STEP 8

OPERATION AND MAINTENANCE

- Please check the box that best describes the maintenance mechanism(s) for this project.

TABLE 13: PROJECT BMP CATEGORY

CATEGORY	SELECTED		BMP Description
	YES	NO	
First	X		Irrigation and Bioretention, fossil filter inserts, detention basin
Second[1]	X		
Third[2]	X		
Fourth			

Note:

1. A recorded maintenance agreement will be required.
2. Project will be required to establish or be included in a Stormwater Maintenance Assessment District for the long-term maintenance of treatment BMPs.

- Please list all individual LID and Treatment Control BMPs (TC-BMPs) incorporated into project. Please ensure the "BMP Identifier" is consistent with the legend in Attachment C "LID and/or TC-BMP Exhibit". Please attach the record plan sheets upon completion of project and amend the Major SWMP where appropriate. For each type of LID or TC-BMP provide an inspection sheet in Attachment F "Maintenance Plan".

TABLE 14: PROJECT SPECIFIC LID AND TC-BMPS

BMP Identifier*	LID or TC-BMP Type	BMP Pollutant of Concern Efficiency (H,M,L) – Table 11	Final Construction Date *(to be completed by County inspector)*	Final Construction Inspector Name *(to be completed by County inspector)*
Fossil Filter Inserts	Media Filters	Sediment (H) Nutrients (M)		
Irrigation and Bioretention in landscaped areas	Irrigation and Bioretention	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		
Detention basins	Settling and filtration	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		

Extended Detention Basin TC-22

Design Considerations

- Tributary Area
- Area Required
- Hydraulic Head

Description

Dry extended detention ponds (a.k.a. dry ponds, extended detention basins, detention ponds, extended detention ponds) are basins whose outlets have been designed to detain the stormwater runoff from a water quality design storm for some minimum time (e.g., 48 hours) to allow particles and associated pollutants to settle. Unlike wet ponds, these facilities do not have a large permanent pool. They can also be used to provide flood control by including additional flood detention storage.

California Experience

Caltrans constructed and monitored 5 extended detention basins in southern California with design drain times of 72 hours. Four of the basins were earthen, less costly and had substantially better load reduction because of infiltration that occurred, than the concrete basin. The Caltrans study reaffirmed the flexibility and performance of this conventional technology. The small headloss and few siting constraints suggest that these devices are one of the most applicable technologies for stormwater treatment.

Advantages

- Due to the simplicity of design, extended detention basins are relatively easy and inexpensive to construct and operate.
- Extended detention basins can provide substantial capture of sediment and the toxics fraction associated with particulates.
- Widespread application with sufficient capture volume can provide significant control of channel erosion and enlargement caused by changes to flow frequency

Targeted Constituents

☑	Sediment	▲
☑	Nutrients	●
☑	Trash	■
☑	Metals	▲
☑	Bacteria	▲
☑	Oil and Grease	▲
☑	Organics	▲

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

relationships resulting from the increase of impervious cover in a watershed.

Limitations

- Limitation of the diameter of the orifice may not allow use of extended detention in watersheds of less than 5 acres (would require an orifice with a diameter of less than 0.5 inches that would be prone to clogging).
- Dry extended detention ponds have only moderate pollutant removal when compared to some other structural stormwater practices, and they are relatively ineffective at removing soluble pollutants.
- Although wet ponds can increase property values, dry ponds can actually detract from the value of a home due to the adverse aesthetics of dry, bare areas and inlet and outlet structures.

Design and Sizing Guidelines

- Capture volume determined by local requirements or sized to treat 85% of the annual runoff volume.
- Outlet designed to discharge the capture volume over a period of hours.
- Length to width ratio of at least 1.5:1 where feasible.
- Basin depths optimally range from 2 to 5 feet.
- Include energy dissipation in the inlet design to reduce resuspension of accumulated sediment.
- A maintenance ramp and perimeter access should be included in the design to facilitate access to the basin for maintenance activities and for vector surveillance and control.
- Use a draw down time of 48 hours in most areas of California. Draw down times in excess of 48 hours may result in vector breeding, and should be used only after coordination with local vector control authorities. Draw down times of less than 48 hours should be limited to BMP drainage areas with coarse soils that readily settle and to watersheds where warming may be determined to downstream fisheries.

Construction/Inspection Considerations

- Inspect facility after first large to storm to determine whether the desired residence time has been achieved.
- When constructed with small tributary area, orifice sizing is critical and inspection should verify that flow through additional openings such as bolt holes does not occur.

Performance

One objective of stormwater management practices can be to reduce the flood hazard associated with large storm events by reducing the peak flow associated with these storms. Dry extended detention basins can easily be designed for flood control, and this is actually the primary purpose of most detention ponds.

Dry extended detention basins provide moderate pollutant removal, provided that the recommended design features are incorporated. Although they can be effective at removing some pollutants through settling, they are less effective at removing soluble pollutants because of the absence of a permanent pool. Several studies are available on the effectiveness of dry extended detention ponds including one recently concluded by Caltrans (2002).

The load reduction is greater than the concentration reduction because of the substantial infiltration that occurs. Although the infiltration of stormwater is clearly beneficial to surface receiving waters, there is the potential for groundwater contamination. Previous research on the effects of incidental infiltration on groundwater quality indicated that the risk of contamination is minimal.

There were substantial differences in the amount of infiltration that were observed in the earthen basins during the Caltrans study. On average, approximately 40 percent of the runoff entering the unlined basins infiltrated and was not discharged. The percentage ranged from a high of about 60 percent to a low of only about 8 percent for the different facilities. Climatic conditions and local water table elevation are likely the principal causes of this difference. The least infiltration occurred at a site located on the coast where humidity is higher and the basin invert is within a few meters of sea level. Conversely, the most infiltration occurred at a facility located well inland in Los Angeles County where the climate is much warmer and the humidity is less, resulting in lower soil moisture content in the basin floor at the beginning of storms.

Vegetated detention basins appear to have greater pollutant removal than concrete basins. In the Caltrans study, the concrete basin exported sediment and associated pollutants during a number of storms. Export was not as common in the earthen basins, where the vegetation appeared to help stabilize the retained sediment.

Siting Criteria

Dry extended detention ponds are among the most widely applicable stormwater management practices and are especially useful in retrofit situations where their low hydraulic head requirements allow them to be sited within the constraints of the existing storm drain system. In addition, many communities have detention basins designed for flood control. It is possible to modify these facilities to incorporate features that provide water quality treatment and/or channel protection. Although dry extended detention ponds can be applied rather broadly, designers need to ensure that they are feasible at the site in question. This section provides basic guidelines for siting dry extended detention ponds.

In general, dry extended detention ponds should be used on sites with a minimum area of 5 acres. With this size catchment area, the orifice size can be on the order of 0.5 inches. On smaller sites, it can be challenging to provide channel or water quality control because the orifice diameter at the outlet needed to control relatively small storms becomes very small and thus prone to clogging. In addition, it is generally more cost-effective to control larger drainage areas due to the economies of scale.

Extended detention basins can be used with almost all soils and geology, with minor design adjustments for regions of rapidly percolating soils such as sand. In these areas, extended detention ponds may need an impermeable liner to prevent ground water contamination.

The base of the extended detention facility should not intersect the water table. A permanently wet bottom may become a mosquito breeding ground. Research in Southwest Florida (Santana et al., 1994) demonstrated that intermittently flooded systems, such as dry extended detention ponds, produce more mosquitoes than other pond systems, particularly when the facilities remained wet for more than 3 days following heavy rainfall.

A study in Prince George's County, Maryland, found that stormwater management practices can increase stream temperatures (Galli, 1990). Overall, dry extended detention ponds increased temperature by about 5°F. In cold water streams, dry ponds should be designed to detain stormwater for a relatively short time (i.e., 24 hours) to minimize the amount of warming that occurs in the basin.

Additional Design Guidelines

In order to enhance the effectiveness of extended detention basins, the dimensions of the basin must be sized appropriately. Merely providing the required storage volume will not ensure maximum constituent removal. By effectively configuring the basin, the designer will create a long flow path, promote the establishment of low velocities, and avoid having stagnant areas of the basin. To promote settling and to attain an appealing environment, the design of the basin should consider the length to width ratio, cross-sectional areas, basin slopes and pond configuration, and aesthetics (Young et al., 1996).

Energy dissipation structures should be included for the basin inlet to prevent resuspension of accumulated sediment. The use of stilling basins for this purpose should be avoided because the standing water provides a breeding area for mosquitoes.

Extended detention facilities should be sized to completely capture the water quality volume. A micropool is often recommended for inclusion in the design and one is shown in the schematic diagram. These small permanent pools greatly increase the potential for mosquito breeding and complicate maintenance activities; consequently, they are not recommended for use in California.

A large aspect ratio may improve the performance of detention basins; consequently, the outlets should be placed to maximize the flowpath through the facility. The ratio of flowpath length to width from the inlet to the outlet should be at least 1.5:1 (L:W) where feasible. Basin depths optimally range from 2 to 5 feet.

The facility's drawdown time should be regulated by an orifice or weir. In general, the outflow structure should have a trash rack or other acceptable means of preventing clogging at the entrance to the outflow pipes. The outlet design implemented by Caltrans in the facilities constructed in San Diego County used an outlet riser with orifices

Figure 1
Example of Extended Detention Outlet Structure

sized to discharge the water quality volume, and the riser overflow height was set to the design storm elevation. A stainless steel screen was placed around the outlet riser to ensure that the orifices would not become clogged with debris. Sites either used a separate riser or broad crested weir for overflow of runoff for the 25 and greater year storms. A picture of a typical outlet is presented in Figure 1.

The outflow structure should be sized to allow for complete drawdown of the water quality volume in 72 hours. No more than 50% of the water quality volume should drain from the facility within the first 24 hours. The outflow structure can be fitted with a valve so that discharge from the basin can be halted in case of an accidental spill in the watershed.

Summary of Design Recommendations

(1) Facility Sizing - The required water quality volume is determined by local regulations or the basin should be sized to capture and treat 85% of the annual runoff volume. See Section 5.5.1 of the handbook for a discussion of volume-based design.

Basin Configuration – A high aspect ratio may improve the performance of detention basins; consequently, the outlets should be placed to maximize the flowpath through the facility. The ratio of flowpath length to width from the inlet to the outlet should be at least 1.5:1 (L:W). The flowpath length is defined as the distance from the inlet to the outlet as measured at the surface. The width is defined as the mean width of the basin. Basin depths optimally range from 2 to 5 feet. The basin may include a sediment forebay to provide the opportunity for larger particles to settle out.

A micropool should not be incorporated in the design because of vector concerns. For online facilities, the principal and emergency spillways must be sized to provide 1.0 foot of freeboard during the 25-year event and to safely pass the flow from 100-year storm.

(2) Pond Side Slopes - Side slopes of the pond should be 3:1 (H:V) or flatter for grass stabilized slopes. Slopes steeper than 3:1 (H:V) must be stabilized with an appropriate slope stabilization practice.

(3) Basin Lining – Basins must be constructed to prevent possible contamination of groundwater below the facility.

(4) Basin Inlet – Energy dissipation is required at the basin inlet to reduce resuspension of accumulated sediment and to reduce the tendency for short-circuiting.

(5) Outflow Structure - The facility's drawdown time should be regulated by a gate valve or orifice plate. In general, the outflow structure should have a trash rack or other acceptable means of preventing clogging at the entrance to the outflow pipes.

The outflow structure should be sized to allow for complete drawdown of the water quality volume in 72 hours. No more than 50% of the water quality volume should drain from the facility within the first 24 hours. The outflow structure should be fitted with a valve so that discharge from the basin can be halted in case of an accidental spill in the watershed. This same valve also can be used to regulate the rate of discharge from the basin.

The discharge through a control orifice is calculated from:

$$Q = CA(2g(H-H_o))^{0.5}$$

where: Q = discharge (ft^3/s)
C = orifice coefficient
A = area of the orifice (ft^2)
g = gravitational constant (32.2)
H = water surface elevation (ft)
H_o= orifice elevation (ft)

Recommended values for C are 0.66 for thin materials and 0.80 when the material is thicker than the orifice diameter. This equation can be implemented in spreadsheet form with the pond stage/volume relationship to calculate drain time. To do this, use the initial height of the water above the orifice for the water quality volume. Calculate the discharge and assume that it remains constant for approximately 10 minutes. Based on that discharge, estimate the total discharge during that interval and the new elevation based on the stage volume relationship. Continue to iterate until H is approximately equal to H_o. When using multiple orifices the discharge from each is summed.

(6) Splitter Box - When the pond is designed as an offline facility, a splitter structure is used to isolate the water quality volume. The splitter box, or other flow diverting approach, should be designed to convey the 25-year storm event while providing at least 1.0 foot of freeboard along pond side slopes.

(7) Erosion Protection at the Outfall - For online facilities, special consideration should be given to the facility's outfall location. Flared pipe end sections that discharge at or near the stream invert are preferred. The channel immediately below the pond outfall should be modified to conform to natural dimensions, and lined with large stone riprap placed over filter cloth. Energy dissipation may be required to reduce flow velocities from the primary spillway to non-erosive velocities.

(8) Safety Considerations - Safety is provided either by fencing of the facility or by managing the contours of the pond to eliminate dropoffs and other hazards. Earthen side slopes should not exceed 3:1 (H:V) and should terminate on a flat safety bench area. Landscaping can be used to impede access to the facility. The primary spillway opening must not permit access by small children. Outfall pipes above 48 inches in diameter should be fenced.

Maintenance

Routine maintenance activity is often thought to consist mostly of sediment and trash and debris removal; however, these activities often constitute only a small fraction of the maintenance hours. During a recent study by Caltrans, 72 hours of maintenance was performed annually, but only a little over 7 hours was spent on sediment and trash removal. The largest recurring activity was vegetation management, routine mowing. The largest absolute number of hours was associated with vector control because of mosquito breeding that occurred in the stilling basins (example of standing water to be avoided) installed as energy dissipaters. In most cases, basic housekeeping practices such as removal of debris accumulations and vegetation

management to ensure that the basin dewaters completely in 48-72 hours is sufficient to prevent creating mosquito and other vector habitats.

Consequently, maintenance costs should be estimated based primarily on the mowing frequency and the time required. Mowing should be done at least annually to avoid establishment of woody vegetation, but may need to be performed much more frequently if aesthetics are an important consideration.

Typical activities and frequencies include:

- Schedule semiannual inspection for the beginning and end of the wet season for standing water, slope stability, sediment accumulation, trash and debris, and presence of burrows.
- Remove accumulated trash and debris in the basin and around the riser pipe during the semiannual inspections. The frequency of this activity may be altered to meet specific site conditions.
- Trim vegetation at the beginning and end of the wet season and inspect monthly to prevent establishment of woody vegetation and for aesthetic and vector reasons.
- Remove accumulated sediment and re-grade about every 10 years or when the accumulated sediment volume exceeds 10 percent of the basin volume. Inspect the basin each year for accumulated sediment volume.

Cost

Construction Cost

The construction costs associated with extended detention basins vary considerably. One recent study evaluated the cost of all pond systems (Brown and Schueler, 1997). Adjusting for inflation, the cost of dry extended detention ponds can be estimated with the equation:

$$C = 12.4V^{0.760}$$

where: C = Construction, design, and permitting cost, and
V = Volume (ft^3).

Using this equation, typical construction costs are:

$ 41,600 for a 1 acre-foot pond

$ 239,000 for a 10 acre-foot pond

$ 1,380,000 for a 100 acre-foot pond

Interestingly, these costs are generally slightly higher than the predicted cost of wet ponds (according to Brown and Schueler, 1997) on a cost per total volume basis, which highlights the difficulty of developing reasonably accurate construction estimates. In addition, a typical facility constructed by Caltrans cost about $160,000 with a capture volume of only 0.3 ac-ft.

An economic concern associated with dry ponds is that they might detract slightly from the value of adjacent properties. One study found that dry ponds can actually detract from the

perceived value of homes adjacent to a dry pond by between 3 and 10 percent (Emmerling-Dinovo, 1995).

Maintenance Cost

For ponds, the annual cost of routine maintenance is typically estimated at about 3 to 5 percent of the construction cost (EPA website). Alternatively, a community can estimate the cost of the maintenance activities outlined in the maintenance section. Table 1 presents the maintenance costs estimated by Caltrans based on their experience with five basins located in southern California. Again, it should be emphasized that the vast majority of hours are related to vegetation management (mowing).

Table 1 Estimated Average Annual Maintenance Effort

Activity	Labor Hours	Equipment & Material ($)	Cost
Inspections	4	7	183
Maintenance	49	126	2282
Vector Control	0	0	0
Administration	3	0	132
Materials	-	535	535
Total	**56**	**$668**	**$3,132**

References and Sources of Additional Information

Brown, W., and T. Schueler. 1997. *The Economics of Stormwater BMPs in the Mid-Atlantic Region*. Prepared for Chesapeake Research Consortium. Edgewater, MD. Center for Watershed Protection. Ellicott City, MD.

Denver Urban Drainage and Flood Control District. 1992. *Urban Storm Drainage Criteria Manual—Volume 3: Best Management Practices*. Denver, CO.

Emmerling-Dinovo, C. 1995. Stormwater Detention Basins and Residential Locational Decisions. *Water Resources Bulletin 31(3)*: 515–521

Galli, J. 1990. *Thermal Impacts Associated with Urbanization and Stormwater Management Best Management Practices*. Metropolitan Washington Council of Governments. Prepared for Maryland Department of the Environment, Baltimore, MD.

GKY, 1989, *Outlet Hydraulics of Extended Detention Facilities* for the Northern Virginia Planning District Commission.

MacRae, C. 1996. Experience from Morphological Research on Canadian Streams: Is Control of the Two-Year Frequency Runoff Event the Best Basis for Stream Channel Protection? In *Effects of Watershed Development and Management on Aquatic Ecosystems*. American Society of Civil Engineers. Edited by L. Roesner. Snowbird, UT. pp. 144–162.

Maryland Dept of the Environment, 2000, Maryland Stormwater Design Manual: Volumes 1 & 2, prepared by MDE and Center for Watershed Protection.
http://www.mde.state.md.us/environment/wma/stormwatermanual/index.html

Metzger, M. E., D. F. Messer, C. L. Beitia, C. M. Myers, and V. L. Kramer. 2002. The Dark Side Of Stormwater Runoff Management: Disease Vectors Associated With Structural BMPs. Stormwater 3(2): 24-39.

Santana, F., J. Wood, R. Parsons, and S. Chamberlain. 1994. Control of Mosquito Breeding in Permitted Stormwater Systems. Prepared for Southwest Florida Water Management District, Brooksville, FL.

Schueler, T. 1997. Influence of Ground Water on Performance of Stormwater Ponds in Florida. *Watershed Protection Techniques* 2(4):525–528.

Watershed Management Institute (WMI). 1997. *Operation, Maintenance, and Management of Stormwater Management Systems*. Prepared for U.S. Environmental Protection Agency, Office of Water. Washington, DC.

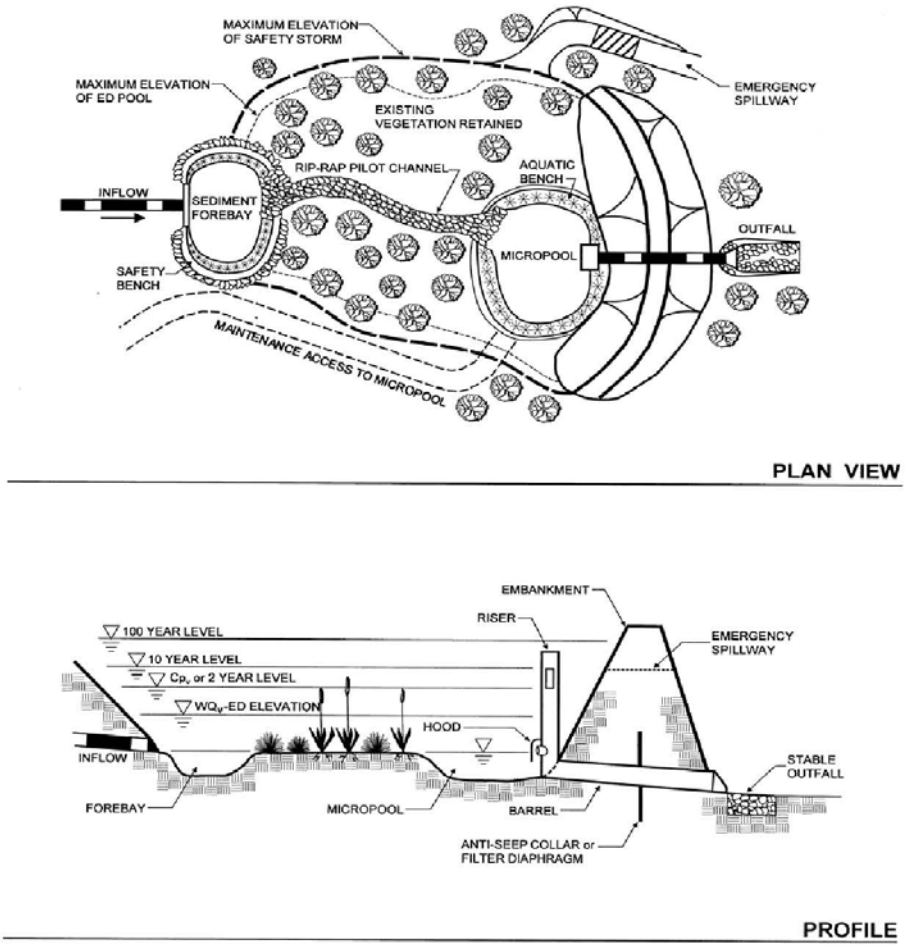
Young, G.K., et al., 1996, *Evaluation and Management of Highway Runoff Water Quality*, Publication No. FHWA-PD-96-032, U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.

Information Resources

Center for Watershed Protection (CWP), Environmental Quality Resources, and Loiederman Associates. 1997. *Maryland Stormwater Design Manual.* Draft. Prepared for Maryland Department of the Environment, Baltimore, MD.

Center for Watershed Protection (CWP). 1997. *Stormwater BMP Design Supplement for Cold Climates*. Prepared for U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds. Washington, DC.

U.S. Environmental Protection Agency (USEPA). 1993. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. EPA-840-B-92-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.



Schematic of an Extended Detention Basin (MDE, 2000)

ATTACHMENT E

Geotechnical Certification Sheet

The design of stormwater treatment and other control measures proposed in this plan requiring specific soil infiltration characteristics and/or geological conditions has been reviewed and approved by a registered Civil Engineer, Geotechnical Engineer, or Geologist in the State of California.

_____ _____

Name Date

N/A, even though the project proposes infiltration BMPs such as the Retention/Irrigation, the anticipated water quality runoff volume is not required to infiltrate into the underlying native soil. The runoff only needs to infiltrate into the top soil section and be discharge to downstream channel via outlet pipe. The pad retention/irrigation BMP will retain the water quality runoff volume.

ADVANCED GEOTECHNICAL SOLUTIONS, INC.
25109 Jefferson Avenue, Suite 220
Murrieta, California 92562
Telephone: (619) 708-1649 Fax: (714) 409-3287

The Accretive Group
12275 El Camino Real, Suite 220
San Diego, CA 92130

March 22, 2012
P/W 1102-01
Report No. 1102-01-B-11

Attention: Mr. Jon Rilling

Subject: Preliminary Infiltration Rates, Lilac Hills Ranch, Valley Center Community Planning Area, County of San Diego, California

Reference: *Feasibility Level Geotechnical Report, Las Lilas Project, Valley Center Area, San Diego, California, prepared by Pacific Soils Engineering, Inc. dated May 23, 2007 (PSE W.O. 401120)*

Gentlemen:

Pursuant to a request from representatives of Landmark Consulting, transmitted herein is Advanced Geotechnical Solutions, Inc.'s (AGS) estimated infiltration rates for use in the preliminary design of infiltration basins for the Lilac Hills Ranch project, Valley Center Community Planning Area, County of San Diego, California. Site specific testing has not been conducted onsite for the determination of infiltration rates. The rates presented herein are based upon USDA Natural Resource Conservation Service (NCRS) mapping, information provided by the County of San Diego, Department of Public Works, and the characteristics of the onsite soils and bedrock.

We have provided you preliminary mapping of the site showing the approximate location of the various geologic units onsite. Based upon the geologic units the following estimated infiltration rates are presented:

- **Artificial Fill, Compacted** (no map symbol)- Soil Group D (rates 0 to 0.05 inches per hour)
- **Artificial Fill, Undocumented** (map symbol afu)- Soil Group D (rates 0 to 0.05 inches per hour)
- **Alluvium** (map symbol Qal)- Soil Group C (rates 0.05 to 0.15 inches per hour)
- **Older Alluvium** (map symbol Qoal)- Soil Group C (rates 0.05 to 0.15 inches per hour)
- **Granitic Rock** (map symbol Kgr)- Soil Group D (rates 0 to 0.05 inches per hour)

The aforementioned rates are highly dependent upon the depth to the underlying relatively impermeable granitic rock and whether the area has been subjected to loading from grading or farming equipment as this will tend to densify the soils and reduce the infiltration rates. Infiltration basins should be located such that the infiltration water is located down gradient from all structural building pads.

Should you desire more accurate design rates than these general rates presented herein, additional testing can be conducted. This testing should be conducted utilizing a Double Ring Infiltrometer apparatus.

Rates determined with the Double Ring Infiltrometer are considered to be more accurate by the local Water Quality Control Board than other methods.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact the undersigned.

Respectfully Submitted,
Advanced Geotechnical Solutions, Inc.

JEFFREY A. CHANEY, Vice President
RCE 46544/ GE 2314

Distribution: (4) Addressee
(1) Landmark Consulting, Attn: Mark Brencick

VI. General Maintenance Requirements:

BMP CATEGORY (FIRST)	**MAINTENANCE ACTIVITIES**	ANNUAL COST
BIO-FILTERATION AREAS	- CUT VEGETATION IN CHANNEL TO 8" or 6" HEIGHT - RESEED/VEGETATE BARE SPOTS AS NECESSARY - REMOVE SEDIMENT FROM CHANNEL AS NECESSARY - BACKFILL BURROW HOLES AS NECESSARY	$38,500
	TOTAL	**$ 38,500**
MAINTENANCE RESPONSIBILITY	The County should have only minimal concern for ongoing maintenance. The property owners and HOA can naturally be expected to do so as a requirement of taking care of their property.	
BMP CATEGORY (THIRD)	**MAINTENANCE ACTIVITIES**	ANNUAL COST
DETENTION BASIN (1 total)	- CUT VEGETATION IN BASIN TO 8" HEIGHT - RESEED/VEGETATE BARE SPOTS AS NECESSARY - REMOVE SEDIMENT FROM BASIN AS NECESSARY - INSPECT STRUCTURAL INTEGRITY - BACKFILL BURROW HOLES AS NECESSARY	
MAINTENANCE RESPONSIBILITY	The County needs to assure ongoing maintenance is heightened, to the point that the County is willing to take on this responsibility. The master HOA will be primarily responsible for maintenance. A permanent funding mechanism needs to be established. A special assessment district will be established for this project, the assessment will be collected with property tax.	
	TOTAL	**$10,000**
BMP CATEGORY (SECOND)	**MAINTENANCE ACTIVITIES**	ANNUAL COST
FOSSIL FILTER INSERTS	- INSPECT UNIT INTEGRITY - REMOVED ACCUMULATED SEDIMENT AND DIPOSE OF PROPERLY - REPLACE HYDROCARBON BOOM AS NECESSARY	
MAINTENANCE RESPONSIBILITY	The Developer would provide the County with security to substantiate the maintenance agreement; security would remain in place for an interim period of 5 years. The amount of the security would equal the estimated cost of 2 years of maintenance activities. The security can be a Cash Deposit, Letter of Credit or other acceptable to the County. If at any time, owners fail to maintain BMPs and the County must perform any of the maintenance activities, then owners shall pay all of County's costs incurred in performing the maintenance as defined in the maintenance agreement.	
	TOTAL	**$12,000**
	GRAND TOTAL	**$60,500**

ATTACHMENT G

Treatment Control BMP Certification for DPW Permitted Land Development Projects

County of San Diego

DEPARTMENT OF PUBLIC WORKS

Treatment Control BMP Certification for DPW Permitted Land Development Projects

Permit Number_____ SWMP #_____

Project Name_____

Location / Address _____

Responsible Party for Construction Phase

Developer's Name: _____

Address: _____

City _____ State _____Zip_____

Email Address: _____

Phone Number: _____

Engineer of Work: _____

Engineer's Phone Number: _____

Responsible Party for Perpetual Maintenance

Owner's Name(s)*_____

Address: _____

City _____ State _____Zip_____

Email Address: _____

Phone Number: _____

* Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information of president at time of project closeout.

Maintenance Agreement No.: _____

Percent Impervious Before Construction: %_____
Percent Impervious After Construction: %_____

Proposed Disturbed Area: _____Acres

Hydromodification Management:
Yes ☐ or No ☐

Primary or Secondary Pollutants of Concerns *(check all that apply)*

- ☐ Sediment
- ☐ Nutrients
- ☐ Organic Compounds
- ☐ Trash and Debris
- ☐ Oxygen Demanding Substances
- ☐ Oil and Grease
- ☐ Bacteria and Viruses
- ☐ Pesticides

Site Layout Strategies *(check all that apply)*

- ☐ Conserve Natural Areas
- ☐ Minimize Disturbance to Natural Areas
- ☐ Minimize and Disconnect Imp.Surfaces
- ☐ Minimize Soil Compaction
- ☐ Minimize erosion from slopes

Disperse Runoff from Impervious Surfaces to Pervious *(check all that apply)*

- ☐ Use of pervious surfaces
- ☐ Street and Road Design
- ☐ Parking Lot Design
- ☐ Driveway, Sidewalk, Bikepath Design
- ☐ Building Design
- ☐ Landscape Design

Source BMPs *(check all that apply)*

- ☐ Storm Drain Inlets
- ☐ Interior Floor Drains
- ☐ Interior Parking Garages
- ☐ Indoor & Structural Pest Control
- ☐ Landscape/Outdoor Pesticide Use
- ☐ Pools, spas, etc.
- ☐ Food Service
- ☐ Refuse Areas
- ☐ Industrial Processes
- ☐ Outdoor Storage of Equipment and Materials
- ☐ Vehicle and Equipment Cleaning
- ☐ Vehicle/ Equipment Repair and Maintenance
- ☐ Fuel Dispensing Areas
- ☐ Loading Docks
- ☐ Fire Sprinkler Test Water
- ☐ Misc. drain or wash water
- ☐ Plazas, sidewalks, and parking lots

Treatment Control, Hydromodification and LID BMPs

BMP Identifier: (Identifier to match TCBMPs on TCBMP Table.)	Type	Record Plan Page for TCBMP	BMP Pollutant of Concern Efficiency (H,M,L)

(Add sheet for all additional BMPs)
The Maintenance Agreement has been recorded. Yes ☐ or No ☐

I certify that the above items for this project are in substantial conformance with the approved plans. Yes ☐ or No ☐

Please sign your name and seal. [SEAL]

Engineer's Print Name: _____

Engineer's Signed Name: _____

Date: _____

Submittals Required with Certification:

- Copy of the final approved SWMP.
- Copy of the approved record plan showing Stormwater TCBMP Table and the location of each verified as-built TCBMP.
- Copy of the specification sheets for the verified proprietary TCBMPs
- Recorded Maintenance Agreement (Category 1 or 2 only)
- Photograph(s) of TCBMP(s)

COUNTY - OFFICIAL USE ONLY:

For PDCI:
PDCI Inspector:_____

Date Project has/expects to close:_____

Date Certification received from EOW:_____

DPW Inspector concurs that every noted BMP on the plan and the SWMP or SWMP Addendum is installed onsite through field verification and completed as certified: Yes ☐
or No ☐

PDCI Inspector's Signed Name: _____ Date: _____

FOR WPP:
Date Received from PDCI:_____

WPP Submittal Reviewer:_____

WPP Reviewer concurs that the provided TC-BMP information is acceptable to enter into the TC-BMP Maintenance verification inventory. Yes ☐ or No ☐

WPP Reviewer's Signed Name: _____ Date:_____

ATTACHMENT H

HMP Exemption Documentation

(if applicable)

ATTACHEMENT I
ADDEMDUM

Due to advancement of technology we have more choices than ever to enhance our project's storm water treatment capability and facilities. In the past few years, it has been recognized that rainwater capturing offers great augmentation to the overall sustainability of our project by reducing the required detention basin for 100-year storm runoff volume attenuation, and subsequently reducing the overall project foot print to preserve more natural land. Furthermore, rainwater capturing will also reduce the water demand for irrigation to reduce the long term impact of the proposed development.

The commercially available rain barrels offer a great variety of colors, shapes and sizes to suite almost any type of development.

Currently, the commercially available pavers have a wide range of colors and textures that differ from the monochromatic asphaltic concrete (AC) pavement, pavers has the ability to visually and sonically alert drivers to slow down as they are entering areas with increased pedestrians and bicycle riders such as town centers, schools and interior residential areas. This will greatly enhance the safety, quality of life and promote walkability of the neighborhoods.

The permeable paver structural section offer significant capacity to store excess runoff volume within the void spaces of the base material. This underground storage capacity will offset the required detention basin size for both the 100-year storm runoff attenuation and hydromodification mitigation. The proposed permeable pavers will reduce the oval all project footprint to preserve more natural areas. Furthermore, during low intensity rain events where the runoff has the highest potential to carry pollutants such as sediments, oils and grease and other as identified in the project SWMPs has the greatest opportunity to seep into the permeable paver structural section such that the pollutants have time to settle and be filtered through the base material. The pavers add another component to the storm water runoff treatment train further enhances the runoff water quality leaving the project site. In conjunction with the reduced detention basins, bio-retention area and other BMP facilities, the paver will greatly contribute to the proposed project being hydrologic impact neutral.

ASSUMPTIONS:

Bio-retention:

-Typical lot size = 4500 sf

-Typical impervious coverage per lot = 1500 sf roof + 300 sf walkways and driveway = 1800 sf

-Typical pervious coverage (bio-retention) per lot = 1000 sf with the top 12" layer providing a minimum of 5"/hour infiltration rate.

Rain barrels:

-Typical home rain gutter down spout location = 4

These permeable pavers and rain barrels offer a great alternative to the proposed detention basins for 100-year runoff volume attenuation.

The project developers projected a total of 23 acres of pavers throughout the project. Per the calculations presented in this report, the proposed rain barrels and permeable pavers will provide adequate storage capacity to eliminate the required detention basin for 100-year storm water runoff volume attenuation purposes.

TABLE 8: LID AND SITE DESIGN

1. Conserve natural Areas, Soils, and Vegetation
☒ Preserve well draining soils (Type A or B)
☒ Preserve Significant Trees
☒ Preserve critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions
☐ Other. Description:
2. Minimize Disturbance to Natural Drainages
☒ Set-back development envelope from drainages
☐ Restrict heavy construction equipment access to planned green/open space areas
☐ Other. Description:
3. Minimize and Disconnect Impervious Surfaces (see 5)
☒ Clustered Lot Design
☐ Items checked in 5?
☐ Other. Description:
4. Minimize Soil Compaction
☒ Restrict heavy construction equipment access to planned green/open space areas
☒ Re-till soils compacted by construction vehicles/equipment
☐ Collect & re-use upper soil layers of development site containing organic Materials
☐ Other. Description:
5. Drain Runoff from Impervious Surfaces to Pervious Areas
LID Street & Road Design
☐ Curb-cuts to landscaping
☐ Rural Swales
☐ Concave Median
☐ Cul-de-sac Landscaping Design
☒ Other. Description: all runoff from streets and roadways are conveyed to proposed permeable pavers located at low points of roadways, the first flush runoff will drain into the base materials under the paver and be
LID Parking Lot Design
☒ Permeable Pavements
☒ Curb-cuts to landscaping
☐ Other. Description:
LID Driveway, Sidewalk, Bike-path Design
☒ Permeable Pavements
☒ Pitch pavements toward landscaping

☐ Other. Description:
LID Building Design
☒ Cisterns & Rain Barrels
☐ Downspout to swale
☐ Vegetated Roofs
☐ Other. Description:
LID Landscaping Design
☒ Soil Amendments
☒ Reuse of Native Soils
☒ Smart Irrigation Systems
☒ Street Trees
☐ Other. Description:
6. Minimize erosion from slopes
☒ Disturb existing slopes only when necessary
☒ Minimize cut and fill areas to reduce slope lengths
☒ Incorporate retaining walls to reduce steepness of slopes or to shorten slopes
☒ Provide benches or terraces on high cut and fill slopes to reduce concentration of flows
☒ Rounding and shaping slopes to reduce concentrated flow
☒ Collect concentrated flows in stabilized drains and channels
☐ Other. Description:

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment facilities

Pollutants of Concern	**Bioretention Facilities (LID)**	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	**Infiltration Facilities or Practices (LID)**	**Media Filters**	Higher-rate biofilters *	Higher-rate media filters*	Trash Racks & Hydro-dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	**High**	High	High	**High**	**High**	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	**High**	High	High	**High**	**High**	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	**Medium**	Low	Medium	**High**	**Low**	Low	Low	Low	Low

- Please check the box(s) that best describes the Treatment BMP(s) and/or LID BMP selected for this project.

TABLE 12: PROJECT LID AND TC-BMPS

LID and TC-BMP Type	**Water Quality Treatment Only**	**Hydromodification Flow Control**
Bioretention Facilites (LID)		
☒ Bioretention area	X	X
☐ Flow-through Planter		
☒ Cistern with Bioretention * rain barrels	X	
Settling Basins (Dry Ponds)		
☐ Extended/dry detention basin with grass/vegetated lining		X
☐ Extended/dry detention basin with impervious lining		
Infiltration Devices (LID)		
☐ Infiltration basin		
☐ Infiltration trench		
☐ Other_____		
Wet Ponds and Constructed Wetlands		
☐ Wet pond/basin (permanent pool)		
☐ Constructed wetland		
Vegetated Swales (LID[1])		
☐ Vegetated Swale		
Media Filters		
☐ Austin Sand Filter		
☐ Delaware Sand Filter		
☐ Multi-Chambered Treatment Train (MCTT)		
Higher-rate Biofilters		
☐ Tree-pit-style unit		
☐ Other_____		
Higher-rate Media Filters		
☐ Vault-based filtration unit with replaceable cartridges		
☐ Other_____		
Hydrodynamic Separator Systems		
☐ Swirl Concentrator		
☐ Cyclone Separator		
Trash Racks		
☐ Catch Basin Insert		
☒ Catch Basin Insert w/ Hydrocarbon boom	X	
☐ Other_____		

Stormwater Treatment Control and LID BMP's			
Description / Type	Sheet	Maintenance Category	Revisions
Bioretention Area, permeable pavers, rain barrels		1	
Catch basin fossil filter inserts		2	

CATEGORY	SELECTED		BMP Description
	YES	NO	
First	X		Irrigation and Bioretention, fossil filter inserts, permeable pavers, rain barrels.
Second[1]	X		
Third[2]			
Fourth			

TABLE 14: PROJECT SPECIFIC LID AND TC-BMPS

BMP Identifier*	LID or TC-BMP Type	BMP Pollutant of Concern Efficiency (H,M,L) – Table 11	Final Construction Date *(to be completed by County inspector)*	Final Construction Inspector Name *(to be completed by County inspector)*
Fossil Filter Inserts	Media Filters	Sediment (H) Nutrients (M)		
Irrigation and Bioretention in landscaped areas	Bioretention	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		
Permeable pavers	Permeable pavers	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		
Rain barrels	Rain barrels	Sediment (H) Nutrients (H) Bacteria & Viruses (H)		

NGBS Credit:

403.6 Landscape plan. *A landscape plan is developed to limit water and energy use while preserving or enhancing the natural environment. Examples of techniques may include, but not limited to, one or more of the following:*

(1) A plan is formulated to restore or enhance natural vegetation cleared during construction. Landscaping is phased to coincide with achievement of final grades to ensure denuded areas are quickly vegetated.

APPLICANT RESPONSE

See attached, Specific Plan, Section II.C.1.d (Openspace and Recreation Plan)
See attached, Specific Plan, Section III.J.3 (Biological Habitat Maintenance Areas)

(2) On-site native or regionally appropriate trees and shrubs are conserved, maintained and reused for landscaping to the greatest extent possible.

APPLICANT RESPONSE

See attached, Specific Plan, Section II.C.2 (Manufactured Openspace)

(3) Turf grass species, other vegetation, and trees that are native or regionally appropriate for local growing conditions are selected.

APPLICANT RESPONSE

See attached, Specific Plan, Section III.D. (Landscape Design Guidelines and Standards)

(4) The percentage of all turf areas are limited as part of the landscaping.

N/A

(5) Plants w/ similar watering needs are grouped (hydrozoning).

APPLICANT RESPONSE

See attached, Specific Plan, Section II.F.9 (Water Conservation Plan)

(6) Species/locations for tree planting identified/utilized to increase summer shading of streets, parking areas, and buildings and moderate temperatures.

APPLICANT RESPONSE

Plan with locations and species of trees intended to provide summer shading of streets, parking areas and buildings can be found within the attached Section III.D (Landscape Design Guidelines and Standards) Figures 21-23, 25, 28-47, 49, 70, 139, 140.

(7) Vegetative wind breaks or channels are designed as appropriate to local conditions.

N/A

(8) On-site tree trimmings or stump grinding of regionally appropriate trees are used to provide protective mulch during construction or as base for walking trails, and cleared trees are recycled as sawn lumber or pulp wood.

APPLICANT RESPONSE

See attached, Specific Plan, Section II.A.6.b

(9) An integrated pest management plan to minimize chemical use in pesticides and fertilizers is developed.

N/A

(10) Plans for the common area landscape watering system include a weather-based or moisture-based controller. Required irrigation systems should be designed in accordance with the Irrigation Association's Turf and Landscape Best Management Practices.

APPLICANT RESPONSE

See attached, Specific Plan, Section II.F.9 (Water Conservation Plan)
See attached, County of San Diego Landscape Design Manual

(11) Trees that might be lost due to site grading are preserved by the use of retaining walls or tree wells.

N/A

(12) Greywater irrigation systems are used to water common areas. Greywater used for irrigation conforms to all criteria of Section 802.1.

APPLICANT RESPONSE

See attached, Specific Plan, Section II.F.1 (Water and Wastewater Plans)

(13) Cisterns, rain barrels, and similar tanks are designed to intercept and store runoff. These systems may be above or below ground, and they may drain by gravity or be pumped. Stored water may be slowly released to a pervious area, and/or used for irrigation of lawn, trees, and gardens located in common areas.

APPLICANT RESPONSE

See attached response to Number 12. (Specific Plan Section II.F.1.b.ii.)

CREDIT
403.5 (6)

See pages
35, 75, 81,
89, 95

Major Stormwater Management Plan (Major SWMP) For *LILAC HILLS RANCH-MASTER TM TM – 5571 RPL-3 Valley Center, San Diego County, California*

Preparation/Revision Date: 5-3-13

Prepared for:

Accretive Investments, Inc.
12275 El Camino Real, Suite 110
San Diego, Ca 92130

Prepared by:

Landmark Consulting
9555 Genesee Ave. Ste. 200
San Diego, Ca 92121
858-587-8070

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan have been prepared under the direction of the following Registered Civil Engineer and meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

David Yeh, RCE 62717, Exp 6-30- 14 _____

5-3-13 _____
Date

The Major Stormwater Management Plan (Major SWMP) must be completed in its entirety and accompany applications to the County for a permit or approval associated with certain types of development projects. To determine whether your project is required to submit a Major or Minor SWMP, please reference the County's Stormwater Intake Form for Development Projects.

Project Name:	Lilac Hills Ranch,
Project Location:	S'ly of W. Lilac Road, E'ly of I-15
Permit Number (Land Development Projects):	TM 5571 RPL-3
Work Authorization Number (**CIP only**):	
Applicant:	Accretive Investments, Inc.
Applicant's Address:	12275 El Camino Real, Suite 110 San Diego, Ca 92130
Plan Prepared By (*Leave blank if same as applicant*):	Landmark Consulting
Preparer's Address:	9555 Genesee Ave. Ste. 200 San Diego, Ca 92121
Date:	5-3-13

The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) (Ordinance No. 9926) requires all applications for a permit or approval associated with a Land Disturbance Activity to be accompanied by a Storm Water Management Plan (SWMP) (section 67.806.b). The purpose of the SWMP is to describe how the project will minimize the short and long-term impacts on receiving water quality. Projects that meet the criteria for a priority development project are required to prepare a Major SWMP.

Since the SWMP is a living document, revisions may be necessary during various stages of approval by the County. Please provide the approval information requested below.

Project Stages	Does the SWMP need revisions?		If YES, Provide Revision Date
	YES	NO	
Revision			
Revision			
Revision			

Instructions for a Major SWMP can be downloaded at
http://www.sdcounty.ca.gov/dpw/watersheds/susmp/susmp.html

Completion of the following checklists and attachments will fulfill the requirements of a Major SWMP for the project listed above.

STEP 1

PRIORITY DEVELOPMENT PROJECT DETERMINATION

TABLE 1: IS THE PROJECT IN ANY OF THESE CATEGORIES?

Yes ☐	No ☒	**A**	**Housing subdivisions of 10 or more dwelling units.** Examples: single-family homes, multi-family homes, condominiums, and apartments.
Yes ☐	No ☒	**B**	**Commercial—greater than one acre.** Any development other than heavy industry or residential. Examples: hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; airfields; and other light industrial facilities.
Yes ☐	No ☒	**C**	**Heavy industry—greater than one acre.** Examples: manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas (bus, truck, etc.).
Yes ☐	No ☒	**D**	**Automotive repair shops.** A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.
Yes ☐	No ☒	**E**	**Restaurants.** Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except for structural treatment BMP and numeric sizing criteria requirements and hydromodification requirements.
Yes ☐	No ☒	**F**	**Hillside development greater than 5,000 square feet.** Any development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.
Yes ☐	No ☒	**G**	**Environmentally Sensitive Areas (ESAs).** All development located within or directly adjacent to or discharging directly to an ESA (where discharges from the development or redevelopment will enter receiving waters within the ESA), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.
Yes ☐	No ☒	**H**	**Parking lots 5,000 square feet or more** or with 15 or more parking spaces and potentially exposed to urban runoff.
Yes ☒	No ☐	**I**	**Street, roads, highways, and freeways.** Any paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
Yes ☐	No ☒	**J**	**Retail Gasoline Outlets (RGOs)** that are: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

To use the table, review each definition A through K. If any of the definitions match, the project is a Priority Development Project. Note some thresholds are defined by square footage of impervious area created; others by the total area of the development. Please see special requirements for previously developed sites and project exemptions on page 6 of the County SUSMP.

STEP 2

PROJECT STORMWATER QUALITY DETERMINATION

Total Project Site Area **608.0 Acres**

Estimated amount of disturbed acreage: **440 Acres**
(If >1 acre, you must also provide a WDID number from the SWRCB)

WDID: **Deferred to during final engineering**

Complete A through C and the calculations below to determine the amount of impervious surface on your project before and after construction.

A. Total size of project site: **608.0 Acres**

B. Total impervious area (including roof tops) before construction **71 Acres**

C. Total impervious area (including roof tops) after construction **72 Acres**

Calculate percent impervious before construction: B/A = **11.7 %**
Calculate percent impervious after construction: C/A = **11.8 %**

Please provide detailed descriptions regarding the following questions:

TABLE 2: PROJECT SPECIFIC STORMWATER ANALYSIS

1.	Please provide a brief description of the project.
The project is a master-planned community on approximately 608.0 acre rural land with existing estate type single-family homes, agriculture, some paved roads and some undisturbed natural areas, in the community of Valley Center and Bonsall, County of San Diego.	
2.	Describe the current and proposed zoning and land use designation.
The proposed development consists of the creating of 6 vacant lots and access roads for the eventual creation of a 1746 dwelling unit master planned community. The existing zoning is A70 and the proposed zoning consists of RU2, RU4, RU 7, RU 10, R10 and C34.	
3.	Describe the pre-project and post-project topography of the project. (Show on Plan)
The project is located on the east side of Interstate 15, southerly of W. Lilac Road in the County of San Diego, State of California. Under the pre-project conditions, the overall project site is on a general north to south sloping terrain over rolling hills and valleys. There are a few existing rural estate type homes surrounded by crop land and agricultural buildings and green houses with access roads amongst natural trees and shrubs. The grading of the proposed development will follow the general land form with mass graded building pads. **All storm water management for all offsite improvements will be addressed in later phases' implementing tentative maps.**	
4.	Describe the soil classification, permeability, erodibility, and depth to groundwater for LID and Treatment BMP consideration. (Show on Plan) If infiltration BMPs are proposed, a Geotechnical Engineer must certify infiltration BMPs in Attachment E.
The site soil is classified as Type "C" as defined in the San Diego County Hydrology Manual and is characterized as having very slow infiltration rate when thoroughly wetted, Chiefly clays that have a high shrink-swell potential, soils that have a high permanent water table, soils that have a claypan or clay layer at or near the surface, or soils that are shallow over nearly imperious material. Rate of water transmission is very slow.	
5.	Describe if contaminated or hazardous soils are within the project area. (Show on Plan)
No contaminated or hazardous soils are encountered within the project area.	
6.	Describe the existing site drainage and natural hydrologic features. (Show on Plan).
The project is located on the east side of Interstate 15, southerly of W. Lilac Road in the County of San Diego, State of California. Under the existing conditions, there are three sub-basins on the project site - the northerly, central and southerly sub-basins. The northerly sub-basin drains the southwesterly along a web of natural drainage channels and into a major natural channel	

along the westerly project boundary. The central sub-basin also drains southwesterly and into the same westerly natural channel along the westerly project boundary, approximately 1000' southerly of the discharge point from the northerly sub-basin. The southerly sub-basin drains westerly across the project site and into a tributary of the westerly natural channel. Under the proposed conditions, the runoff pattern will be preserved where the runoff from the proposed pads and driveways will be designed to flow into the existing receiving sub-basin areas and be conveyed to the eventual discharge point exiting the site. Existing drainage consists of natural swales and ravines that convey the runoff from the site southwesterly into a natural drainage channel that is tributary to San Luis Rey River.	
7.	Describe site features and conditions that constrain, or provide opportunities for stormwater control, such as LID features.
The project site is covered with heavy vegetation that prevent soil erosion from runoff discharge.	
8.	Is this project within the environmentally sensitive areas as defined on the maps in Appendix A of the *County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects?*
	No
9.	Is this an emergency project?
	No

CHANNELS & DRAINAGES

Complete the following checklist to determine if the project includes work in channels.

TABLE 3: PROJECT SPECIFIC STORMWATER ANALYSIS

No.	CRITERIA	YES	NO	N/A	COMMENTS
1.	Will the project include work in channels?		X		If YES go to 2 If NO go to 13.
2.	Will the project increase velocity or volume of downstream flow?				If YES go to 6.
3.	Will the project discharge to unlined channels?				If YES go to. 6.
4.	Will the project increase potential sediment load of downstream flow?				If YES go to 6.
5.	Will the project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?				If YES go to 8.
6.	Review channel lining materials and design for stream bank erosion.				Continue to 7.
7.	Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.				Continue to 8.
8.	Include, where appropriate, energy dissipation devices at culverts.				Continue to 9.
9.	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.				Continue to 10.
10.	Include, if appropriate, detention facilities to reduce peak discharges.				Continue to 11.
11.	"Hardening" natural downstream areas to prevent erosion is not an acceptable technique for protecting channel slopes, unless pre-development conditions are determined to be so erosive that hardening would be required even in the absence of the proposed development.				Continue to 12.
12.	Provide other design principles that are comparable and equally effective.				Continue to 13.
13.	End	X			

TEMPORARY CONSTRUCTION BMPS

Please check the construction BMPs that may be implemented during construction of the project. The applicant will be responsible for the placement and maintenance of the BMPs incorporated into the final project design.

- ☒ Silt Fence
- ☒ Fiber Rolls
- ☒ Street Sweeping and Vacuuming
- ☒ Storm Drain Inlet Protection
- ☒ Stockpile Management
- ☒ Solid Waste Management
- ☒ Stabilized Construction Entrance/Exit
- ☐ Dewatering Operations
- ☒ Vehicle and Equipment Maintenance
- ☒ Desilting Basin
- ☒ Gravel Bag Berm
- ☐ Sandbag Barrier
- ☒ Material Delivery and Storage
- ☒ Spill Prevention and Control
- ☒ Concrete Waste Management
- ☒ Water Conservation Practices
- ☒ Paving and Grinding Operations
- ☒ Any minor slopes created incidental to construction and not subject to a major or minor grading permit shall be protected by covering with plastic or tarp prior to a rain event, and shall have vegetative cover reestablished within 180 days of completion of the slope and prior to final building approval.

EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

Complete the checklist below to determine if a proposed project will pose an "exceptional threat to water quality," and therefore require Advanced Treatment Best Management Practices during the construction phase.

TABLE 4: EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

No.	CRITERIA	YES	NO	INFORMATION
1.	Is all or part of the proposed project site within 200 feet of waters named on the Clean Water Act (CWA) Section 303(d) list of Water Quality Limited Segments as impaired for sedimentation and/or turbidity? Current 303d list may be obtained from the following site: http://www.swrcb.ca.gov/tmdl/docs/303dlists2006/approved/r9_06_303d_reqtmdls.pdf		X	If YES, continue to 2. If NO, go to 5.
2.	Will the project disturb more than 5 acres, including all phases of the development?			If YES, continue to 3. If NO, go to 5.
3.	Will the project disturb slopes that are steeper than 4:1 (horizontal: vertical) with at least 10 feet of relief, and that drain toward the 303(d) listed receiving water for sedimentation and/or turbidity?			If YES, continue to 4. If NO, go to 5.
4.	Will the project disturb soils with a predominance of USDA-NRCS Erosion factors k_f greater than or equal to 0.4?			If YES, continue to 6. If NO, go to 5.
5.	Project is not required to use Advanced Treatment BMPs.	X		Document for Project Files by referencing this checklist.
6.	Project poses an "exceptional threat to water quality" and is required to use Advanced Treatment BMPs.			Advanced Treatment BMPs must be consistent with WPO section 67.811(b)(20)(D) performance criteria

Exemption potentially available for projects that require advanced treatment: Project proponent may perform a Revised Universal Soil Loss Equation, Version 2 (RUSLE 2), Modified Universal Soil Loss Equation (MUSLE), or similar analysis that shows to the County official's satisfaction that advanced treatment is not required

STEP 3

HYDROMODIFICATION DETERMINATION

The following questions provide a guide to collecting information relevant to hydromodification management issues.

TABLE 5: HYDROMODIFICATION DETERMINATION

	QUESTIONS	YES	NO	Information
1.	Will the project reduce the pre-project impervious area and are the unmitigated post-project outflows (outflows without detention routing) to each outlet location less as compared to the pre-project condition?	X		If NO, continue to 2. If YES, go to 7.
2.	Would the project site discharge runoff directly to an exempt receiving water, such as the Pacific Ocean, San Diego Bay, an exempt reservoir, or a tidally-influenced area?			If NO, continue to 3. If YES, go to 7.
3.	Would the project site discharge to a stabilized conveyance system, which has the capacity for the ultimate *Q10,* and extends to the Pacific Ocean, San Diego Bay, a tidally-influenced area, an exempt river reach or reservoir?			If NO, continue to 4. If YES, go to 7.
4.	Does the contributing watershed area to which the project discharges have an impervious area percentage greater than 70 percent?			If NO, continue to 5. If YES, go to 7.
5.	Is this an urban infill project which discharges to an existing hardened or rehabilitated conveyance system that extends beyond the "domain of analysis," where the potential for cumulative impacts in the watershed are low, and the ultimate receiving channel has a "Low" susceptibility to erosion as defined in the SCCWRP channel assessment tool?			If NO, continue to 6. If YES, go to 7.
6.	Project is required to manage hydromodification impacts.			Reference Appendix G "Hydromodification Management Plan" of the County SUSMP.
7.	Project is not required to manage hydromodification impacts.	X		Hydromodification Exempt. Keep on file.

An exemption is potentially available for projects that are required (No. 5. in Table 5 above) to manage hydromodification impacts: The project proponent may conduct an independent geomorphic study to determine the project's full hydromodification impact.

The study must incorporate sediment transport modeling across the range of geomorphically-significant flows and demonstrate to the County's satisfaction that the project flows and sediment reductions will not detrimentally affect the receiving water to qualify for the exemption.

STEP 4

POLLUTANTS OF CONCERN DETERMINATION

WATERSHED

Please check the watershed(s) for the project.

☐ San Juan 901	☐ Santa Margarita 902	☒ **San Luis Rey 903**	☐ Carlsbad 904
☐ San Dieguito 905	☐ Penasquitos 906	☐ San Diego 907	☐ Sweetwater 909
☐ Otay 910	☐ Tijuana 911	☐ Whitewater 719	☐ Clark 720
☐ West Salton 721	☐ Anza Borrego 722	☐ Imperial 723	

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

HYDROLOGIC SUB-AREA NAME AND NUMBER(S)

Number	Name
903.11	Sub-area San Luis Rey River
903.12	Bonsall

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

SURFACE WATERS that each project discharge point proposes to discharge to. List the impairments identified in Table 7.

SURFACE WATERS (river, creek, stream, etc.)	Hydrologic Unit Basin Number	Impairment(s) listed [303(d) listed waters or waters with established TMDLs]	Distance to Project
San Luis Rey River	903.1		Approximately 1.5miles south

http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/r9_06_303d_reqtmdls.pdf

GROUND WATERS

Ground Waters	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Lower San Luis	903.1	●	●	●												

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

+ Excepted from Municipal ● Existing Beneficial Use ○ Potential Beneficial Use

PROJECT ANTICIPATED AND POTENTIAL POLLUTANTS

Using Table 6, identify pollutants that are anticipated to be generated from the proposed priority project categories. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

TABLE 6: ANTICIPATED AND POTENTIAL POLLUTANTS GENERATED BY LAND USE TYPE

	General Pollutant Categories								
PDP Categories	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development 1 acre or greater	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Heavy industry /industrial development	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	
Hillside Development >5,000 ft²	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X		

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

PROJECT POLLUTANTS OF CONCERN SUMMARY TABLE

Please summarize the identified project pollutant of concern by checking the appropriate boxes in the table below and list any surface water impairments identified. Pollutants anticipated to be generated by the project, which are also causing impairment of receiving waters, shall be considered the primary pollutants of concern. For projects where no primary pollutants of concern exist, those pollutants identified as anticipated shall be considered secondary pollutants of concern.

TABLE 7: PROJECT POLLUTANTS OF CONCERN

Pollutant Category	Anticipated (X)	Potential (P)	Surface Water Impairments
Sediments	X		
Nutrients	X		X
Heavy Metals	X		
Organic Compounds	X		
Trash & Debris	X		
Oxygen Demanding Substances	X		
Oil & Grease	X		
Bacteria & Viruses			
Pesticides	X		X

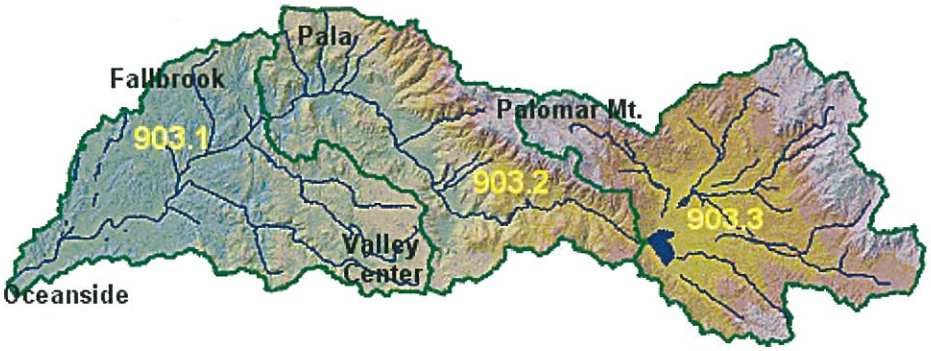
project clean water

clean water through local commitment and action

Home
Overview
Planning Efforts
Watersheds
San Juan
Santa Margarita
San Luis Rey
Carlsbad
San Dieguito
Penasquitos
San Diego
Pueblo
Sweetwater
Otay
Tijuana
For Kids
Report Dumping
Search

San Luis Rey River Watershed

Plan | Projects | Stewards



Hydrologic Unit 903.11 - 903.32

Hydrologic Areas:	Lower San Luis 903.1 Monserate 903.2 Warner Valley 903.3
Major Water Bodies:	San Luis Rey River and Lake Henshaw
CWA 303(d) List:	Pacific Ocean shoreline: indicator bacteria; San Luis Rey River (lower 13 miles): chloride; San Luis Rey River (lower 19 miles): total dissolved solids.
Major Impacts:	Surface water quality degradation, habitat loss, invasive species, channel bed erosion
Constituents of Concern:	Indicator bacteria and nutrients
Sources / Activities:	Agriculture, orchards, livestock, domestic animals, urban runoff, and septic systems

The San Luis Rey River Watershed is located in northern San Diego County. It is bordered to the north by the Santa Margarita River Watershed and to the south by the Carlsbad and San Dieguito River Watersheds. The San Luis Rey River originates in the Palomar and Hot Springs Mountains, both over 6,000 feet above mean sea level, as well as several other mountain ranges along the western border of the Anza Borrego Desert Park. The river extends over 55 miles across northern San Diego County forming a watershed with an area of approximately 360,000 acres or 562 square miles. The river ultimately discharges to the Pacific Ocean near the City of Oceanside. Of the nine major watersheds in the San Diego region, the San Luis Rey is the third

largest.

About half (49%) of the land in the watershed is privately owned, 37% is publicly owned, and the remaining 14% consists of six federally recognized Tribal Indian Reservations. In the western half of the watershed, private ownership dominates. Population centers include the City of Oceanside and the unincorporated communities of Fallbrook, Bonsall, and Valley Center. Moving east through the watershed, public lands become increasingly dominant. Over 54% of the land in the watershed is vacant or undeveloped. The next largest land uses in the watershed are residential (15%) and agriculture (14%). Principal agricultural uses include cattle grazing, nurseries, citrus groves, and avocado groves.

The watershed is comprised of three Hydrologic Areas (HAs), which have been delineated by the San Diego Regional Water Quality Control Board based on drainage patterns: Lower San Luis (HA 903.1), Monserate (HA 903.2), and Warner Valley (HA 903.3). The Warner Valley HA is upstream of Lake Henshaw, a reservoir owned and operated by the Vista Irrigation District. Water from the San Luis Rey River is diverted approximately ten miles downstream of Henshaw Dam to serve the municipal drinking water needs of customers in Escondido and Vista.

Beneficial water uses within the San Luis Rey Watershed as designated in the State Water Resources Control Board's San Diego Region Basin Plan.

Beneficial Uses	Inland Surface Water	Coastal Waters	Reservoirs and Lakes	Ground Water
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X		X	X
Industrial Process Supply			X	X
Hydropower Generation	X		X	
Navigation		X		
Freshwater Replenishment	X		X	X
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Biological Habitats of Special Signif.		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X			
Wildlife Habitat	X	X	X	
Rare, Threatened, or End.	X	X	X	
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod. and/ or Early Develop.		X		