING FINAL DESIGN.
4. STRIPE NEW PERVIOUS CONCRETE PAVEMENT TO MATCH EXISTING PARKING LOT STRIPING.



SECTION A-A
NOT TO SCALE

GRAPHIC SCALE
40 0 20 40 80
(IN FEET)
1 inch = 40 ft.

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SHEET 2 OF 5

SOUTHCREST PARK INFILTRATION FOR CHOLLAS CREEK WATERSHED PROTECTION – CONCEPT PLAN

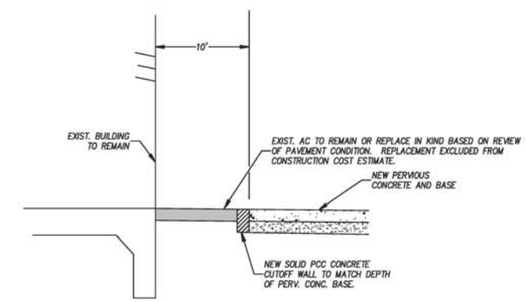
WORK TO BE DONE

(2) REMOVE EXISTING AC PAVING AND BASE IN SHADED AREA – PROTECT EXISTING PCC CURBS AND GUTTERS IN PLACE.

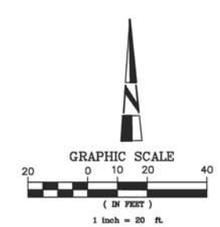
(3) PLACE NEW 8 INCH THICK PERVIOUS CONCRETE PAVEMENT OVER 4 INCHES OF PERMEABLE CRUSHED AGGREGATE BASE IN SHADED AREA – MAINTAIN EXISTING LINES AND GRADES. PERVIOUS CONCRETE THICKNESS AND BASE THICKNESS PROVIDED FOR COST ESTIMATING PURPOSES ONLY. FINAL PERVIOUS CONCRETE AND BASE THICKNESS TO BE DETERMINED DURING FINAL DESIGN.

(4) STRIPE NEW PERVIOUS CONCRETE PAVEMENT TO MATCH EXISTING PARKING LOT STRIPING.

(12) INSTALL RAIN BARREL CONNECTED TO EXISTING DOWNSPOUT – COORDINATE WITH CITY STORMWATER RAIN BARREL PROGRAM



SECTION B-B
NOT TO SCALE
TYP. AT BUILDINGS



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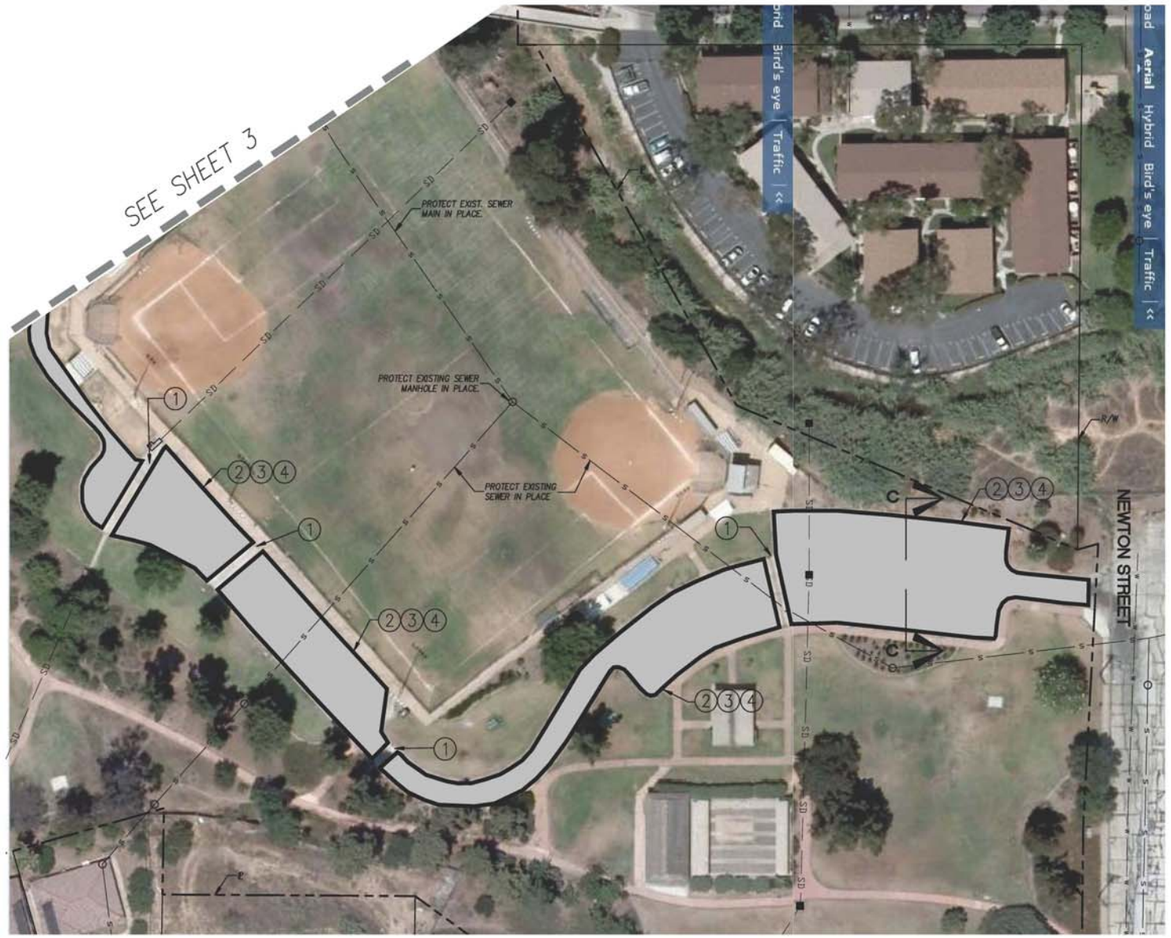
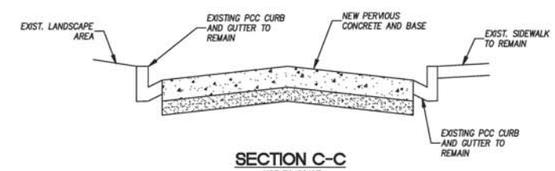
SHEET 3 OF 5

SOUTHCREST PARK INFILTRATION FOR CHOLLAS CREEK WATERSHED PROTECTION – CONCEPT PLAN



WORK TO BE DONE

1. REMOVE AND REPLACE EXISTING CROSS GUTTER IN KIND.
2. REMOVE EXISTING AC PAVING AND BASE IN SHADED AREA – PROTECT EXISTING PCC CURBS AND GUTTERS IN PLACE.
3. PLACE NEW 8 INCH THICK PERVIOUS CONCRETE PAVEMENT OVER 4 INCHES OF PERMEABLE CRUSHED AGGREGATE BASE IN SHADED AREA – MAINTAIN EXISTING LINES AND GRADES. PERVIOUS CONCRETE THICKNESS AND BASE THICKNESS PROVIDED FOR COST ESTIMATING PURPOSES ONLY. FINAL PERVIOUS CONCRETE AND BASE THICKNESS TO BE DETERMINED DURING FINAL DESIGN.
4. STRIPE NEW PERVIOUS CONCRETE PAVEMENT TO MATCH EXISTING PARKING LOT STRIPING.



SECTION C-C
NOT TO SCALE

GRAPHIC SCALE
40 0 20 40 80
(IN FEET)
1 inch = 40 ft.

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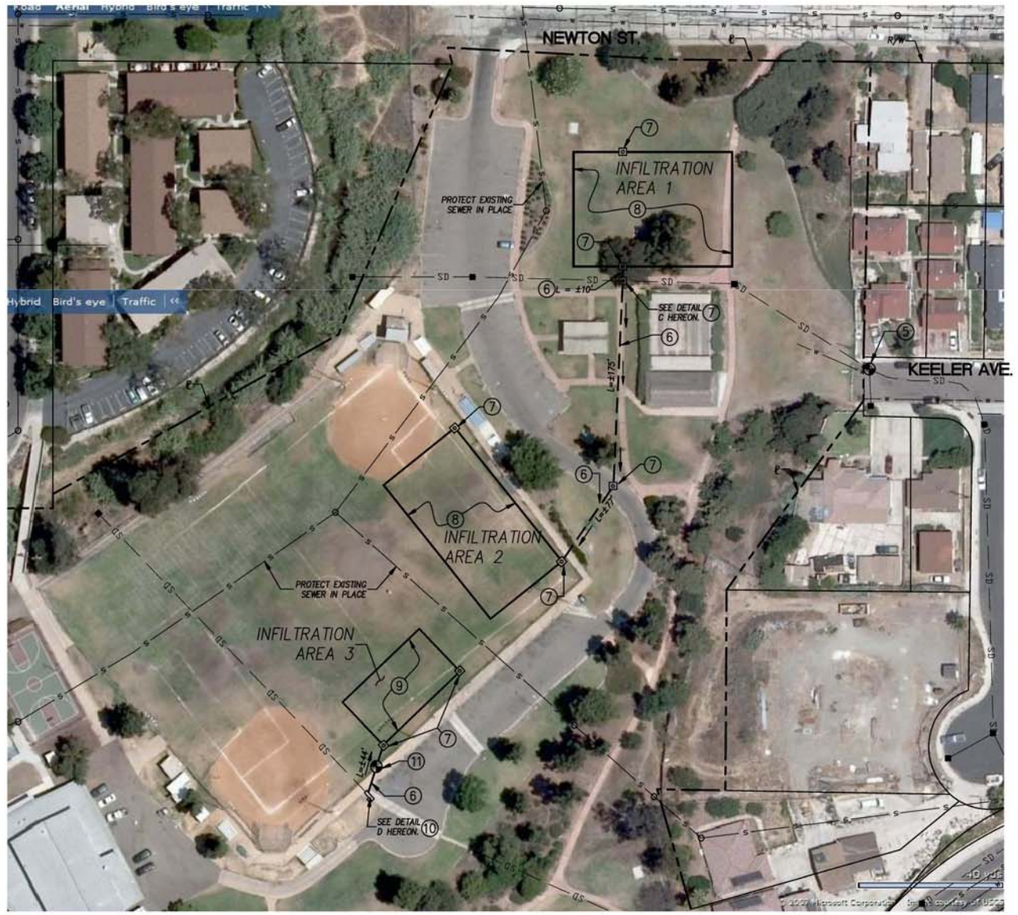
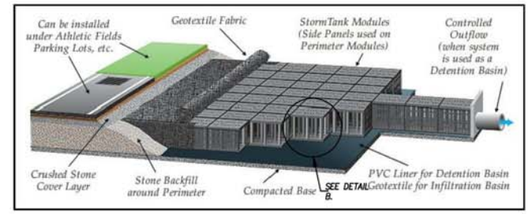
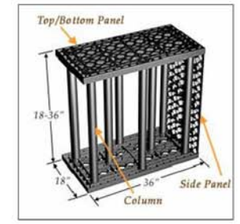
SHEET 4 OF 5

SOUTHCREST PARK INFILTRATION FOR CHOLLAS CREEK WATERSHED PROTECTION – CONCEPT PLAN





OPTION 1: DETAIL A – STORM TANK
NOT TO SCALE

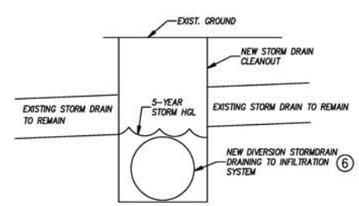


OPTION 1: DETAIL B – STORM TANK
NOT TO SCALE

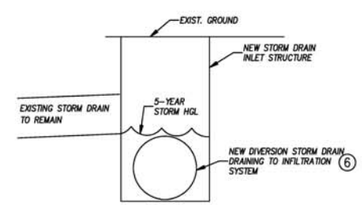
WORK TO BE DONE

5. INSTALL HYDRODYNAMIC SEPARATOR – MULTIPLE UNITS MAY BE REQUIRED – DESIGN FLOW IS APPROXIMATELY 40 CFS.
6. INSTALL PVC OR RCP STORMDRAIN
7. INSTALL STORM DRAIN CLEANOUT PER SDRSD D-9
8. INSTALL UNDERGROUND STORMWATER INFILTRATION SYSTEM PER DETAIL A OPTION 1 OR OPTION 2, OR EQUIVALENT. AREAS SHOWN ON PLANS ARE CONCEPTUAL AND MAY BE MODIFIED. INFILTRATION AREAS 1 AND 2 TOTAL STORAGE VOLUME TO BE APPROXIMATELY 72,000 CF. RESTORE PLAYING FIELD LINES, GRADES, LANDSCAPING, STRIPING, AND IRRIGATION TO EXISTING CONDITIONS.
9. INSTALL UNDERGROUND STORMWATER INFILTRATION SYSTEM PER DETAIL A OPTION 1 OR OPTION 2, OR EQUIVALENT. AREA SHOWN ON PLANS ARE CONCEPTUAL AND MAY BE MODIFIED. INFILTRATION AREA 3 STORAGE VOLUME TO BE APPROXIMATELY 10,500 CF. RESTORE PLAYING FIELD LINES, GRADES, LANDSCAPING, STRIPING, AND IRRIGATION TO EXISTING CONDITIONS.
10. INSTALL CURB INLET TYPE B PER SDRSD D-2 MODIFIED PER DETAIL D
11. INSTALL HYDRODYNAMIC SEPARATOR – DESIGN FLOW IS APPROXIMATELY 10 CFS.

OPTION 2 – STORM CHAMBERS
NOT TO SCALE



DETAIL C
NOT TO SCALE



DETAIL D
NOT TO SCALE

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 inch = 50 ft.

STORMWATER STORAGE DATA TABLE

		DIMENSIONS							
PRODUCT NAME*	MANUFACTURER	LENGHT (FT)	WIDTH (FT)	HEIGHT (FT)	CALCULATED PRODUCT VOLUME (CF) PER UNIT	VOID RATIO	LOAD CAPACITY	CALCULATED WATER STORAGE VOL. (CF) PER UNIT	UNITS REQUIRED FOR STORAGE CAPACITY
STORM TANK	BRENTWOOD INDUSTRIES	3	1.5	1.5	6.8	97%	H-25	6.6	12,450
STORM TANK	BRENTWOOD INDUSTRIES	3	1.5	3.0	13.5	97%	H-25	13.0	6,320
STORM CHAMBERS	HYDROLOGIC SOLUTIONS	8.5	5.0	2.8	115.0†	–‡	H-20	75.0	720

* SHOWN FOR COMPARISON ONLY.
† BASED ON 6" OF 1.5"-2" STONE ABOVE AND 6" BELOW STORM CHANBERS.
‡ MANUFACTURE SPEC. NOT AVAILABLE

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SHEET 5 OF 5

SDPD Western Division Porous Pavement for San Diego River Watershed Protection

Concept Design

Several of the SDPD Western Division parking lots will be reconstructed in order to remove existing asphalt concrete paving and replaced with pervious concrete pavement. Existing curb and gutters will be protected in place where possible, and existing lines and finished grades will be maintained, as will existing parking striping to the extent that it complies with current code. The new pavement section will include the pervious concrete paving, a gravel base, an amended soil layer, and a gravel subdrain system. The subdrain system is necessary due to low-permeability soils found at the site. The subdrain system will tie in to the existing storm drain system within the site at several locations.

Under existing conditions, there are underground fuel storage tanks and monitoring wells within the property. No infiltration is proposed in the immediate vicinity of these tanks or monitoring wells. The need for a below grade impermeable barrier between the infiltration areas and the tanks, used to prevent lateral migration of infiltrate parking lot stormwater, should be investigated during final design.

Drainage Area Limits – The project drainage area only includes the SDPD Western Division facilities which drain to the parking lot. No drainage area map has been provided.

Project Coordination – Generally, the level of coordination required for this project was limited to gaining access to the site for geotechnical investigations. Weston coordinated with the City Police Department to obtain facility access during the geotechnical investigations. Weston also coordinated with City maintenance personnel responsible for the SDPD Western Division facilities to obtain information regarding the size, type, and location of the underground fuel storage tanks and monitoring wells. Additional information regarding coordination and project contacts may be found in Appendix F.

Performance Specification – The project goal is to infiltrate rainfall landing on the new pervious concrete parking areas and allow this rainfall—which previously would have run off the site carrying parking lot pollutants—to pass through the base and amended soils for treatment prior to exiting the site through the subdrain to the existing storm drain system. Refer to detailed Performance Specifications below.

Operations and Maintenance (O&M) – It is anticipated that O&M will consist of biannual (twice per year) sweeping of the pervious pavement with a suction/evacuation truck. The frequency of this sweeping may vary based upon performance of the pavement.

The estimated construction is $1,741,000. Refer to detailed cost estimate below.

Performance Specifications

The goal of the SDPD Western Division Porous Pavement for San Diego River Watershed Protection Project is to reduce the pollutant load and volume of runoff entering the storm drain. This goal will be achieved by infiltrating rainfall landing on the new pervious concrete parking areas and allow this rainfall, which previously would have run off the site carrying parking lot pollutants, to pass through the base and amended soils for treatment prior to exiting the site through the underdrain to the existing storm drain system.

GENERAL

Unless otherwise indicated herein, work shall be done in accordance with the latest approved edition of SDRSD.

Existing utilities shall be protected in place unless otherwise noted in construction drawings as directed by the Design Engineer. Existing curb and gutters shall be protected in place where possible. Existing lines and finished grades shall be maintained as shall existing parking striping to the extent that it complies with current code.

Potential clogging issues will need to be addressed in the final design. Clogging issues will need to be monitored after the project has been constructed.

Project components shall be designed to remove pollutants and priority constituents of concern in the San Diego River Watershed, including bacteria, gross pollutants (trash), nutrients, sediment, and total dissolved solids (Appendix D). The system shall be designed to achieve a 99% reduction in bacteria for the treated flow, in accordance with the final wet weather objective in the Bact-I TMDL.

1. PERVIOUS PAVEMENT (EAST)

The purpose of the pervious pavement is to reduce the volume of storm runoff entering the storm drain and reduce the bacterial pollutant load to the storm drain. The pervious pavement shall be designed to infiltrate rain that falls directly onto the paved area.

The low permeability of existing soils minimizes the potential for down gradient flow from the pervious pavement (east) through the monitored area surrounding the underground storage tanks (USTs) west of the project site. The pervious pavement shall be designed in order to avoid horizontal flow as a result of infiltration.

Existing planters, curbs, and gutters shall be protected in place where possible.

The pervious pavement shall consist of (1) pervious concrete, (2) amended soils (base), (3) a sub-base and underdrain (outlet) system, (4) geosynthetic lining (optional), and (5) cutoff walls.

The pervious concrete shall:

- Be designed to allow maximum infiltration;
- Match existing grade lines;

- Have a thickness sufficient to bear standard traffic loads without reducing structural integrity (final thickness of concrete layer shall be determined during final engineering); and
- Be installed as indicated in Section B-B of the concept design.

The amended soils (base) shall:

- Be designed to allow maximum infiltration and treat the design flow;
- Be designed with sufficient thickness in order to minimize clogging (final engineering design may include an optional geotextile layer to separate the amended soil layer from the underlying gravel drainage layer (sub-base));
- Minimize the number of organics in the design mixture to minimize decomposition as a natural source of bacteria and maximize structural integrity of the base soil;
- Have a thickness, soil structure, and load-bearing capacity sufficient to support and carry standard traffic loads (vertical subsidence shall be minimized – final base thickness and composition shall be determined during final engineering); and
- Be installed as indicated in Section B-B of the concept design.

The sub-base and underdrains (outlet) system shall:

- Be designed to allow maximum infiltration such that no hydraulic head develops as a result of infiltration (no horizontal (east to west) flow shall occur as a result of the pervious pavement/infiltration system);
- Be designed in order to minimize clogging (underdrains shall extend close to the edge of the porous pavement in order for the porous pavement to drain even if the amended soil layer becomes clogged – sub-base section shall have a minimum gravel layer thickness of 1 foot – final thickness of sub-base shall be determined during final design);
- Space pipes at 10 feet on center across the entire length of the pervious pavement area; and
- Be designed using perforated pipe (entire system of pipes shall be burrito-wrapped with gravel and filter fabric as indicated in Section B-B of the concept design – during the final engineering design, an equivalent graded filter system may be used as an alternative to the burrito-wrap geotextile system).

The (optional) geosynthetic lining shall:

- Prevent horizontal flow from the pervious pavement (east) section through the monitored area surrounding the USTs west of the project site;
- Be impermeable;
- Be non-woven Poly-Flex or Nilex (or equivalent type) geocomposite liner;
- Be installed along western boundary of as indicated on the concept design; and
- Be designed to minimize clogging.

The cutoff walls shall:

- Prevent horizontal flow from the pervious pavement (east) section through the monitored area surrounding the USTs west of the project site;
- Be 6-inch thick PCC concrete;
- Be designed to match the total final depth of the pervious concrete, amended soils base, and sub-base (sum of final layer thicknesses); and
- Be installed as indicated in Section B-B of the concept design.

2. PERVIOUS PAVEMENT (WEST)

The purpose of the pervious pavement is to reduce the volume of storm runoff entering the storm drain and reduce the bacterial pollutant load to the storm drain. The pervious pavement shall be designed to infiltrate rain that falls directly onto the paved area.

Existing planters, curbs, and gutters shall be protected in place where possible.

The pervious pavement shall consist of (1) pervious concrete, (2) amended soils (base), (3) gravel (sub-base), (4) an underdrain system with geosynthetic liner, and (5) cutoff walls.

The pervious concrete shall:

- Be designed to allow maximum infiltration;
- Match existing grade lines;
- Have a thickness sufficient to bear standard traffic loads without reducing structural integrity (final thickness of concrete layer shall be determined during final engineering); and
- Be installed as indicated in Section A-A of the concept design.

The amended soils (base) shall:

- Be designed to allow maximum infiltration and treat the design flow;
- Be designed with sufficient thickness in order to minimize clogging (final engineering design may include an optional geotextile layer to separate the amended soil layer from the underlying gravel drainage layer (sub-base));
- Minimize the number of organics in the design mixture to minimize decomposition as a natural source of bacteria and maximize structural integrity of the base soil;
- Have a thickness, soil structure, and load-bearing capacity sufficient to support and carry standard traffic loads (vertical subsidence shall be minimized – final base thickness and composition shall be determined during the final engineering design); and
- Be installed as indicated in Section A-A of the concept design.

The gravel sub-base shall:

- Be designed to allow maximum infiltration;
- Be designed in order to minimize clogging (sub-base section shall have a minimum gravel layer thickness of 1 foot – final thickness of sub-base shall be determined during final design); and
- Be installed as indicated in Section A-A of the concept design.

The underdrains (outlet system) shall:

- Be designed in order to maximize infiltration (design shall use perforated pipe which is spaced and size in accordance with the needs with the design flow during the final engineering design);
- Be designed in order to minimize clogging (underdrains shall extend close to the edge of the porous pavement in order for the porous pavement to drain even if the amended soil layer becomes clogged; and

- Each pipe shall be wrapped in filter fabric and installed as indicated in Section A-A of the concept design (during the final engineering design, an equivalent graded filter system may be used as an alternative to the burrito-wrap geotextile system).

The cutoff walls shall:

- Be 6-inch thick PCC concrete;
- Be designed to match the total final depth of the raised planter height or the sum of final layer thicknesses of the pervious concrete, amended soils base, and sub-base; and
- Be installed as indicated in Section A-A of the concept design.

3. RAIN BARREL / DOWNSPOUT DISCONNECT SYSTEM

Rain barrel / downspout disconnect systems are flow reduction structures which capture, hold, and utilize roof runoff from the existing building for irrigation. The purpose of these systems is to reduce the volume of design storm runoff flowing to the storm drain.

The rain barrel / downspout disconnect systems shall tie into existing roof downspouts at the locations indicated on the concept design.

Existing curb and asphalt shall be protected in place where possible.

The rain barrel / downspout disconnect systems shall consist of (1) a raised concrete planter, (2) rip rap, and (3) amended soils.

The raised concrete planter shall:

- Be designed for gravity flow such that the system does not cause flooding for an 85th percentile SUSUMP design storm;
- Be sized to treat the design flow to capture, hold, and treat the design flow;
- Allow storm flow exceeding the design flow to exit the planter through the existing PVC downspout drain pipe, in accordance with Section C-C of the concept design; and
- Be installed as indicated in Section C-C of the concept design.

The rip rap shall:

- Function as an energy dissipater;
- Be designed in accordance with the specifications of SDRSD-D40; and
- Be installed as indicated in Section C-C of the concept design.

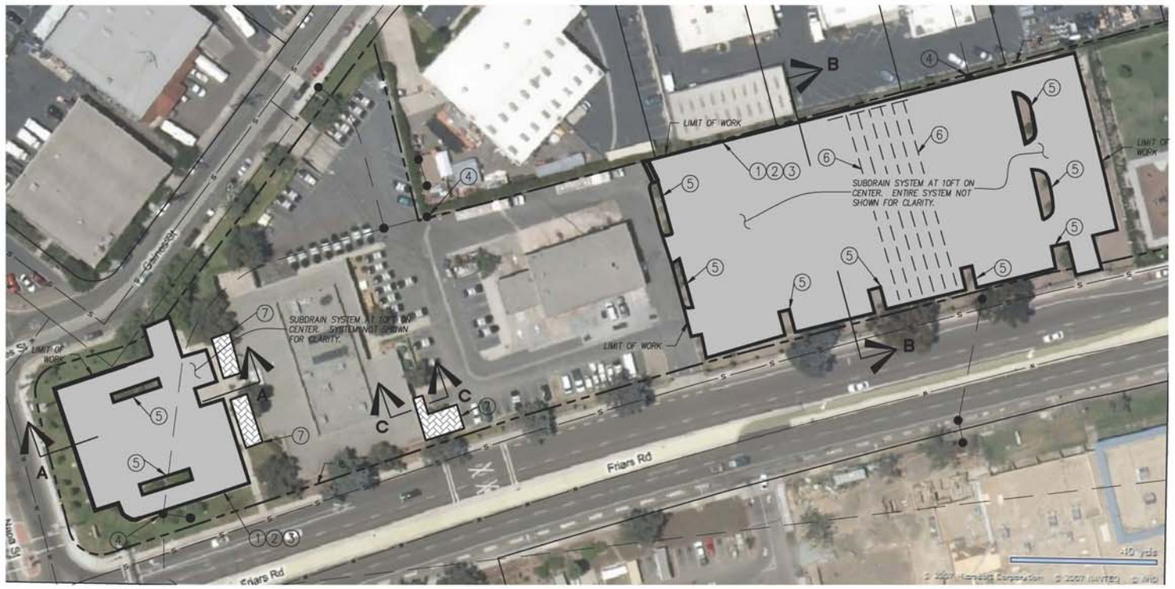
The amended soils shall:

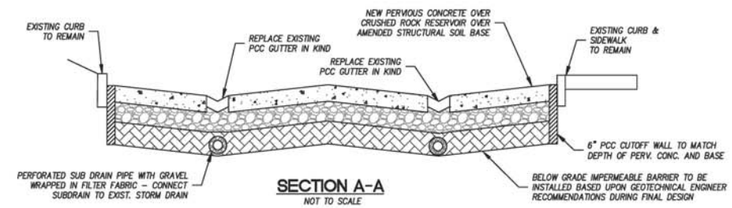
- Be designed to treat the design flow to achieve maximum load reduction, allow maximum infiltration, and sustain the selected species of trees/shrubs;
- Minimize the number of organics in the design mixture to minimize decomposition as a natural source of bacteria; and
- Be installed as indicated in Section C-C of the concept design.

Estimated Costs

SDPD West Division Construction Cost Estimate CValdo Corporation J# 07-021 April 21, 2008				
Item	**Quantity**	**Unit**	**Unit Price**	**Cost**
Demolition				
AC pavement and base removal – assumes 4 over 6	79,600	SF	$0.50	$39,800.00
Haul and dispose material – assumes 4 inches of asphalt concrete, 3 inches of base material – remainder of base material assumed reusable	1,750	CY	$50.00	$87,500.00
Miscellaneous soil and material export	1	LS	$10,000.00	$10,000.00
			Subtotal	$137,300.00
Improvements				
8-inch thick pervious concrete	79,600	SF	$8.00	$636,800.00
1-foot thick of gravel base	3,000	CY	$35.00	$105,000.00
1-foot thick of amended soil base	3,000	CY	$35.00	$105,000.00
Excavate and export (assumes 2 feet of excavation)	6,000	CY	$22.00	$132,000.00
PCC ribbon gutter	410	LF	$10.00	$4,100.00
6-inch wide by 3-feet deep PCC cutoff wall	2,300	LF	$20.00	$46,000.00
PVC or hdpe subdrain with gravel and fabric	8,000	LF	$25.00	$200,000.00
PCC planter box	3	EA	$10,000.00	$30,000.00
Striping	250	Stall	$20.00	$5,000.00
Miscellaneous landscaping and irrigation	1	LS	$10,000.00	$10,000.00
Attach subdrain to existing drainage system	2	EA	$1,000.00	$2,000.00
			Subtotal	$1,275,900.00
Miscellaneous				
Erosion control	1	LS	$5,000.00	$5,000.00
Traffic control	1	LS	$10,000.00	$10,000.00
			Subtotal	$15,000.00
			Construction Subtotal	$1,428,200.00
			Mobilization – 6% of construction subtotal	$85,692.00
			Contingency – 15% of construction subtotal plus mobilization	$227,083.80
			Construction Total	**$1,740,975.80**

SDPD WEST DIVISION POROUS PAVEMENT FOR SAN DIEGO RIVER WATERSHED PROTECTION – CONCEPT DESIGN





SECTION A-A
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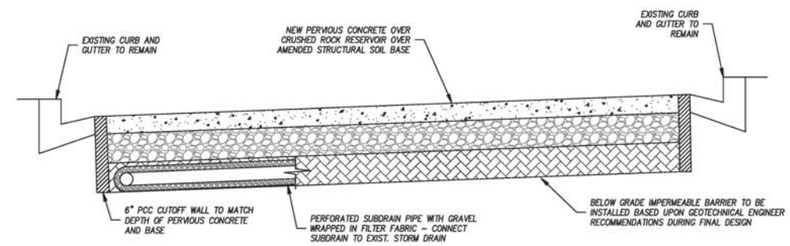

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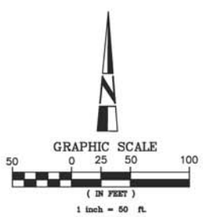
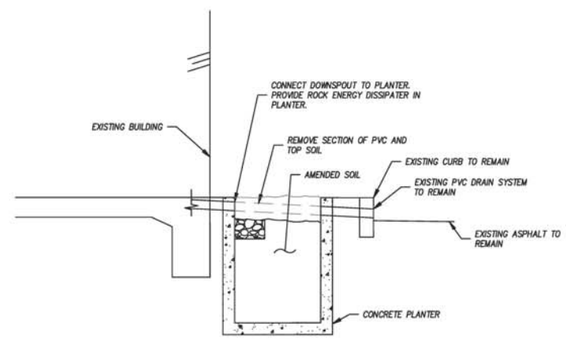
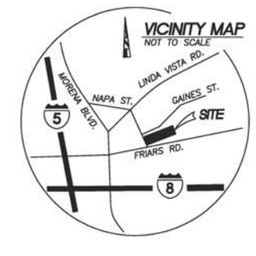


WORK TO BE DONE

1. REMOVE EXISTING AC PAVING AND PCC GUTTER IN SHADED AREA – PROTECT EXISTING PCC CURBS IN PLACE.
2. PLACE NEW 8 INCH THICK PERVIOUS CONCRETE PAVEMENT OVER 1 FOOT OF GRAVEL SUB-BASE AND 1 FOOT OF AMENDED SOIL BASE IN SHADED AREA – MAINTAIN EXISTING LINES AND GRADES. PERVIOUS CONCRETE THICKNESS AND BASE THICKNESS PROVIDED FOR COST ESTIMATING PURPOSES ONLY. FINAL PERVIOUS CONCRETE AND BASE THICKNESS TO BE DETERMINED DURING FINAL DESIGN.
3. STRIPE NEW PERVIOUS CONCRETE PAVEMENT TO MATCH EXISTING PARKING LOT STRIPING.
4. PROTECT EXISTING STORM DRAIN INLET IN PLACE.
5. PROTECT EXISTING PLANTER IN PLACE.
6. INSTALL PERFORATED SUBDRAIN WITH GRAVEL WRAPPED IN FILTER FABRIC – CONNECT SUBDRAIN TO EXISTING STORM DRAIN.
7. INSTALL CONCRETE PLANTER PER SECTION C-C
8. INSTALL 6" PCC CUTOFF WALL TO MATCH DEPTH OF PERVIOUS CONCRETE AND BASE OR RAISED PLANTER HEIGHT.



SECTION C-C
NOT TO SCALE
TYP. AT BUILDINGS



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Mira Mesa Library Bioretention for Los Peñasquitos Watershed Protection

Concept Design

New catchbasins will be constructed within the parking area to capture parking lot and building runoff. These catchbasins will drain *via* a new storm drain system to an existing unpaved area on the site. Under existing conditions, this unpaved area is higher in elevation than the parking lot and is covered with grass. This area will be excavated approximately 5 feet below the parking lot elevation, lined with an impermeable liner, and backfilled around the perimeter of the excavation with a gravel reservoir to which the new storm drain system will drain. Soils and plants capable of surviving with only the seasonal rainfall typical of Southern California will be placed in the center of the excavation. The gravel reservoir will be separated from the planter area by a concrete wall. Storm runoff will pass from the gravel reservoir to the planter area *via* small-diameter pipes through the concrete wall.

In addition, approximately four building downspouts will be retrofitted with rain barrels which will drain to raised concrete planters. The planters will allow low flows to infiltrate and pass through a subdrain system out the bottom of the planter, while high flows will pass over the surface of the planter and exit on the far end from the rain barrel. The rain barrels will be installed elevated and secured to capture runoff from the rainspouts. This runoff can be used to water the raised planters by gravity flow.

Drainage Area Limits – The project drainage area only includes the Mira Mesa Library facilities which drain to the parking and rain barrel systems included in this project. No drainage area map has been provided.

Project Coordination – Generally, the level of coordination required for this project was limited to gaining access to the site for geotechnical investigations. Weston coordinated with the City Libraries Department to obtain facility access during the geotechnical investigations and to obtain input regarding the aesthetics and placement of the rain barrel / downspout disconnect systems. Additional information regarding coordination and project contacts may be found in Appendix F.

Performance Specification – The project goal is to capture site runoff from the five-year, six-hour storm event and convey it to the gravel reservoir / planter area where the water will exit the site *via* evapotranspiration. An additional project goal is to capture roof runoff with rain barrels and use it to water raised planters, with the planters providing treatment *via* infiltration for low flows or surface contact during high flows. Refer to detailed Performance Specifications below.

Operations and Maintenance (O&M) – It is anticipated that O&M will consist of regularly cleaning out the catchbasin filter inserts and to a lesser extent the storm drain cleanouts. The frequency of maintenance on cleanouts will depend greatly upon the degree of maintenance of catchbasin inserts.

The estimated construction cost is $329,000. Refer to detailed cost estimate below.

Performance Specifications

The goal of the Mira Mesa Library Bioretention for Los Peñasquitos Watershed Protection Project is to reduce the pollutant load and volume of runoff entering the storm drain. This goal will be achieved by infiltrating rainfall landing on the new pervious concrete parking areas and allow this rainfall—which previously would have run off the site carrying parking lot pollutants—to pass through the base and amended soils for treatment prior to exiting the site through the underdrain system. A portion or the underdrain system will drain to the planter area where the water will exit the site *via* evapotranspiration. This goal will also be achieved by capturing roof runoff from the Mira Mesa Library in rain barrel / downspout disconnection systems which hold and utilize the water for irrigation.

GENERAL

Unless otherwise indicated herein, work shall be done in accordance with the latest approved edition of SDRSD.

Existing utilities shall be protected in place unless otherwise noted in construction drawings as directed by the Design Engineer.

Under existing conditions, the Mira Mesa Library parking lot drains overland to the adjacent streets. The existing drainage shall be maintained in order to avoid parking lot flooding. The existing grade of the parking lot pavement and the capacity of and flow lines to the existing storm drains in the street adjacent shall be maintained. The purpose of the overflow pipe of the bioretention planter is to limit the height which water will sit ponded within the stone reservoir by providing a means for positive drainage, not necessarily to convey a particular design storm. In the event that the planter becomes full and the capacity of the overflow drain is exceeded, the system shall back up to prevent water from entering the catchbasins and drain overland. This will only occur under extreme conditions or after periods of extended rainfall where the planter has not had sufficient time to evapotranspirate the retained runoff. The design storm used for the overflow drain will be determined by design engineering during the final engineering design.

Potential clogging issues will need to be addressed in the final design. Clogging issues will need to be monitored after the project has been constructed.

Project components shall be designed to remove pollutants and priority constituents of concern in the Los Peñasquitos Watershed, including bacteria, nutrients, sediment, and total dissolved solids (Appendix D). The system shall be designed to achieve a 99% reduction in bacteria for the treated flow, in accordance with the final wet weather objective in the Bact-I TMDL.

1. GRATE INLET SKIMMER

The purpose of the grate inlet skimmer is to capture trash and debris before it enters the bioretention planter system and storm drain system.

The grate inlet skimmer shall:

- Be a grate inlet skimmer (Biocleanenvironmental – see Appendix G), or equivalent;

- Have a hydraulic capacity sufficient to capture an 85th percentile SUSUMP storm event and accommodate the drainage area (Mira Mesa Library parking lot and building);
- Provide maintenance access; and
- Be installed as indicated in Sheet 1 of the concept design.

Existing curbs shall be protected in place where possible.

2. STORM DRAIN

The purpose of the storm drain is to direct flow from the grate inlet skimmers to the bioretention planter system.

The storm drain shall:

- Be designed for gravity flow such that the system does not cause flooding;
- Be designed using PVC pipe (pipe and bedding conditions are in accordance with the specifications of SDRSD-D60);
- Be installed as indicated on Sheet 1 of the concept design.
- Be installed so that the existing curb and gutters are protected in place where possible.

Upon completion of the project, the existing storm drain trenches in the Mira Mesa parking lot shall be resurfaced in accordance with the specifications of SDRSD-G24.

3. STORM DRAIN CLEANOUT

The purpose of storm drain cleanouts is to provide maintenance access to the bioretention planter system.

The storm drain cleanouts shall:

- Be designed for gravity flow such that the system does not cause flooding or backs up in the system. This objective shall be achieved through the incorporation of sufficient pipe offsets, diversion structures, or other structural solutions;
- Be designed in accordance with the specifications of SDRSD-D9, Type A cleanout; and
- Be installed as indicated on Sheet 1 of the concept design.

Upon completion of the project, the parking lot shall be restored to existing grade and parking spaced shall be re-striped in accordance with City regulations.

4. BIORETENTION PLANTER SYSTEM

The bioretention planter system is a natural treatment system which captures, holds, and treats a design flow using amended soils and vegetation. The purpose of the system is to reduce the pollutant loading.

The bioretention planter system shall consist of (1) sidewalk and sidewalk underdrains (inlet system), (2) a crushed rock reservoir, (3) amended soils, (4) vegetation, (5) a filter blanket, (6) geosynthetic lining, and (7) an underdrain (outlet system).

The existing sidewalk shall be demolished as indicated on Sheet 1 of the concept design. The demolished sidewalk shall be replaced with new concrete sidewalks in accordance with the specifications of SDRSD-G11.

The sidewalk underdrains (inlet system) shall:

- Be designed in accordance with the specifications of SDRSD-D27;
- Provide a hydraulic capacity sufficient to allow the design flow to enter the bioretention planter system; and
- Be installed as indicated on Sheet 1 of the concept design and in the detail on Sheet 2 of the concept design.

The crushed rock reservoir shall:

- Encompass the area where treatment, storage, and evapotranspiration will take place;
- Include an open concrete planter box where treatment will take place (planter box shall be at least 110 feet long by 20 feet wide by 5 feet deep, with 8-inch thick walls and provide sufficient hydraulic capacity to capture and treat the design flow);
- Be at least 5 feet deep, as measured from the elevation of the existing adjacent sidewalk, and transition from the crushed rock layer to a 6 inch layer of pea gravel, a 3 inch layer of sand, and a 12 inch layer of topsoil planted with *Carex pansa* (Pacific Dune Sedge) 4 inch pots, or equivalent design as determined by the Design Engineer during final design;
- Be installed as indicated on Sheet 1 of the concept design and in the detail on Sheet 2 of the concept design.

The amended soils shall:

- Be designed to treat the design flow to achieve maximum load reduction and allow maximum infiltration;
- Be designed to sustain the selected species of trees/shrubs;
- Have a composition of 15% to 30% organic material for the entire soil profile; and
- Be installed as indicated on Sheet 1 of the concept design and in the detail on Sheet 2 of the concept design.

The vegetation shall:

- Survive extreme moisture conditions;
- Absorb water captured in the bioretention planter system with the goal of achieving a load reduction;
- Be arranged to match the existing design aesthetic used in other vegetated areas around the Mira Mesa Library (it is recommended for the Design Engineer to mirror the wedge shape used in the Library courtyard and to consult with the relevant Mira Mesa Planning Committee for input);
- Include *Juncus effuses* (Common Rush) 1 gallon size 24 inch on center, 3 – 15 gallon *Salix lasiolepsis* (Arroyo Willow), and a meadow mixture of equal quantities of 1 gallon at 12 inches on center *Sisyrinchium bellum* (Blue-Eyed Grass), *Stachys chamissonis* (Magenta Butterfly Flower), *Mimulus cardinalis* (Scarlet Monkey Flower) and *Leymus triticoides* (Creeping Wildreye 'Rio'), or equivalent design as determined by the Landscape Architect of the City of San Diego during the final engineering stage; and
- Be irrigated with an in-line tube emitter drip system, complete with weather based irrigation controller, a rain shut off device, and an in-line moisture sensor at the lowest

point of the planter basin, or equivalent system (irrigation shall meet all standards of the City of San Diego Landscape Ordinance).

The filter blanket shall:

- Allow water to filter into the underdrains through the gravel;
- Be designed a geofabric of type, Mirafi 1100N/15/300 filter blanket, or equivalent; and
- Be installed as indicated on Sheet 1 of the concept design and in the detail on Sheet 2 of the concept design.

The geosynthetic lining shall:

- Prevent contamination of groundwater and surrounding soils by containing the concentrated pollutant plume within the open concrete planter box;
- Be impermeable;
- Be non-woven Poly-Flex or Nilex (or equivalent type) geocomposite liner; and
- Be installed as indicated on Sheet 1 of the concept design and in the detail on Sheet 2 of the concept design, at the direction and discretion of the Geotechnical Engineer.

The underdrains (outlet system) shall:

- Be designed using PVC pipe (pipe and bedding conditions are in accordance with the specifications of SDRSD-D60);
- Be designed in accordance with the needs with the design flow during the final engineering design; and
- Be installed as indicated on Sheet 1 of the concept design and in the detail on Sheet 2 of the concept design.

5. RAIN BARREL / DOWNSPOUT DISCONNECT SYSTEMS

Rain barrel / downspout disconnect systems are flow reduction structures which capture, hold, and utilize roof runoff from the Mira Mesa Library for irrigation. The purpose of these systems is to reduce the volume of design storm runoff flowing to the storm drain.

The rain barrel / downspout disconnect systems shall:

- Tie into existing roof downspouts at the locations indicated on the map on Sheet 1 of the concept design and
- Engineer shall coordinate with the City of San Diego Storm Water Department regarding the location and design specifications of installed rain barrel / downspout disconnect systems.

Estimated Costs

Mira Mesa Library Construction Cost Estimate CValdo Corporation J# 07-021 April 21, 2008				
Item	**Quantity**	**Unit**	**Unit Price**	**Cost**
Demolition				
Haul and dispose material – assumes 8 feet of soil 5 feet of below grade, 3 feet above ground will be reused for planter	1,100	CY	$50.00	$55,000.00
Miscellaneous soil and material export	1	LS	$10,000.00	$10,000.00
			Subtotal	$65,000.00
Improvements				
5-foot thick, 2-inch crushed rock	700	CY	$35.00	$24,500.00
PVC storm drain	600	LF	$30.00	$18,000.00
Sidewalk removal and replacement per SDRSD G-11	450	SF	$7.00	$3,150.00
Sidewalk under drain per SDRSD D-27	2	EA	$2,500.00	$5,000.00
Trench resurfacing type D per SDRSD G-25	1,400	SF	$10.00	$14,000.00
8-inch thick by 5-foot high PCC planter box	300	LF	$80.00	$24,000.00
Raised planter box	3	EA	$10,000.00	$30,000.00
30-gallon tree	3	EA	$500.00	$1,500.00
Miscellaneous landscaping	1	LS	$10,000.00	$10,000.00
Catchbasin type G with filter insert	4	EA	$5,000.00	$20,000.00
Storm drain cleanout type A	4	EA	$5,000.00	$20,000.00
Geofabric and geocomposite	1	EA	$20,000.00	$20,000.00
Informative sign	1	EA	$5,000.00	$5,000.00
			Subtotal	$190,150.00
Miscellaneous				
Erosion control	1	LS	$5,000.00	$5,000.00
Traffic control	1	LS	$10,000.00	$10,000.00
			Subtotal	$15,000.00
			Construction subtotal	$270,150.00
			Mobilization – 6% of construction subtotal	$16,209.00
			Contingency – 15% of construction subtotal plus mobilization	$42,953.85
			Construction Total	**$329,312.85**

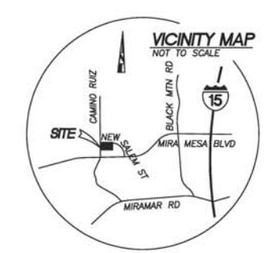
MIRA MESA LIBRARY BIORETENTION FOR LOS PENASQUITOS WATERSHED PROTECTION – CONCEPT DESIGN

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING SEWER MANHOLE
- EXISTING DOWN SPOUT LOCATIONS
- PROPOSED STORMDRAIN
- PROPOSED GRATED INLET
- PROPOSED STORM DRAIN CLEANOUT
- PROPOSED CRUSHED ROCK RESERVOIR
- PROPOSED CONCRETE REMOVAL AND REPLACEMET
- PROPOSED PLANTER BOX
- PROPOSED TREE
- TRENCH RESURFACING

WORK TO BE DONE

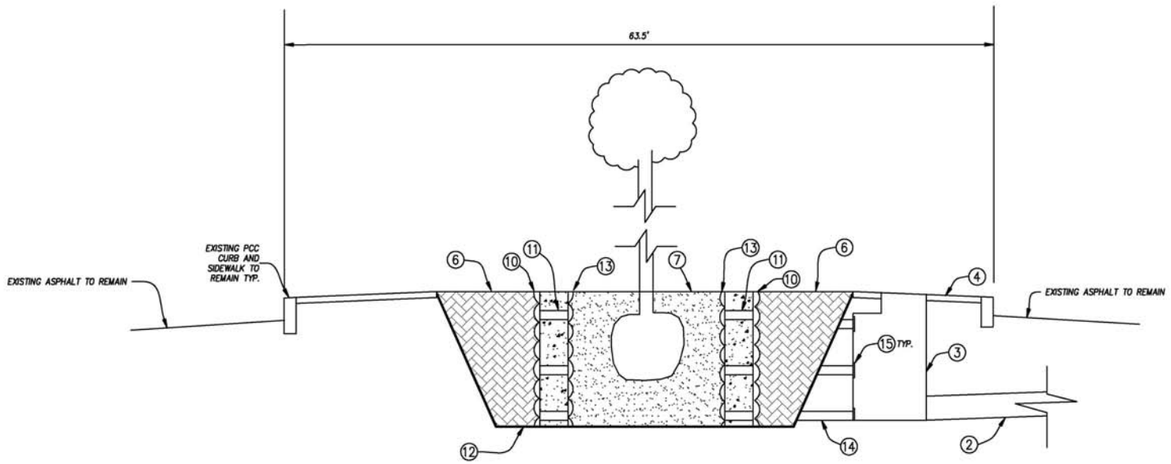
1. INSTALL CATCH BASIN TYPE G PER SDRSD D-8 WITH CATCH BASIN FILTER INSERT.
2. INSTALL PVC STORM DRAIN
3. INSTALL STORM DRAIN CLEANOUT TYPE A PER SDRSD D-9
4. REMOVE AND REPLACE SIDEWALK PER SDRSD G-11
5. INSTALL SIDEWALK UNDERDRAIN PER SDRSD D-27
6. INSTALL CRUSHED ROCK RESERVOIR 5 FEET DEEP MEASURED FROM EXISTING ADJACENT SIDEWALK ELEVATION.
7. INSTALL 30 GALLON TREES AND OPEN CONCRETE 110 FT LONG BY 20 FT WIDE BY 5 FT HIGH BY 8 INCH THICK PLANTER BOX. TREE SPECIES, SPACING, PLANTER SOILS AND WATERING TO BE DETERMINED DURING FINAL ENGINEERING.
8. INSTALL RAIN BARREL CONNECTED TO EXISTING DOWNSPOUT – COORDINATE WITH CITY STORMWATER RAIN BARREL PROGRAM.
9. TRENCH RESURFACING TYPE B PER SDRSD G-24.



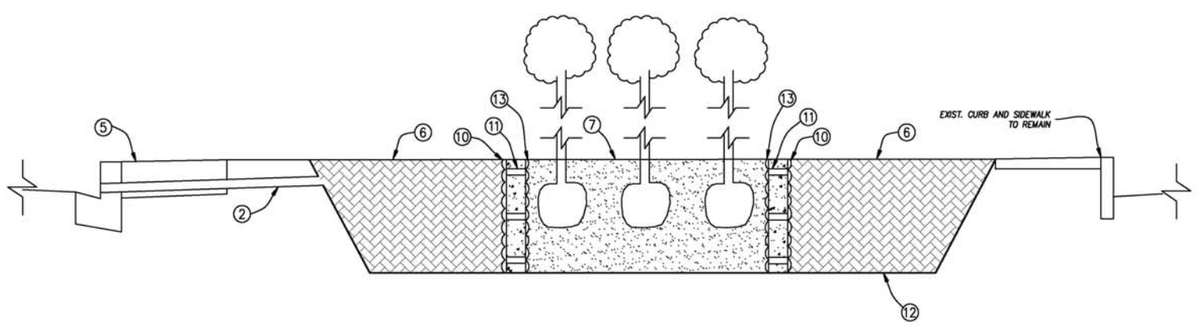
GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

SHEET 1 OF 2

MIRA MESA LIBRARY BIORETENTION FOR LOS PENASQUITOS WATERSHED PROTECTION – CONCEPT DESIGN



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE

WORK TO BE DONE

2. INSTALL PVC OR RCP STORM DRAIN PIPE
3. INSTALL STORM DRAIN CLEANOUT TYPE A PER SDRSD D-9 MODIFIED FOR ADDITION OF SIDE DRAINS.
4. REMOVE AND REPLACE SIDEWALK PER SDRSD G-11
5. INSTALL SIDEWALK UNDERDRAIN PIPE PER SDRSD D-27
6. INSTALL CRUSHED ROCK RESERVOIR 5 FEET DEEP MEASURED FROM EXISTING ADJACENT SIDEWALK ELEVATION.
7. INSTALL LANDSCAPING PER LANDSCAPE ARCHITECT RECOMMENDATIONS AND OPEN CONCRETE 110 FT LONG BY 20 FT WIDE BY 5 FT HIGH BY 8 INCH THICK PLANTER BOX. PLANT SPECIES, SPACING, PLANTER SOILS AND WATERING REQUIREMENTS TO BE DETERMINED DURING FINAL DESIGN.
10. INSTALL MIRAFI 1100N/15/300 FILTER BLANKET OR EQUIVALENT.
11. INSTALL 6-INCH PVC PIPE THROUGH PLANTER SIDE, NUMBER AND SPACING TO BE DETERMINED DURING FINAL DESIGN.
12. INSTALL IMPERMEABLE LINER AT DIRECTION OF GEOTECHNICAL ENGINEER.
13. INSTALL POLY-FLEX GEOCOMPOSITE LINER OR EQUIVALENT.
14. INSTALL 6-INCH PVC – NUMBER AND SPACING TO BE DETERMINED DURING FINAL DESIGN.
15. INSTALL WIRE SCREEN TO PREVENT DEBRIS FROM ENTERING PIPE AND RESERVOIR.

SHEET 2 OF 2

Bannock Avenue Neighborhood Streetscape Enhancements and Bannock Avenue Bacteria Treatment for Tecolote Creek Watershed Protection

Concept Design

Within the tributary watershed of the Bannock Avenue Neighborhood, vegetated planter areas will be constructed between the existing curb and the sidewalk at locations shown on the conceptual design project plans. Cuts will be made in the existing curbs to allow flow to exit the street paved section as well as enter and exit the planter areas. The planter areas will be filled with cobbles and/or gravel to a depth of approximately 1 foot and planted with landscaping to be determined during final design. The cobbles and/or gravel must be placed to an elevation approximately 1 inch below the adjacent sidewalk and curb to ensure no Americans with Disabilities Act (ADA) access issues are encountered. The cobbles and/or gravel must be prevented from spilling into the street through the curb cut by a metal screen. Where shown on the concept plans, existing sidewalks will be replaced with new pervious concrete sidewalks. The need for temporary or permanent irrigation to establish the planter areas must be determined during final design.

Within North Clairemont Park, a diversion structure will divert flows to a trash segregation unit, followed in series by an AbTech (Bacterial Treatment System) unit. From the AbTech unit, flows will be returned to the natural drainage course at the location of the existing storm drain system outlet headwall. The diversion structure will be sized to divert the 85th percentile storm event in order for it to be treated by the trash segregation and AbTech units. This size storm was selected because this treatment BMP is a pilot project to assess the effectiveness of this treatment technology. The larger storm event would result in a significantly larger system and higher project cost. The City determined that the 85th percentile storm was adequate to assess the effectiveness of this treatment technology through a pilot program because this technology has not been proven at larger flows. Should this technology prove cost effective for storm flows, the system may be expanded for a larger design storm.

Drainage Area Limits – The existing 30-inch reinforced concrete pipe located in North Clairemont Park services an approximate 65-acre tributary area. The drainage area has been delineated as shown in the drainage area drawings in Appendix E.

Project Coordination – Generally, the level of coordination required for this project was limited to gaining access to the site for geotechnical investigations. Weston coordinated with the City Streets Department to obtain facility access during the geotechnical investigations. Additional information regarding coordination and project contacts may be found in Appendix F.

Performance Specification – The project goal is to capture and infiltrate a volume from approximately the first quarter inch of rainfall landing in the tributary paved street section adjacent to each planter area. The treatment goal for the hydrodynamic separator and AbTech units is the 85th percentile flow rate. Refer to detailed Performance Specifications below.

Operations and Maintenance (O&M) – It is anticipated that O&M will include regular maintenance of the hydrodynamic separator unit. Maintenance requirements for this unit may be lessened if it is designed so low flows can drain from the bottom of the unit to either an infiltration area, the sanitary sewer, or further downstream in the storm drain system. This may not be possible in all circumstances. Regular maintenance will also be required of the AbTech

unit. This will consist of cleaning the unit and replacing the filter medium. Maintenance of both the hydrodynamic separator and the AbTech unit will vary year to year based upon rainfall frequency. Maintenance of the curb-side infiltration areas will consist of regular cleaning of the debris collection pads and more infrequent removal of sediment from the collection areas themselves. Maintenance requirements will vary based upon rainfall and the degree to which adjacent residents take on the maintenance responsibility.

The estimated construction cost is $3,596,000. Refer to detailed cost estimate below.

Performance Specifications

The goal of the Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection Project and the Bannock Avenue Bacteria Treatment for Tecolote Creek Watershed Protection Project is to reduce the pollutant load and volume of runoff entering the storm drain. The load reduction goal will be achieved by diverting stormwater from the street to bioretention and treatment planters through curb cutouts. Enhanced streets will infiltrate storm flows through pervious pavement which will reduce storm flows. These goals will also be achieved by diverting flows through a trash segregation unit and a series of AbTech (Bacterial Treatment System) units.

GENERAL

Unless otherwise indicated herein, work shall be done in accordance with the latest approved edition of SDRSD.

Existing utilities shall be protected in place unless otherwise noted in construction drawings as directed by the Design Engineer.

It is recommended that as part of the final design, additional in-situ permeability tests be performed to establish a BMP-specific infiltration rate. Due to percolation rates observed during a preliminary geotechnical investigation, it may be undesirable to locate projects where old paralic deposits were encountered.

Potential clogging issues will need to be addressed in the final design. Clogging issues will need to be monitored after the project has been constructed.

Project components shall be designed to remove pollutants and priority constituents of concern in the Tecolote Creek Watershed, including bacteria, heavy metals, nutrients, pesticides, and sediment (Appendix D). The system shall be designed to achieve a 99% reduction in bacteria for the treated flow, in accordance with the final wet weather objective in the TMDL for Indicator Bacteria in Tecolote Creek Tributary to Mission Bay.

PROJECT 1 – BANNOCK AVENUE STREETSCAPE ENHANCEMENTS

GREEN SIDEWALKS

The purpose of green sidewalks is to reduce bacterial load reductions by removing trash and capturing and treating design flows in bioretention planter systems. Stormwater will be diverted to bioretention and treatment planter systems from the street through curb cutouts. Diverted stormwater will be treated in the planter systems in order to achieve a 99% reduction in bacteria concentration for the treated flow and in order to significantly reduce other priority constituents of concern. Pervious pavement will be designed to reduce the peak storm flow.

1. BIORETENTION PLANTER SYSTEMS

A bioretention planter system is a natural treatment system which captures, holds, and treats a design flow using amended soils and vegetation. Bioretention planter systems shall be designed

and spaced in order to maximize the pollutant load reduction achieved along a given green sidewalk.

Existing utilities shall be protected in place unless otherwise noted in construction drawings.

Bioretention planter systems shall consist of (1) a debris collection pad (inflow and outflow systems), (2) a crushed rock reservoir, (3) amended soils, and (4) geosynthetic lining on the street side of the bioretention planter.

The demolished sidewalk shall be replaced with new pervious concrete sidewalks in accordance with the specifications of SDRSD-G11 and the details under Specification 9 (Pervious Sidewalks).

The debris collection pad (inflow and outflow systems) shall:

- Require the demolition of a 4-foot section of existing PCC curb (planter inflow systems shall require an additional 1 inch (minimum) of PCC curb to be demolished);
- Allow flow to enter and exit planters through a 2-foot opening (1 foot of 6 inch-curb shall be reconstructed in accordance with Sheet 2 of the concept design, Detail A, on both sides of the opening so that curb adjacent to opening has rounded edges with a 3-inch radius);
- Be designed to allow gravity flow and shall not cause flooding under design storm conditions (85th percentile SUSUMP storm);
- Be designed and spaced along the street in order to capture 100% of trash and debris (one pad shall be installed at least once every five houses and shall not block or restrict access to ADA access ramps – final spacing shall be determined during the final engineering design);
- Be at least 4-inch thick, with a 2-foot by 3-foot minimum rectangular footprint (top of the pad shall be no less than 0.2 foot below the existing gutter flow line);
- Have a non-galvanized, corrosion-resistant steel grate at least 0.25-inch thick with 2-square inch openings (grate shall attach to the curb in accordance with Sheet 2 of the concept design, Detail B, using four 0.75-inch diameter expansion bolts (two per side)); and
- Be installed as indicated on Sheet 2 of the concept design.

The crushed rock reservoir shall:

- Encompass the area where treatment, storage, and evapotranspiration will take place;
- Be placed no closer than 10 feet to any sewer mains or laterals;
- Reservoirs shall not block or restrict access to ADA access ramps;
- Be at least 4-feet deep, as measured from the elevation of the existing adjacent sidewalk;
- Include an open concrete planter where treatment will take place (circular planter shall be at least 3-feet in diameter, with at least 6-inch thick walls, and provide sufficient hydraulic capacity to capture and treat the design flow;
- Have non-invasive, 15-gallon trees/shrubs installed in each planter (vegetation shall be capable of surviving with only the seasonal rainfall typical of Southern California shall be placed in the center of the excavation – final tree/shrub selection and spacing shall be determined by the Landscape Architect of the City of San Diego during the final engineering stage); and

- Be installed as indicated on Sheet 2 of the concept design.

The amended soils shall:

- Be covered by a layer of crushed rock with minimum thickness of 1 foot (crushed rock shall have a grain size between 3 and 6 inches (final thickness of soil layers—including the sub-base layer—and grain size shall be determined during the final engineering design);
- Be designed to treat the design flow to achieve maximum load reduction, allow maximum infiltration, and sustain the selected species of trees/shrubs;
- Minimize the number of organics in the design mixture to minimize decomposition as a natural source of bacteria;
- Be designed in order to minimize clogging; and
- Be installed as indicated on Sheet 2 of the concept design.

The geosynthetic lining shall:

- Prevent lateral movement of infiltrated runoff to the street section (no other impervious barriers shall be needed);
- Prevent contamination of groundwater and surrounding soils by containing the concentrated pollutant plume within the open concrete planter box;
- Be impermeable;
- Be non-woven Poly-Flex or Nilex (or equivalent type) geocomposite liner; and
- Be installed as indicated on Sheet 2 of the concept design, at the direction and discretion of the Geotechnical Engineer.

2. PERVIOUS SIDEWALKS

The purpose of the pervious sidewalks is to reduce the volume of storm runoff entering the storm drain and reduce the bacterial pollutant load to the storm drain. Locations and text of neighborhood educational signage regarding green streets and green sidewalks shall be incorporated into final engineering design.

Existing utilities shall be protected in place unless otherwise noted in construction drawings.

The pervious pavement shall consist of (1) new ADA access routes and sidewalk, (2) pervious concrete, and (3) amended soils (base).

The new ADA access routes and sidewalk shall:

- Be installed in accordance with the specifications of SDRSD-G28 Type A-1 ramps and SDRSD-G7;
- Be designed to allow gravity flow and shall not cause flooding under design storm conditions (85th percentile SUSUMP storm);
- Match existing grade and flow lines; and
- Be installed as indicated in the Typical Plan View on Sheet 2 of the concept design and on the maps on Sheet 3, Sheet 4, and Sheet 5 of the concept design.

Existing ADA access routes shall be protected in place.

The pervious concrete shall:

- Be designed to allow maximum infiltration;
- Be 4-feet wide or match existing sidewalk width;
- Be designed and installed for sidewalks (pervious concrete shall only be used to replace driveways where existing approach is damaged – structurally sound driveways shall be protected in place);
- Have a minimum thickness of 6 inches (thicker concrete layer may be needed at certain driveways to accommodate commercial loadings – final thickness of concrete layer shall be determined during final engineering);
- Match existing grade and flow lines; and
- Be installed as indicated on Sheet 2 of the concept design.

The amended soils (base) shall:

- Be designed to allow maximum infiltration and treat the design flow;
- Be designed in order to minimize clogging;
- Minimize the number of organics in the design mixture to minimize decomposition as a natural source of bacteria and maximize structural integrity of the base soil (soil shall not be expansive);
- Have a thickness, soil structure, and load-bearing capacity sufficient to support and carry standard traffic loads (vertical subsidence shall be minimized – final base thickness and composition shall be determined during final engineering); and
- Be installed as indicated on Sheet 2 of the concept design.

PROJECT 2 – BANNOCK AVENUE BACTERIA TREATMENT

The purpose of the bacteria treatment system is to achieve a 99% reduction in bacteria concentration for the treated flow.

1. STORM DRAIN CLEANOUT

The purpose of this storm drain cleanout is to provide maintenance access to the hydrodynamic separator and storm drain bypass.

The storm drain cleanouts shall:

- Be designed for gravity flow in order to avoid system flooding and back up (objective shall be achieved through the incorporation of sufficient pipe offsets, diversion structures, or other structural solutions);
- Be designed in accordance with the specifications of SDRSD-D9, Type A cleanout; and
- Be installed as indicated on Sheet 6 of the concept design.

2. STORM DRAIN BYPASS

The purpose of the storm drain bypass is to redirect flow from a design storm exceeding the design capacity of the AbTech (Bacterial Treatment System) unit to the main branch of the storm drain.

The storm drain bypass shall:

- Be designed with a hydraulic capacity capable of accommodating a 100-year watershed storm event;
- Be designed for gravity flow such that the system does not cause flooding;
- Be designed using reinforced concrete pipe (pipe and bedding conditions are in accordance with the specifications of SDRSD-D60); and
- Be installed as indicated on Sheet 6 of the concept design.

3. HYDRODYNAMIC SEPARATOR

A hydrodynamic separator is a flow-through structure with a separation unit which removes trash and coarse sediment. Therefore, the purpose of the hydrodynamic separator is to remove trash and sediment before the design flow enters the AbTech (Bacterial Treatment System) unit.

The hydrodynamic separator shall:

- Be a CDS hydrodynamic separator, or equivalent;
- Have a hydraulic capacity sufficient to capture an 85th percentile SUSUMP storm event;
- Connect to upstream curb storm drain cleanout and downstream ABbTech unit *via* reinforced concrete pipe (pipe and bedding conditions shall be designed in accordance with the specifications of SDRSD-D60);
- Be designed for gravity flow (central separation unit will result in significant head loss, therefore the hydraulic design of the hydrodynamic separator shall incorporate sufficient head to allow gravity flow – mechanical pump system shall not be included in the hydraulic design); and
- Be installed as indicated on Sheet 6 of the concept design.

4. AB-TECH (BACTERIAL TREATMENT SYSTEM) UNIT

The purpose of the AbTech (Bacterial Treatment System) unit is to treat design flow to reduce the bacterial load.

The AbTech (Bacterial Treatment System) unit shall:

- Be an AbTech unit, or equivalent;
- Have a hydraulic capacity sufficient to capture an 85th percentile SUSUMP storm event and have a footprint of at least 25-feet wide and 20-feet long (flow direction) (unit dimensions shall be determined during the final engineering design);
- Be designed to treat the design flow (approximately 9 cfs) to achieve a 99% load reduction of bacteria for the treated flow;
- Be designed for gravity flow such that the system does not cause flooding; and
- Be installed as indicated on Sheet 6 of the concept design.

5. STORM DRAIN CLEANOUT

The purpose of storm drain cleanouts is to provide maintenance access to the storm drain bypass system and the AbTech (Bacterial Treatment System) unit.

The storm drain cleanouts shall:

- Be designed for gravity flow such that the system does not cause flooding or backs up in the system. This objective shall be achieved through the incorporation of sufficient pipe offsets, diversion structures, or other structural solutions
- Be designed in accordance with the specifications of SDRSD-D9, Type A cleanout; and
- Be installed as indicated on Sheet 6 of the concept design.

6. STORM DRAIN

The purpose of the storm drain is to direct flow from the AbTech (Bacterial Treatment System) unit and storm drain bypass to the main branch of the storm drain.

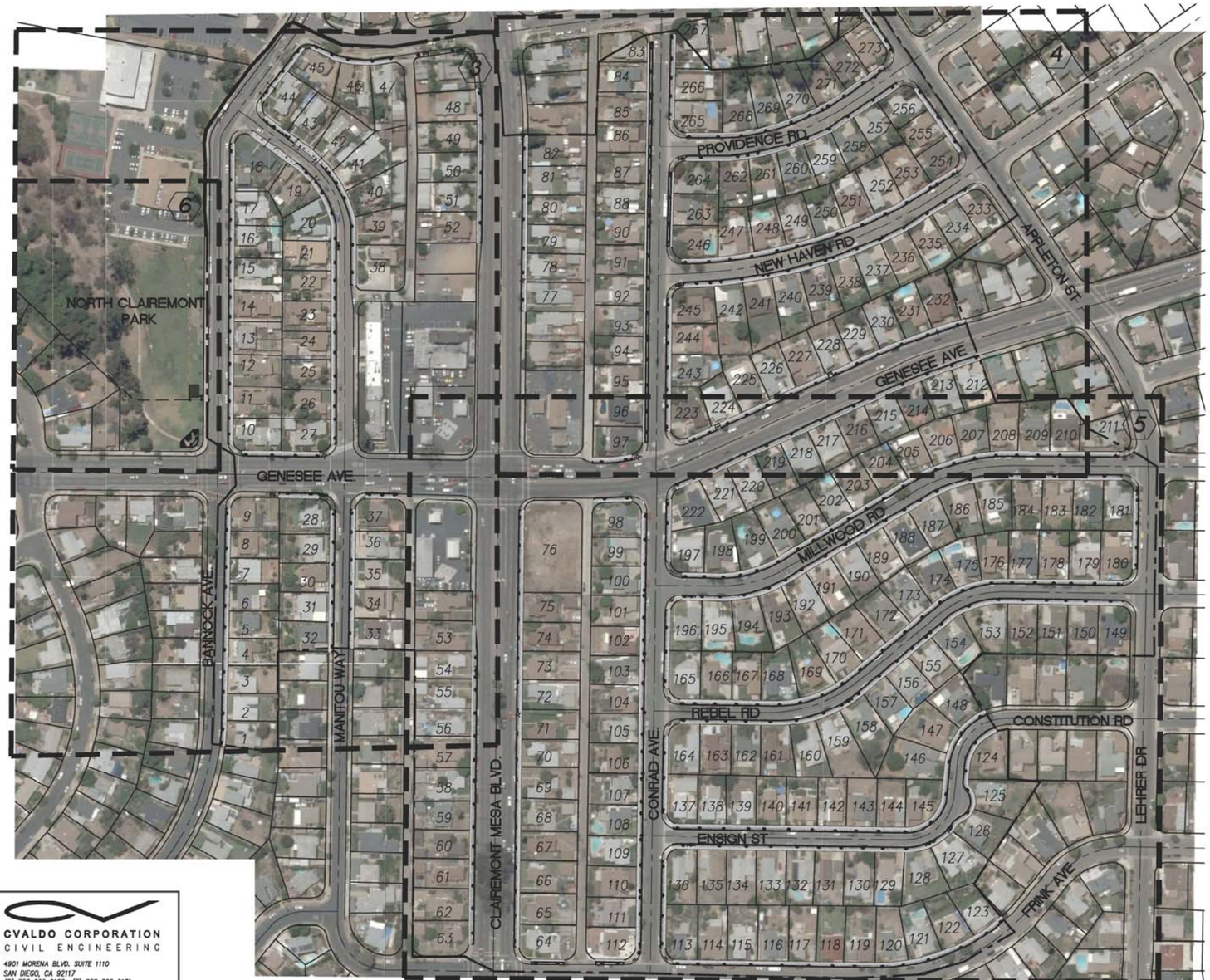
The storm drain shall:

- Be designed for gravity flow such that the system does not cause flooding;
- Be designed using reinforced concrete pipe (pipe and bedding conditions are in accordance with the specifications of SDRSD-D60); and
- Be installed as indicated on Sheet 6 of the concept design.

Estimated Costs

North Clairemont Park Construction Cost Estimate CValdo Corporation J# 07-021 April 21, 2008				
Item	**Quantity**	**Unit**	**Unit Price**	**Cost**
Demolition				
Saw cut and grind concrete curb	1,100	LF	$50.00	$55,000.00
Concrete sidewalk removal – assumes 6 inches thick	74,000	SF	$1.50	$111,000.00
Excavation and export soil between sidewalk and curb assumes 274 homes have planters installed	3,000	CY	$35.00	$105,000.00
Haul and dispose material – assumes 6 inches of concrete sidewalk and 1,100 feet of concrete curb	1,400	CY	$50.00	$70,000.00
Miscellaneous soil and material export	1	LS	$10,000.00	$10,000.00
			Subtotal	$351,000.00
Improvements				
6-inch thick pervious concrete sidewalk	74,000	SF	$8.00	$592,000.00
3 to 6-inch crushed rock assumes 274 homes have planters installed	3,000	CY	$25.00	$75,000.00
30-gallon tree – Two per house assumes 274 homes have planters installed	550	EA	$200.00	$110,000.00
Bioretention cell with amended soils – two per house assumes 274 homes have planters installed	550	EA	$100.00	$55,000.00
PCC disabled access ramps	20	EA	$3,000.00	$60,000.00
Driveway replacement from curb to sidewalk	28	EA	$2,000.00	$56,000.00
RCP storm drain	210	LF	$175.00	$36,750.00
AbTech Unit – assumed 9 cfs treatment at 150k/cfs	1	EA	$1,350,000.00	$1,350,000.00
Cleanout – type A	2	EA	$5,000.00	$10,000.00
Hydrodynamic separator unit	1	EA	$45,000.00	$45,000.00
Miscellaneous landscaping and irrigation	1	LS	$30,000.00	$30,000.00
2-foot by 3-foot by 6-inch thick concrete pad assumes one in five homes have planters installed	60	EA	$250.00	$15,000.00
3-sided, 1/4-inch thick steel plate – 2 by 3 feet by 0.7 feet high with attachments – assumes one in five homes has concrete pad and plate installed	60	EA	$400.00	$24,000.00
1/4-inch steel plate – 2-feet long with attachments assumes 274 homes with two per house	550	EA	$200.00	$110,000.00
			Subtotal	$2,568,750.00
Miscellaneous				
Erosion control	1	LS	$15,000.00	$15,000.00
Traffic control	1	LS	$15,000.00	$15,000.00
			Subtotal	$30,000.00
			Construction subtotal	$2,949,750.00
			Mobilization – 6% of construction subtotal	$176,985.00
			Contingency – 15% of construction subtotal plus mobilization	$469,010.25
			Construction Total	**$3,595,745.25**

BANNOCK AVENUE NEIGHBORHOOD STREETSCAPE ENHANCEMENTS AND BACTERIA TREATMENT FOR TECOLOTE CREEK WATERSHED PROTECTION – CONCEPT PLAN



LEGEND

- EXISTING FIRE HYDRANT
- EXISTING LIGHT POLE
- EXISTING SDG&E MANHOLE
- EXISTING SDG&E BOX
- EXISTING POWER POLE
- WATERSHED BOUNDARY
- PROPOSED CURBSIDE INFILTRATION PLANTER
- PROPOSED BIORETENTION CELL AND LANDSCAPE PLANTING
- PROPOSED PERVIOUS CONCRETE SIDEWALK AND/OR STREET SECTION
- PROPOSED PCC DISABLED ACCESS RAMP
- PROPOSED BIORETENTION CELL
- SHEET NUMBER

NOTES

1. STRUCTURAL SECTION OF PERVIOUS CONCRETE SIDEWALK TO BE DETERMINED DURING FINAL DESIGN. SECTION AS CALLED OUT IS ONLY FOR COST ESTIMATING PURPOSES.
2. PLANTING CALLED OUT ONLY FOR COST ESTIMATING PURPOSES. FINAL PLANT SPACING AND SPECIES TO BE DETERMINED DURING FINAL DESIGN.
3. INFILTRATION NOT TO BE USED IN EXPANSIVE SOILS. GEOTECHNICAL EVALUATION TO BE CONDUCTED OF SITE IN ORDER TO VERIFY EXPANSIVE SOILS ARE NOT PRESENT. SOIL REMEDIATION OR SELECTION OF AN ALTERNATE SITE MAY BE REQUIRED IF EXPANSIVE SOILS ARE PRESENT.
4. EXISTING UTILITIES SHALL BE PROTECTED IN PLACE UNLESS OTHERWISE NOTED.
5. APPROXIMATELY EVERY FIFTH HOUSE ALONG FLOW PATH TO HAVE 2' X 3' RECTANGULAR CLEANOUT PAD PER DETAIL A SHEET 2. EXACT LOCATION TO BE DETERMINED DURING FINAL DESIGN.
6. COST ESTIMATE ALLOWS FOR APPROXIMATELY 10% OF EXISTING DRIVEWAY APPROACHES TO BE REMOVED AND REPLACED IN KIND DUE TO POOR EXISTING CONDITION. LOCATIONS FOR REMOVAL AND REPLACEMENT OF DRIVEWAY APPROACHES TO BE DETERMINED DURING FINAL DESIGN.

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

VICINITY MAP
NOT TO SCALE
CONRAD AVE.
CLAIREMONT MESA BLVD.
MANITOU WAY
BANNOCK AVE
GENESEE AVE
PARK SITE
805

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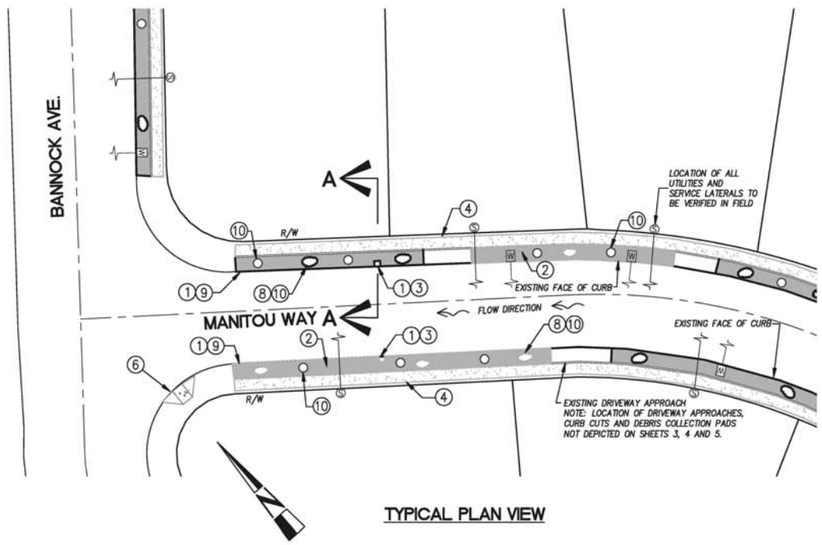
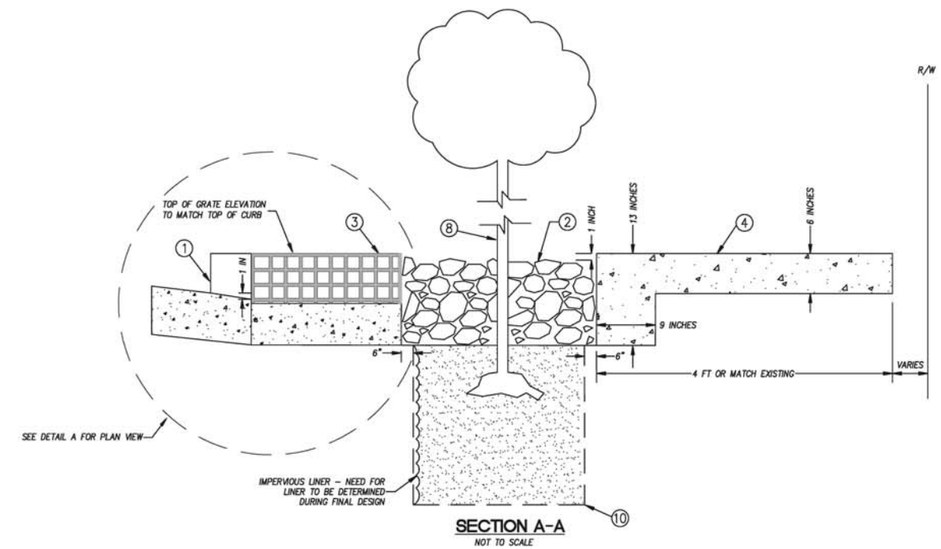
SHEET 1 OF 6

BANNOCK AVENUE NEIGHBORHOOD STREETSCAPE ENHANCEMENTS AND BACTERIA TREATMENT FOR TECOLOTE CREEK WATERSHED PROTECTION – CONCEPT PLAN



TYPICAL PLAN VIEW

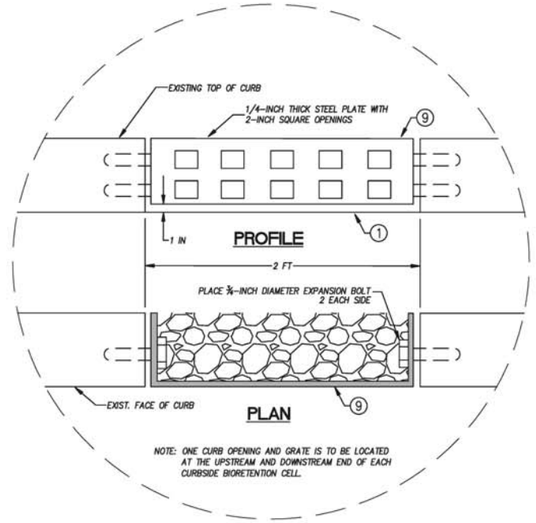
GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.



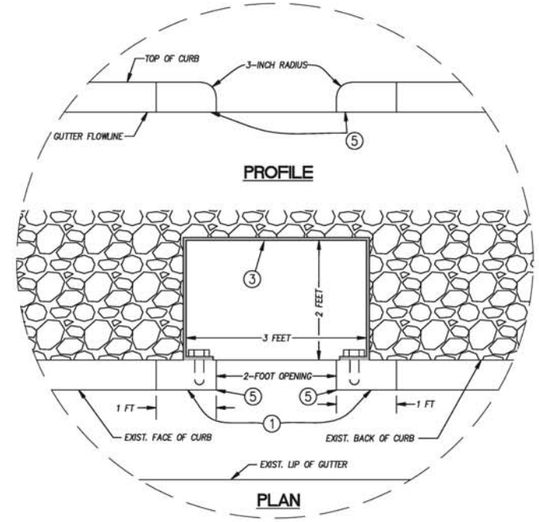
SECTION A-A
NOT TO SCALE

WORK TO BE DONE

1. CUT AND GRIND 4-FOOT SECTION OF PCC CURB TO GUTTER FLOWLINE. GRIND ADDITIONAL 1 INCH TO DRAIN TOWARD PLANTER AT INFLOW OPENINGS ONLY.
2. PLACE 3-INCH TO 6-INCH CRUSHED ROCK 1 FOOT THICK.
3. PLACE 2' X 3' RECTANGLE 4-INCH THICK CONCRETE DEBRIS COLLECTION PAD WITH 1/4-INCH THICK CORROSION RESISTANT STEEL GRATE – NO GALVANIZING PERMITTED. TOP OF PAD TO BE 0.2 FEET BELOW GUTTER FLOWLINE. REINFORCE CONCRETE WITH 10-GUAGE WWM. GRATE OPENINGS TO BE 2-INCH SQUARE. ATTACH GRATE TO CURB WITH 3/4-INCH EXPANSION BOLTS – 2 EACH SIDE. SEE DETAIL A. DEBRIS COLLECTION PAD TO OCCUR AT APPROXIMATELY EVERY FIFTH HOUSE. PRECISE LOCATIONS TO BE DETERMINED DURING FINAL ENGINEERING.
4. PLACE 6 INCH THICK PERVIOUS CONCRETE SIDEWALK – 4 FEET WIDE OR MATCH EXISTING. THICKER SECTION MAY BE REQUIRED AT CERTAIN DRIVEWAYS TO ACCOMODATE COMMERCIAL LOADING. REPLACE EXISTING PCC DRIVEWAY APPROACHES WITH PERVIOUS CONCRETE DRIVEWAY APPROACH WHERE EXISTING APPROACH IS DAMAGED. COST ESTIMATE ASSUMES 10% OF DRIVEWAYS WILL REQUIRE REPLACEMENT.
5. RECONSTRUCT 1-FOOT OF 6-INCH CONCRETE CURB WITH CORNERS ADJACENT TO OPENING ROUNDED TO 3-INCH RADIUS PER DETAIL A.
6. CONSTRUCT NEW DISABLED ACCESS RAMP AND SIDEWALK PER SDRSD G-28 TYPE A-1 AND G-7.
8. PLACE 15-GALLON TREE OR SHRUB PER SECTION A-A. SPECIES, SPACING AND WATERING TO BE DETERMINE DURING FINAL ENGINEERING. PLANTING TO BE PLACED NO CLOSER THAN TEN FEET FROM SEWER MAINS OR LATERALS.
9. PLACE 1/4-INCH THICK CORROSION RESISTANT STEEL GRATE – NO GALVANIZING PERMITTED. GRATE OPENINGS TO BE 2-INCH SQUARE. ATTACH GRATE TO CURB WITH 3/4-INCH DIAMETER EXPANSION BOLTS – 2 EACH SIDE. SEE DETAIL B.
10. 3-FOOT DIAMETER BY 4-FOOT DEEP BIORETENTION CELL FILLED WITH AMENDED SOIL. NUMBER AND LOCATION TO BE DETERMINED DURING FINAL ENGINEERING. BIORETENTION CELLS MAY BE PLACED NO CLOSER THAN TEN FEET FROM SEWER MAINS OR LATERALS THAT HAVE NO PROTECTION FROM INFLOW OR INFILTRATION.



DETAIL B – PLANTER INFLOW/OUTFLOW
NOT TO SCALE



DETAIL A – PLANTER INFLOW WITH DEBRIS COLLECTION PAD
SCALE: 1" = 1'

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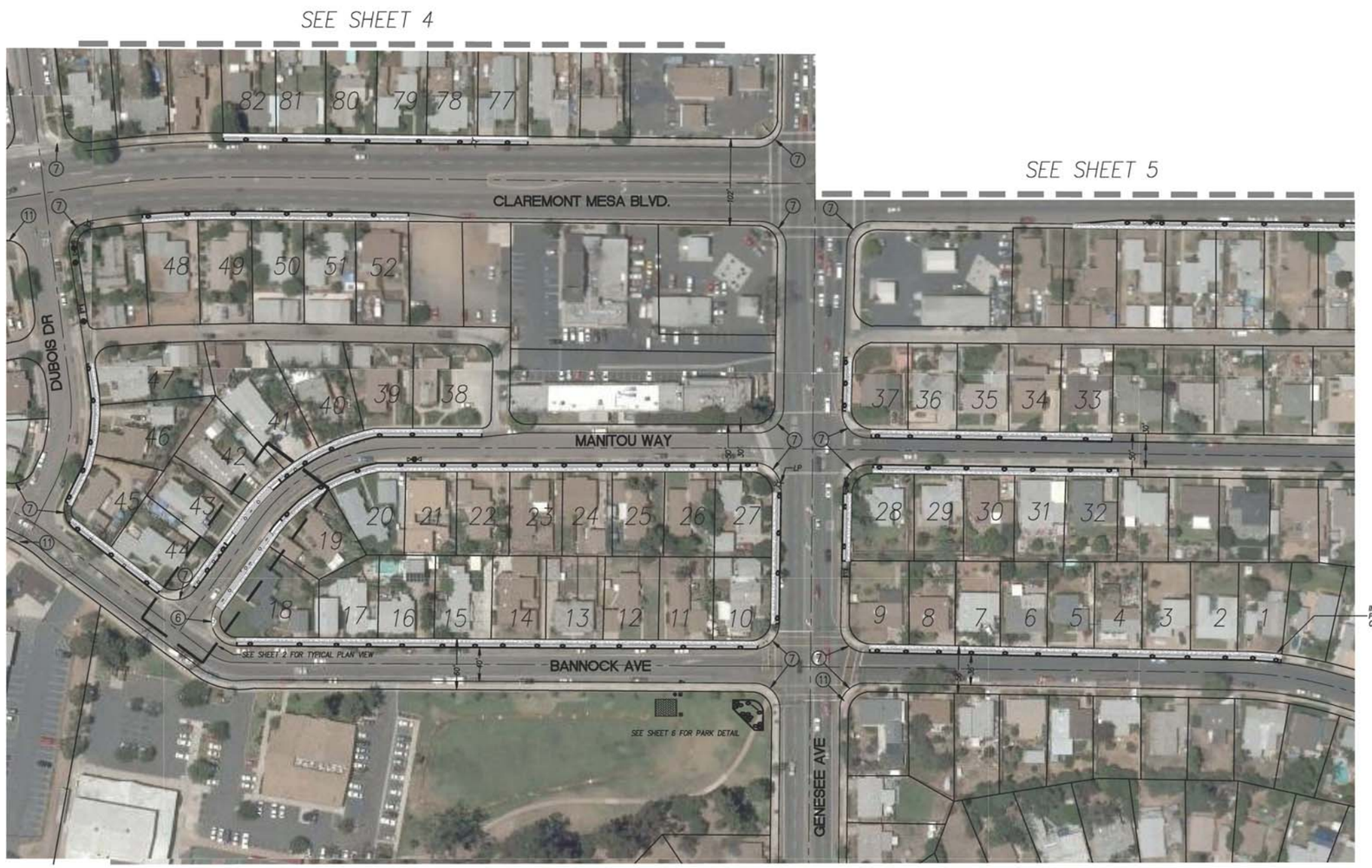
SHEET 2 OF 6

BANNOCK AVENUE NEIGHBORHOOD STREETSCAPE ENHANCEMENTS AND BACTERIA TREATMENT FOR TECOLOTE CREEK WATERSHED PROTECTION - CONCEPT PLAN



WORK TO BE DONE

6. CONSTRUCT NEW DISABLED ACCESS RAMP AND SIDEWALK PER SDRSD G-28 TYPE A-1 AND G-7.
7. PROTECT EXISTING DISABLED ACCESS RAMPS IN PLACE.
11. POTENTIAL LOCATION FOR GREEN STREETS NEIGHBORHOOD INFORMATIONAL SIGNAGE

N

GRAPHIC SCALE
60 0 30 60 120
(IN FEET)
1 inch = 60 ft.

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SHEET 3 OF 6

BANNOCK AVENUE NEIGHBORHOOD STREETSCAPE ENHANCEMENTS AND BACTERIA TREATMENT FOR TECOLOTE CREEK WATERSHED PROTECTION - CONCEPT PLAN

WORK TO BE DONE

6. CONSTRUCT NEW DISABLED ACCESS RAMP AND SIDEWALK PER SDRSD G-28 TYPE A-1 AND G-7.
7. PROTECT EXISTING DISABLED ACCESS RAMPS IN PLACE.
11. POTENTIAL LOCATION FOR GREEN STREETS NEIGHBORHOOD INFORMATIONAL SIGNAGE

GRAPHIC SCALE
60 0 30 60 120
(IN FEET)
1 inch = 60 ft.

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SHEET 4 OF 6

BANNOCK AVENUE NEIGHBORHOOD STREETSCAPE ENHANCEMENTS AND BACTERIA TREATMENT FOR TECOLOTE CREEK WATERSHED PROTECTION – CONCEPT PLAN

WORK TO BE DONE

6. CONSTRUCT NEW DISABLED ACCESS RAMP AND SIDEWALK PER SDRSD G-28 TYPE A-1 AND G-7.
7. PROTECT EXISTING DISABLED ACCESS RAMPS IN PLACE.
11. POTENTIAL LOCATION FOR GREEN STREETS NEIGHBORHOOD INFORMATIONAL SIGNAGE

GRAPHIC SCALE
80 0 40 80 160
(IN FEET)
1 inch = 80 ft.

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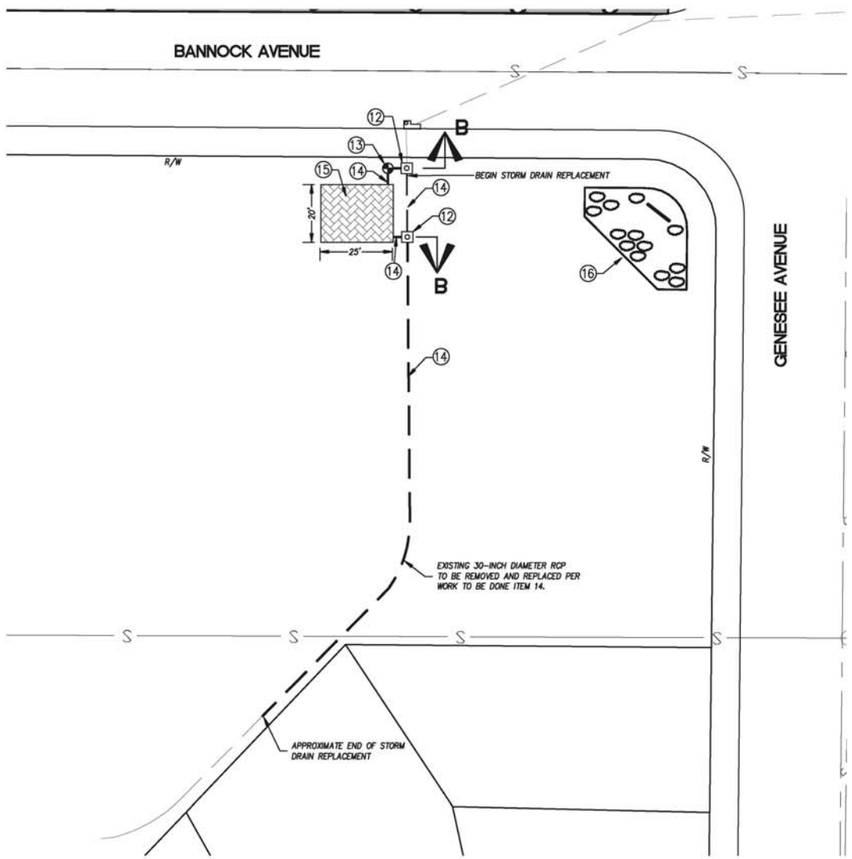
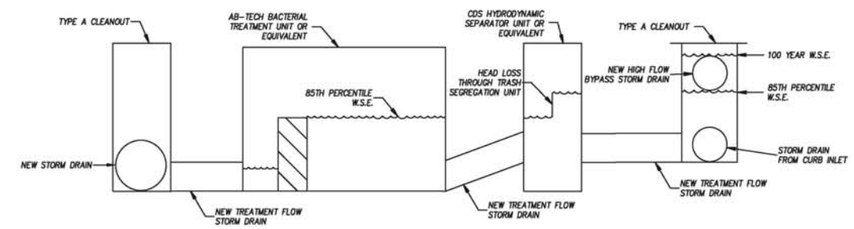
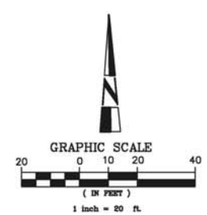
SHEET 5 OF 6

BANNOCK AVENUE NEIGHBORHOOD STREETSCAPE ENHANCEMENTS AND BACTERIA TREATMENT FOR TECOLOTE CREEK WATERSHED PROTECTION – CONCEPT PLAN





SECTION B-B
NOT TO SCALE



WORK TO BE DONE

(12) INSTALL STORM DRAIN CLEANOUT TYPE A PER SDRSD D-9

(13) INSTALL HYDRODYNAMIC SEPARATOR UNIT

(14) INSTALL RCP STORM DRAIN – TOTAL LENGTH ±210 LF

(15) INSTALL AB-TECH SYSTEM OR EQUIVALENT. DIMENSIONS SHOWN ON PLANS ARE CONCEPTUAL AND MAY BE MODIFIED. TREATMENT FLOW TO BE APPROXIMATELY 9 CFS. RESTORE PARK LINES AND GRADES TO EXISTING CONDITIONS.

(16) CONSTRUCT GREEN STREET NEIGHBORHOOD INFORMATION SIGN AND LANDSCAPED PLANTER RELOCATE EXISTING TRAIL TO ACCOMODATE PLANTER AREA.

NOTES

1. DIMENSIONS FOR AB-TECH SYSTEM TO BE DETERMINED DURING FINAL DESIGN. DIMENSIONS CALLED OUT ARE FOR COST ESTIMATING PURPOSES ONLY. TREATMENT FLOW TO BE BASED ON 85TH PERCENTILE STORM EVENT.

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SHEET 6 OF 6

Park Ridge Boulevard Bacteria Treatment for San Diego River Watershed Protection

Concept Design

At the southern terminus of Park Ridge Boulevard, a new catchbasin, storm drain, trash segregation unit, and AbTech (Bacterial Treatment System) unit will be constructed. A new catchbasin will be placed along the western right-of-way south of the intersection with Murray Park Drive. The catchbasin will be sized for the full design flow reaching that location.

Flows up to an 85th percentile storm event will exit the catchbasin and flow through a trash segregation unit, followed in series by an AbTech (Bacterial Treatmenet System) unit. Flows in excess of an 85th percentile storm will exit the catchbasin *via* an overflow pipe and bypass the treatment system. The design storm was selected because this treatment BMP is a pilot project to assess the effectiveness of this treatment technology. The larger storm event would result in a significantly larger system and higher project cost. The City determined that the 85th percentile storm was adequate to assess the effectiveness of this treatment technology through a pilot program because this technology has not been proven at larger flows. Should this technology prove cost effective for storm flows, the system may be expanded for a larger design storm.

A common manhole will receive flows from both the treatment system and the overflow pipe. From that manhole, a new storm drain will convey flows to the outlet location for the existing storm drain system within the eastern Park Ridge Boulevard right-of-way. A new headwall sized to accommodate both outlets will be required at this location.

Drainage Area Limits – Generally, the project drainage area is the tributary drainage area of the storm drains to which the project BMPs are connected. The catchbasin which will be retrofitted with an AbTech unit services an approximate 25-acre tributary area. Flow from the east side of Park Ridge Boulevard was not included in the conceptual design because it was deemed not economically viable. The existing storm drain system is deeper on the east side of Park Ridge Boulevard than on the west side. In order to achieve gravity flow, the AbTech unit would need to be installed deeper into the ground at significant additional cost. Flow from the gutter system on the east side of the street would require the AbTech unit to be significantly enlarged to accommodate the additional water from a relatively small drainage area. Therefore, these flows are not included in the project design. The drainage areas for this project have been delineated as shown in the drainage area drawings in Appendix E.

Project Coordination – No project coordination with a City department was required to complete this concept design.

Performance Specification – The project goal is to treat watershed runoff using the hydrodynamic separator and AbTech units at the 85th percentile flow rate. Refer to detailed Performance Specifications below.

Operations and Maintenance (O&M) – It is anticipated that O&M will include regular maintenance of the hydrodynamic separator unit. Maintenance requirements for this unit may be lessened if it is designed so low flows can drain from the bottom of the unit to either an infiltration area, the sanitary sewer, or further downstream in the storm drain system. This may not be possible in all circumstances. Regular maintenance will also be required of the AbTech unit. This will consist of cleaning the unit and replacing the filter medium. Maintenance of both

the hydrodynamic separator and the AbTech unit will vary year to year based upon rainfall frequency.

The estimated construction cost is $703,000. Refer to detailed cost estimate below.

Performance Specifications

The goal of the Park Ridge Boulevard Bacteria Treatment for San Diego River Watershed Protection Project is to reduce bacterial pollutant loads in the watershed. This goal will be achieved by installing a new catchbasin which diverts runoff to a trash segregation unit / AbTech (Bacterial Treatment System) unit.

GENERAL

Unless otherwise indicated herein, work shall be done in accordance with the latest approved edition of SDRSD.

Existing utilities shall be protected in place unless otherwise noted in construction drawings as directed by the Design Engineer.

Upon completion of the project, street lines and grades shall be returned to existing conditions.

Project components shall be designed to remove pollutants and priority constituents of concern in the San Diego River Watershed, including bacteria, gross pollutants (trash), nutrients, sediment, and total dissolved solids (Appendix D). The system shall be designed to achieve a 99% reduction in bacteria for the treated flow, in accordance with the final wet weather objective in the Bact-I TMDL.

1. CURB INLET

The purpose of the curb inlet is to capture runoff from the drainage area, direct design flow into the AbTech (Bacterial Treatment System) unit, and divert design storm flow exceeding this design flow into the storm drain bypass.

The curb inlet shall:

- Have a hydraulic capacity sufficient to capture an 85th percentile SUSUMP storm event;
- Be designed in accordance with the specifications of SDRSD-D2, Type B inlet;
- Provide maintenance access; and
- Be installed on the western side of Park Ridge Boulevard as indicated on the concept design.

2. HYDRODYNAMIC SEPARATOR

A hydrodynamic separator is a flow-through structure with a separation unit which removes trash and coarse sediment. Therefore, the purpose of the hydrodynamic separator is to remove trash and sediment before the design flow enters the AbTech (Bacterial Treatment System) unit.

The hydrodynamic separator shall:

- Be a CDS hydrodynamic separator, or equivalent;
- Have a hydraulic capacity sufficient to capture an 85th percentile SUSUMP storm event;
- Connect to upstream curb inlet and downstream AbTech unit *via* reinforced concrete pipe (pipe and bedding conditions shall be designed in accordance with the specifications of SDRSD-D60);

- Be designed for gravity flow (central separation unit will result in significant headloss, therefore the hydraulic design of the hydrodynamic separator shall incorporate sufficient head to allow gravity flow – mechanical pump system shall not be included in the hydraulic design); and
- Be installed as indicated on the concept design.

3. STORM DRAIN BYPASS

The purpose of the storm drain bypass is to redirect flow from a design storm exceeding the design capacity of the AbTech (Bacterial Treatment System) unit to the storm drain outfall.

The storm drain bypass shall:

- Be designed with a hydraulic capacity capable of accommodating a 100-year watershed storm event;
- Be designed for gravity flow such that the system does not cause flooding;
- Be designed using reinforced concrete pipe (pipe and bedding conditions are in accordance with the specifications of SDRSD-D60); and
- Be installed as indicated on the concept design.

4. STORM DRAIN CLEANOUT

The purpose of storm drain cleanouts is to provide maintenance access to the storm drain bypass system and the AbTech (Bacterial Treatment System) unit.

The storm drain cleanouts shall:

- Be designed for gravity flow such that the system does not cause flooding or backs up in the system. This objective shall be achieved through the incorporation of sufficient pipe offsets, diversion structures, or other structural solutions;
- Be designed in accordance with the specifications of SDRSD-D9, Type A cleanout; and
- Be installed as indicated on the concept design.

5. AB-TECH (BACTERIAL TREATMENT SYSTEM) UNIT

The purpose of the AbTech (Bacterial Treatment System) unit is to treat design flow to reduce the bacterial load.

The AbTech (Bacterial Treatment System) unit shall:

- Be an AbTech unit, or equivalent;
- Have a hydraulic capacity sufficient to capture an 85th percentile SUSUMP storm event and have a footprint of at least 10-feet wide and 20-feet long (unit dimensions shall be determined during the final engineering design);
- Be designed to treat the design flow (approximately 3 cfs) to achieve a 99% load reduction of bacteria for the treated flow:
- Be designed for gravity flow such that the system does not cause flooding;
- Be installed as indicated on the concept design.

6. STORM DRAIN

The purpose of the storm drain is to direct flow from the AbTech (Bacterial Treatment System) unit and storm drain bypass to the storm drain outfall.

The storm drain shall:

- Be designed for gravity flow such that the system does not cause flooding;
- Be designed using reinforced concrete pipe (pipe and bedding conditions are in accordance with the specifications of SDRSD-D60); and
- Be installed as indicated on the concept design.

7. WING-TYPE HEADWALL

The purpose of wing-type headwall is to connect new and existing storm drains and discharge storm flow to the outfall.

The wing-type headwall shall:

- Be designed in accordance with the specifications of a SDRSD-D34, Modified Wing-Type Headwall;
- Connect to the new storm drain system from the AbTech unit and existing storm drains; and
- Be installed as indicated on the concept design.

8. RIP RAP ENERGY DISSIPATER

The purpose of rip rap energy dissipater is to dissipate energy of storm flow and prevent erosion.

The rip rap energy dissipater shall:

- Be designed in accordance with the specifications of SDRSD-D40 and
- Be installed as indicated on the concept design.

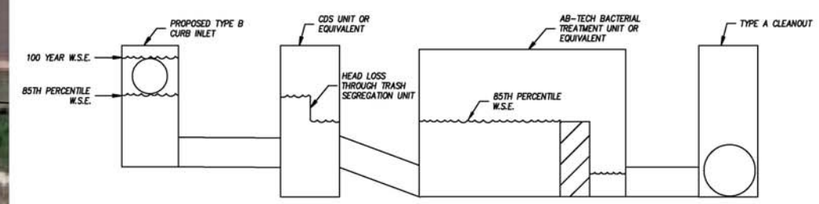
Estimated Costs

Park Ridge AbTech Construction Cost Estimate CValdo Corporation J# 07-021 April 21, 2008				
Item	**Quantity**	**Unit**	**Unit Price**	**Cost**
Demolition				
AC pavement and base removal – assumes 4 over 6	2,050	SF	$1.00	$2,050.00
Haul and dispose material – assumes 4 inches of asphalt concrete, 3 inches of base material – remainder of base material assumed reusable	50	CY	$50.00	$2,500.00
Miscellaneous soil and material export	1	LS	$10,000.00	$10,000.00
			Subtotal	$14,550.00
Improvements				
RCP storm drain	130	LF	$175.00	$22,750.00
Curb inlet type B per D-2	1	EA	$5,000.00	$5,000.00
AbTech Unit – assumed 3 cfs treatment at 150k/cfs	1	EA	$450,000.00	$450,000.00
Cleanout – type A	2	EA	$5,000.00	$10,000.00
Modified wing headwall per D-34	1	EA	$5,000.00	$5,000.00
Hydrodynamic separator unit at catchbasin	1	EA	$40,000.00	$40,000.00
AC pavement 4inches with paving subgrade preparation	2,050	SF	$2.25	$4,612.50
Miscellaneous improvements	1	LS	$10,000.00	$10,000.00
			Subtotal	$547,362.50
Miscellaneous				
Erosion control	1	LS	$5,000.00	$5,000.00
Traffic control	1	LS	$10,000.00	$10,000.00
			Subtotal	$15,000.00
			Construction subtotal	$576,912.50
			Mobilization – 6% of construction subtotal	$34,614.75
			Contingency – 15% of construction subtotal plus mobilization	$91,729.09
			Construction Total	**$703,256.34**

PARK RIDGE BOULEVARD BACTERIA TREATMENT FOR SAN DIEGO RIVER WATERSHED PROTECTION – CONCEPT PLAN

LEGEND

- RIGHT-OF-WAY
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING SEWER MANHOLE
- EXISTING STORM DRAIN CLEANOUT
- PROPOSED STORM DRAIN CLEANOUT
- PROPOSED HYDRODYNAMIC SEPARATOR
- PROPOSED STORMDRAIN
- PROPOSED CURB INLET
- PROPOSED AB-TECH UNIT



SECTION A-A

NOT TO SCALE

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)

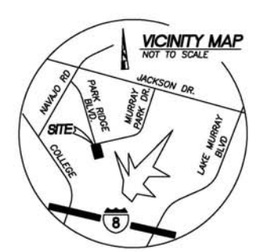
1 inch = 20 ft.

WORK TO BE DONE

1. INSTALL CURB INLET TYPE B PER SDRSD D-2
2. INSTALL HYDRODYNAMIC SEPARATOR UNIT – PRECAST CDS MANHOLE MODEL PMSU30_30 OR EQUIVALENT
3. INSTALL RCP STORM DRAIN – TOTAL LENGTH ±130 LF
4. INSTALL AB-TECH SYSTEM OR EQUIVALENT. DIMENSIONS SHOWN ON PLANS ARE CONCEPTUAL AND MAY BE MODIFIED. TREATMENT FLOW TO BE APPROXIMATELY 3 CFS. RESTORE STREET LINES AND GRADES TO EXISTING CONDITIONS.
5. INSTALL STORM DRAIN CLEANOUT TYPE A PER SDRSD D-9
6. INSTALL MODIFIED WING TYPE HEADWALL PER SDRSD D-34
7. INSTALL 1/4-TON RIP RAP ENERGY DISSIPATER PER SDRSD D-40
8. CONNECT EXISTING STORM DRAIN TO NEW HEADWALL

NOTES

1. DIMENSIONS FOR AB-TECH SYSTEM TO BE DETERMINED DURING FINAL DESIGN. DIMENSIONS CALLED OUT ARE FOR COST ESTIMATING PURPOSES ONLY. TREATMENT FLOW TO BE BASED ON 85TH PERCENTILE STORM EVENT.



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Roselle Street Flow Control for Los Peñasquitos Watershed Protection

Concept Design

A detention basin will be constructed on City-owned land at the southwestern end of Roselle Street. The detention basin will utilize an area that impounds runoff within a natural canyon under existing conditions and increase use of the impoundment by decreasing the size of the outlet and improving the condition and/or height of the embankment which currently impounds the flow. The new outlet will detain low flows with a perforated concrete weir structure while allowing larger flows to spill over the weir and enter the existing storm drain system as it does under existing conditions. The project will also include a new access road to maintain the basin inlet works and an emergency spillway to pass flows in excess of the existing storm drain system capacity.

Drainage Area Limits – Based upon a cursory analysis of the watershed hydrology and storm drain hydraulics, it appears that the existing storm drain system draining the impoundment area may be undersized to accommodate the 85th percentile design storm. The tributary watershed is approximately 625 acres, and the existing drainage system consists of an approximately 60-inch diameter pipe, which transitions to a smaller, approximately 48-inch diameter pipe, at a grated cleanout within the property. These pipe sizes were visually estimated based upon a fairly poor vantage point from the top of the grate at the cleanout. Record plans show a 60-inch storm drain over the entire length of the system, although this does not appear to reflect existing conditions. It appears that the grated cleanout may actually be a discharge point from the system during the design storm, assuming that the hydraulic grade line reaches the top of grate elevation. It may be desired to improve the entire storm drain system as part of this project, although cost for this improvement has not been considered herein. A detailed hydrologic and reservoir routing analysis of the impoundment area, together with a hydraulic analysis of the storm drain system, will be required in order to determine the required storm drain size. The drainage area used for this conceptual design has been delineated as shown on the drainage area drawings in Appendix E.

Project Coordination – Over the course of this project Weston Solutions, Inc. coordinated with the City and the Metropolitan Water District of Southern California, the property manager. The property is under consideration for sale. In the event that this property is sold, Weston recommends transferring this project to similar City properties impacted by the Sorrento Creek dredging project. A list of high-priority alternative sites is being developed by the City in conjunction with a sediment source study. Due to the uncertain status of the Roselle Street property, submittals to Engineering and Capital Projects (ECPs) for this project may be suspended pending the final decision on the property by Metropolitan and the final results from the sediment study. Additional information regarding coordination and project contacts may be found in Appendix F.

Performance Specification – The purpose of this project is to decrease peak flows in the downstream receiving waters, thus decreasing erosion and subsequent sedimentation of Peñasquitos Lagoon. The greater the amount of impoundment area that can be utilized for detention, the more peak flows from the watershed can be reduced. The goal is to maximize reduction in peak flows from the approximately 625-acre watershed. Refer to detailed Performance Specifications below.

Operations and Maintenance (O&M) – It is anticipated that O&M will consist of annual sediment removal from the detention basin inlet works.

The estimated construction cost is $904,000. Refer to detailed cost estimate below.

Performance Specifications

The goal of the Roselle Street Flow Control for Los Peñasquitos Watershed Protection Project is to reduce erosion and sediment loading in the watershed. This goal will be achieved by installing a detention basin which will reduce the size and duration of peak storm loads, therefore reducing bank scouring in downstream channels.

GENERAL

Unless otherwise indicated herein, work shall be done in accordance with the latest approved edition of SDRSD.

Existing utilities shall be protected in place unless otherwise noted in construction drawings as directed by the Design Engineer.

Upon completion of the project, street lines and grades shall be returned to existing conditions.

Project components shall be designed to remove pollutants and priority constituents of concern in the Los Peñasquitos Watershed, including bacteria, nutrients, sediment, and total dissolved solids (Appendix D). The system shall be designed to achieve a 99% reduction in bacteria for the treated flow, in accordance with the final wet weather objective in the Bact-I TMDL.

1. DETENTION BASIN

The purpose of the detention basin is to capture design storm flows from the surrounding drainage area in order to reduce the peak flow and control downstream erosion by holding and slowly releasing flow.

The detention basin shall:

- Be designed with sufficient hydraulic capacity to accommodate flow from the surrounding drainage area during an 85th percentile SUSUMP storm event – (detention basin shall be sized based on routing and other necessary calculations during the final engineering design);
- Require excavation and regrading to form side berms (final cut and fill and grading will be determined during the final engineering design);
- Require the removal of approximately 400 linear feet of existing 60-inch storm drain pipe (final engineering design will determine length of pipe to be removed – existing utilities and end point storm drain cleanout shall be protected in place); and
- Be installed as indicated on the concept design.

2. ACCESS ROAD

The purpose of the access road is to provide vehicular access to the detention basin for cleaning and maintenance purposes.

The access road shall:

- Be at least 15 feet wide;
- Have a Class II type base along the south west portion of road;

- Include a section of road that has concrete side slopes which allow the road to double as an emergency spillway (northeast portion of road) (road shall have a minimum thickness of 6 inches);
- Include a minimum 70-feet wide emergency concrete spillway, as shown on the concept design (final dimensions of the emergency spillway shall be determined during the final engineering design); and
- Be installed as indicated on the concept design (access road's final coordinates, elevations, slopes, bases, and other features shall be determined during the final engineering design).

3. INLET STRUCTURE

The purpose of the inlet structure is to allow runoff from the drainage area that has been captured in the drainage basin to slowly drain to slowly enter the storm drain system. The inlet structure shall consist of (1) an inlet structure and (2) a wing-type headwall.

The inlet structure shall:

- Be designed in accordance with Section A-A of the concept design;
- Be designed to allow sufficient flow such that the detention basin does not exceed its design hydraulic capacity during an 85th percentile SUSUMP storm event (inlet hole size, spacing and frequency shall be determined during the final engineering design); and
- Be installed as indicated on the map on the concept design (inlet structure's final coordinates and elevation shall be determined during the final engineering design).

The wing-type headwall shall:

- Connect the new detention basin inlet to the new 60-inch diameter storm drain outlet pipe;
- Be designed in accordance with the specifications of SDRSD-D35, Modified Wing-Type Headwall; and
- Be installed as indicated on the map on the concept design.

4. OUTLET STORM DRAIN

The purpose of the outlet storm drain is to carry flow from the detention basin to the existing storm drain.

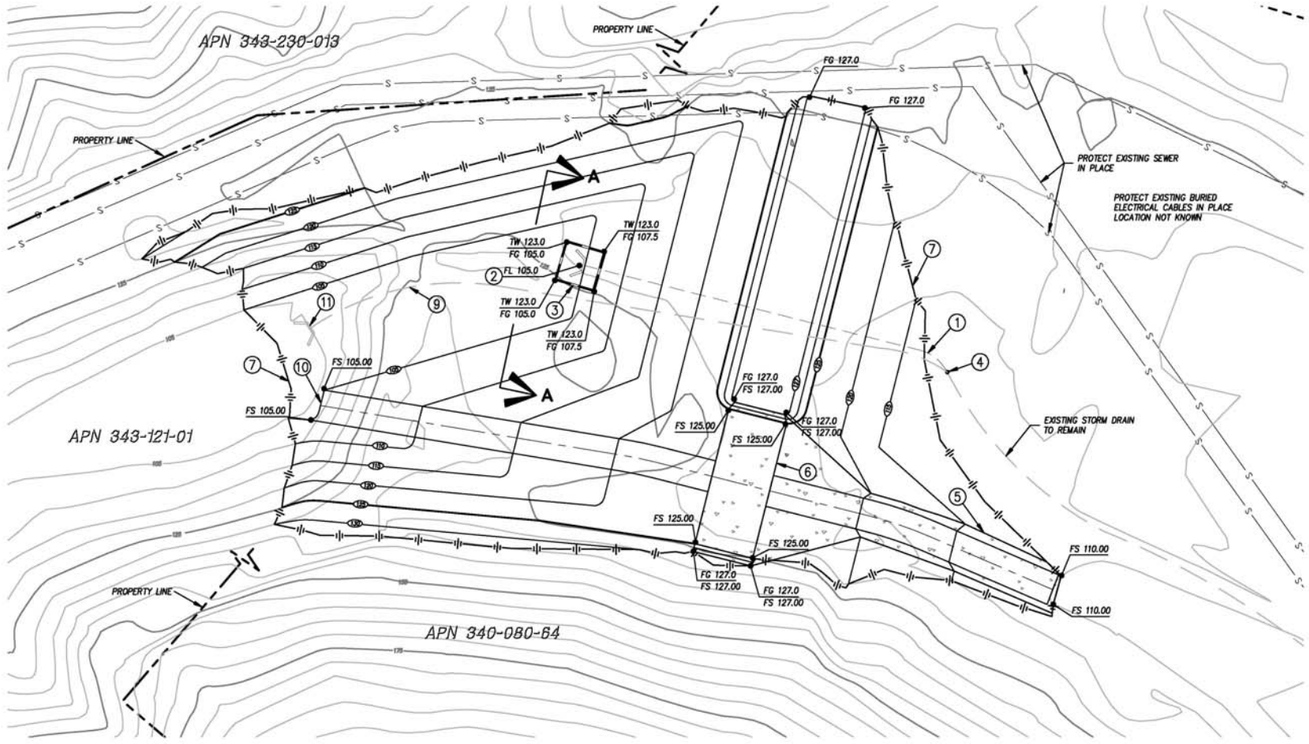
The storm drain shall:

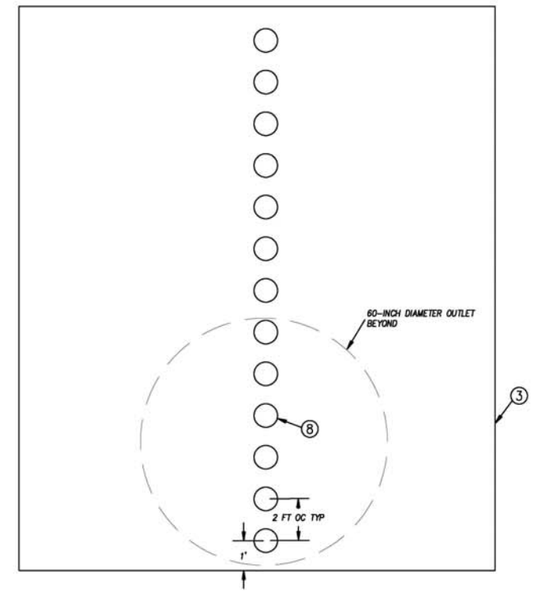
- Require the excavation, demolition, and removal of existing 60-inch storm drain pipe;
- Be designed for gravity flow such that the system does not cause flooding;
- Be designed using 60-inch storm drain pipe (pipe and bedding conditions are in accordance with the specifications of SDRSD-D60);
- Connect to the existing storm drain system *via* the existing storm drain clean out (existing clean out shall be protected in place); and
- Be installed as indicated on the map on the concept design (final pipe length, slope, and elevation shall be determined during the final engineering design).

Estimated Costs

Roselle Street Detention Basin Construction Cost Estimate CValdo Corporation J# 07-021 April 21, 2008				
Item	**Quantity**	**Unit**	**Unit Price**	**Cost**
Improvements				
Excavation and export	11,420	CY	$30.00	$342,600.00
Embankment	4,260	CY	$30.00	$127,800.00
Wing type headwall	1	EA	$5,000.00	$5,000.00
Remove and dispose of existing 60-inch RCP	400	LF	$50.00	$20,000.00
60-inch RCP	200	LF	$255.00	$51,000.00
Concrete detention inlet structure	1	EA	$25,000.00	$25,000.00
Concrete paving – emergency spillway / access road	7,250	SF	$10.00	$72,500.00
Class II base for access road within basin	3,280	SF	$0.75	$2,460.00
Miscellaneous landscaping and irrigation	1	LS	$25,000.00	$25,000.00
Basin perimeter fencing – chain link or equivalent	3,000	LF	$20.00	$60,000.00
			Subtotal	$731,360.00
Miscellaneous				
Erosion control	1	LS	$10,000.00	$10,000.00
			Subtotal	$10,000.00
			Construction subtotal	$741,360.00
			Mobilization – 6% of construction subtotal	$44,481.60
			Contingency – 15% of construction subtotal plus mobilization	$117,876.24
			Construction Total	**$903,717.84**

ROSELLE STREET FLOW CONTROL FOR LOS PENASQUITOS WATERSHED PROTECTION – CONCEPT PLAN





SETION AA : DETENTION INLET STRUCTURE
NOT TO SCALE

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

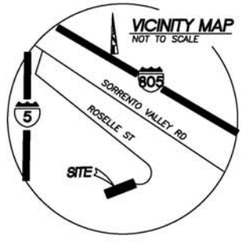
WORK TO BE DONE

1. CONSTRUCT APPROXIMATELY 200 LF NEW 60-INCH STORM DRAIN
2. CONTRUCT NEW WING TYPE HEADWALL PER SDRSD D-35
3. CONSTRUCT DETENTION INLET STRUCTURE PER SECTION AA AT RIGHT – DIMENSIONS AND OPENINGS TO BE DETERMINED DURING FINAL ENGINEERING
4. PROTECT EXISTING STORM DRAIN GRATED CLEANOUT IN PLACE
5. CONSTRUCT 15-FOOT WIDE 6-INCH THICK CONCRETE ACCESS ROAD WITH CONCRETE SIDE SLOPES TO DOUBLE AS EMERGENCY SPILLWAY
6. CONSTRUCT 70-FOOT WIDE EMENGENCY CONCRETE SPILLWAY – DIMENSIONS FOR COST ESTIMATING PURPOSES ONLY
7. GRADE DETENTION BASIN BERM PER CONTOURS HEREON
8. CONSTRUCT 12-INCH DIAMETER HOLES AT 2 FT ON CENTER ALONG DETENTION INLET STRUCTURE. HOLE SIZE AND SPACING FOR CONCEPT PURPOSES ONLY. ACTUAL SIZE AND SPACING TO BE DETERMINED DURING FINAL ENGINEERING.
9. REMOVE APPROXIMATELY 400 LF EXISTING 60-INCH STORM DRAIN – SALVAGE PIPE IF POSSIBLE
10. CONSTRUCT 15-FOOT WIDE CLASS II BASE ACCESS ROAD
11. REMOVE EXISTING HEADWALL

NOTE

NO DETENTION ROUTING CALCULATIONS WERE PREPARED TO ACCOMPANY THIS CONCEPTUAL PLAN. THE INTENT OF THE PROJECT IS TO MINIMIZE PEAK RUNOFF FROM THE TRIBUTARY WATERSHED AS PART OF AN EFFORT TO DECREASE SCOUR IN PENASQUITOS CREEK AND SUBSEQUENT SEDIMENTATION OF THE PENASQUITOS LAGOON. THIS CAN BE DONE BY MAXIMIZING USE OF THE AREA UPSTREAM OF THE OUTLET STRUCTURE SHOWN ABOVE FOR IMPOUNDMENT OF STORM WATER. IT SHOULD BE NOTED THAT THE EXISTING 60-INCH STORM DRAIN TRANSITIONS TO A SMALLER SIZE PIPE AT THE EXISTING GRATED CLEANOUT SHOWN ABOVE. THE ADEQUACY OF THIS EXISTING SYSTEM TO PASS THE DESIGN STORM SHOULD BE ANALYZED. THE LARGE AREA AVAILABLE FOR DETENTION MAY PROVE ADEQUATE TO CUT THE PEAK FLOW FROM THE BASIN TO A POINT WHERE THIS EXISTING SYSTEM IS ADEQUATE. IF THE SYSTEM IS NOT ADEQUATE, THE CITY MAY DESIRE TO INSTALL A PARALLEL OR REPLACEMENT PIPE CAPABLE OF PASSIGN THE DESIGN STORM. THE COST FOR A REPLACEMENT OR PARALLEL SYSTEM WAS NOT INCLUDED IN THE ESTIMATED CONSTRUCTION COST FOR THIS PROJECT.

BASED UPON THE ABOVE DESIGN, IT IS ANTICIPATED THAT THIS PROJECT WOULD BE EXEMPT FROM DSOD PROCESSING. IF THE BASIN HEIGHT IS INCREASED OR THE IMPOUNDMENT VOLUME INCREASED BEYOND THAT SHOWN, A REVIEW OF DSOD REGULATIONS SHOULD BE MADE.



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El Cajon Boulevard Storm Drain Inlet Retrofit for Chollas Creek Watershed Protection

Concept Design

The goal of the El Cajon Boulevard Storm Drain Inlet Retrofit for Chollas Creek Watershed Protection Project is to reduce the source of pollution in the storm drain by capturing it at the source (street level). The four storm drain catchbasins at the intersection of El Cajon Boulevard and Fairmount Avenue will be retrofitted with catchbasin inserts. This site was selected for its placement on a major arterial, proximity to the ongoing aggressive street sweeping program (Tier I BMP activity) along El Cajon Boulevard, and commercial land uses (gas station, two vehicle sales lots, and a clothing thrift shop). The close proximity of the catchbasins will also allow for easier project maintenance.

Inserts will be designed with stainless steel baskets that do not obstruct storm flows, that prevent street level flooding, and that maintain the structural integrity of the existing catchbasin. Inserts will be designed to capture trash and debris that flows from the streets during the first flush of a storm (Appendix G). Figure 9 shows recommended locations for trash segregation devices in aggressive street sweeping areas.

Project Coordination – Weston coordinated with the City Streets Department to obtain information regarding previous experiences with storm drain retrofit technologies as well as staff duties and capabilities. During this coordination, the Streets Department indicated their dislike for curb and street level screen systems. These systems require significant maintenance and when poorly maintained, cause flooding.

Operations and Maintenance (O&M) – It is anticipated that O&M will consist of at least quarterly trash and debris removal from the catchbasin insert. In order to prevent storm drain blockage and subsequent street flooding, systems would need to be inspected prior to major storm events.

The estimated construction cost is $16,000. For more details on this project, refer to Appendix G.

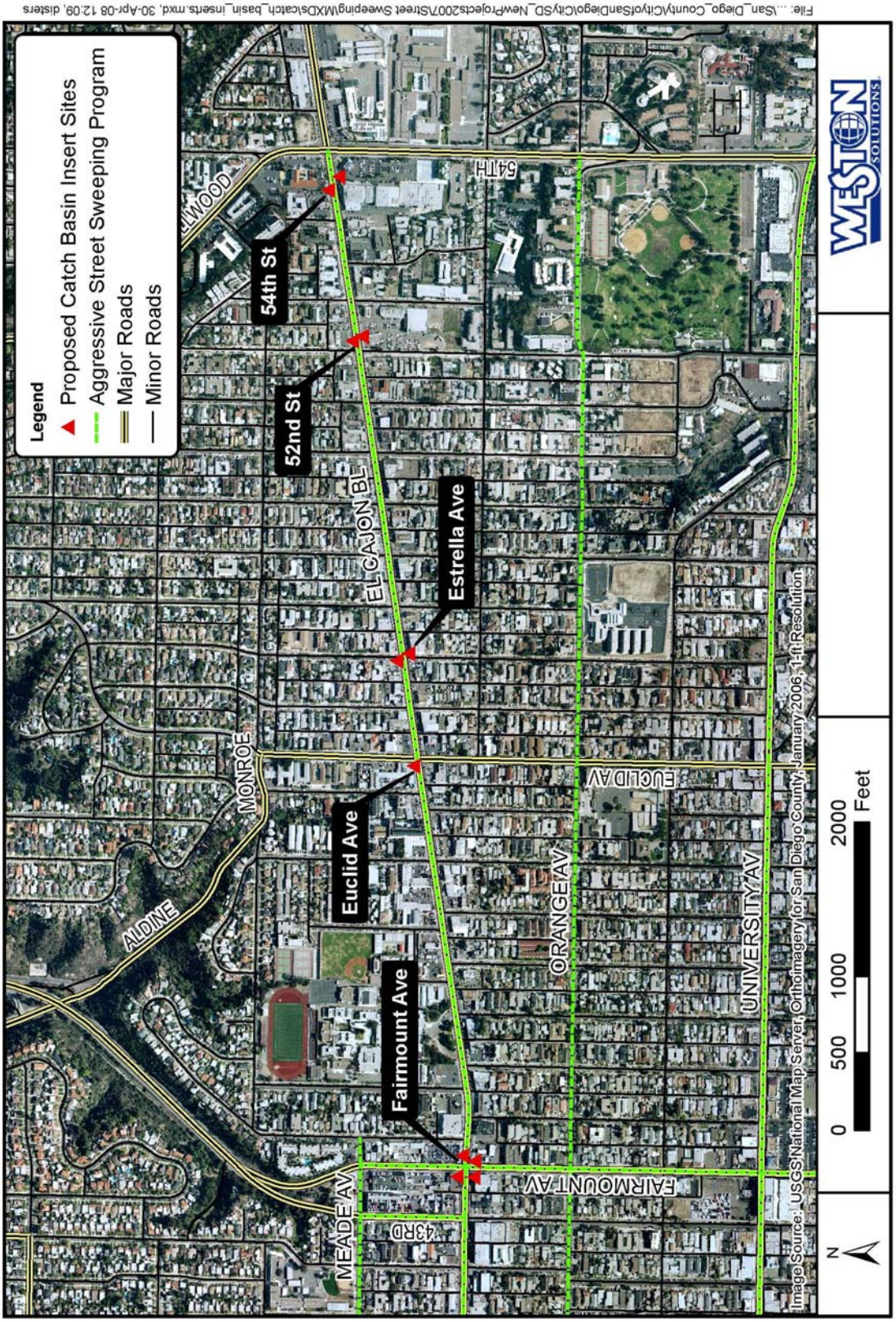

Figure 9. Chollas Creek – Potential Trash Segregation Devices Implementation Locations along Aggressive Street Sweeping Routes