Project Specific Water Quality Management Plan (WQMP)

A Template for preparing Project Specific Water Quality Management Plans (WQMPs) for Priority Development Projects located in the City of Wildomar.

Project Title: Baxter Village

Development No: TTM 36674 & PA18-XXXX

City Project No: Insert text here

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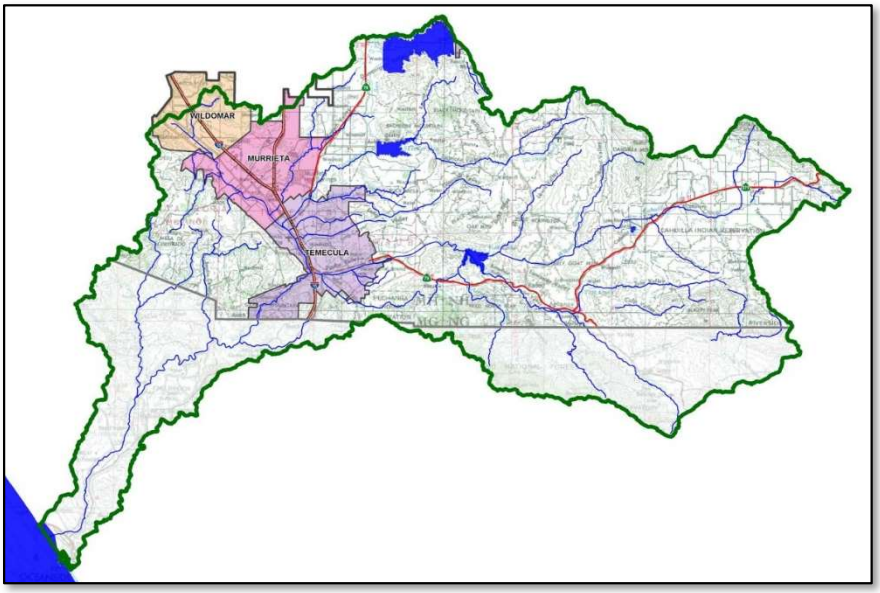
WQMP Type: ☒ **Preliminary (entitlement submittal)**
☐ **Final**



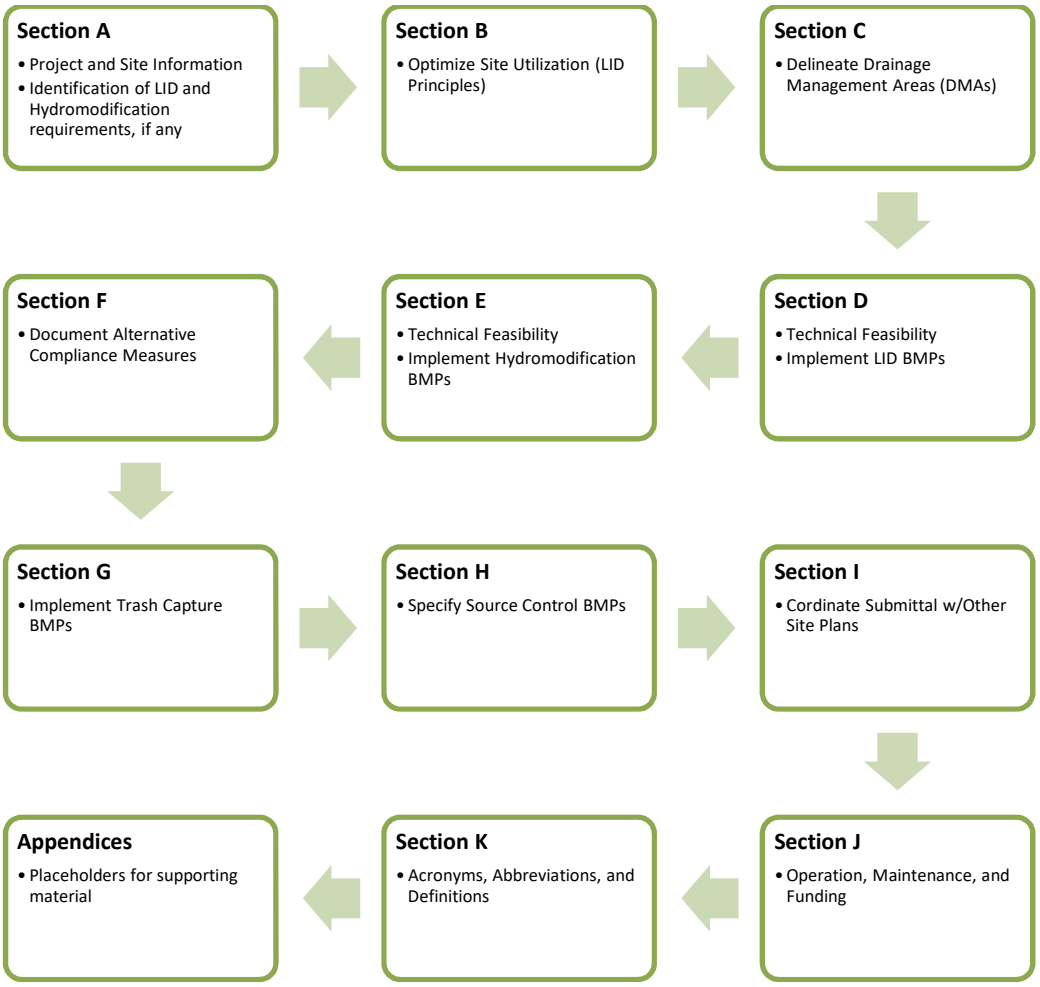
Original Date Prepared: December 5, 2019
Revision Summary (post WQMP acceptance):

MARK	**BY**	**DATE**	**REVISIONS**	**APPRV.**	**DATE**
ENGINEER				**CITY**	

Prepared for Compliance with Regional Board Order No. **R9-2013-0001** *as amended by Order No.* **R9-2015-0001** *and Order No.* **R9-2015-0100**

A Brief Introduction

The Regional Municipal Separate Stormwater Sewer System (MS4) Permit[1] requires that a Project-Specific WQMP be prepared for all development projects within the Santa Margarita Region (SMR) that meet the 'Priority Development Project' categories and thresholds listed in the SMR Water Quality Management Plan (WQPM). This Project-Specific WQMP Template for Development Projects in the **Santa Margarita Region** has been prepared to help document compliance and prepare a WQMP submittal. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



[1] Order No. R9-2013-0001 as amended by Order Nos. R9-2015-0001 and R9-2015-0100, NPDES No. CAS0109266, National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the MS4s Draining the Watersheds within the San Diego Region, California Regional Water Quality Control Board, May 8, 2013.

OWNER'S CERTIFICATION

This Project-Specific WQMP has been prepared for Strata Equity Group Inc. by Michael Baker International for the Baxter Village project.

This WQMP is intended to comply with the requirements of the City of Wildomar for Wildomar Municipal Code Ch. 13.12 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of storm water Best Management Practices until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Wildomar Water Quality Ordinance (Wildomar Municipal Code Ch. 13.12).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control Best Management Practices (BMPs) in this plan meet the requirements of Regional Water Quality Control Board Order No. **R9-2013-0001** as amended by Order Nos. **R9-2015-0001 and R9-2015-0100**."

Preparer's Signature	Date
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

Use the table below to compile and summarize basic site information that will be important for completing subsequent steps. Subsections A.1 through A.4 provide additional detail on documentation of additional project and site information.

PROJECT INFORMATION	
Type of PDP:	New Development
Type of Project:	Single-Family, Multi-Family, Hotel, Medical Office
Planning Area:	Approximately 36-acres
Community Name:	Insert Community Name if known
Development Name:	Baxter Village
PROJECT LOCATION	
Latitude & Longitude (DMS):	33°36'51" & -117°15'54"
Project Watershed and Sub-Watershed:	Santa Margarita HU, Murrieta HA, Wildomar HSA 902.31
24-Hour 85th Percentile Storm Depth (inches):	0.70 inches
Is project subject to Hydromodification requirements?	☒ Y ☐ N (Select based on Section A.3)
APN(s):	367-180-056 & 367-180-057
Map Book and Page No.:	PM 31/33
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Single-Family, Multi-Family, Hotel, Medical Office
Proposed or Potential SIC Code(s)	1521, 1522, 7011, 8011
Existing Impervious Area of Project Footprint (SF)	0 sf
Total area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	1,171,322 sf
Total Project Area (ac)	36.5 acres
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
Is the project exempt from Hydromodification Performance Standards?	☐ Y ☒ N
Does the project propose the use of Alternative Compliance to satisfy BMP requirements? (note, alternative compliance is not allowed for coarse sediment performance standards)	☐ Y ☒ N
Has preparation of Project-Specific WQMP included coordination with other site plans?	☒ Y ☐ N
EXISTING SITE CHARACTERISTICS	
Is the project located within any Multi-Species Habitat Conservation Plan area (MSHCP Criteria Cell?)	☐ Y ☒ N If "Y" insert Cell Number
Are there any natural hydrologic features on the project site?	☒ Y ☐ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the Natural Resources Conservation Service (NRCS) soils type(s) present on the site (A, B, C and/or D)	Insert text here.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the Project vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Vicinity and location maps
- Parcel Boundary and Project Footprint
- Existing and Proposed Topography
- Drainage Management Areas (DMAs)
- Proposed Structural Best Management Practices (BMPs)
- Drainage Paths
- Drainage infrastructure, inlets, overflows
- Source Control BMPs
- Site Design BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Pervious Surfaces (i.e. Landscaping)
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Copermittee plan reviewer must be able to easily analyze your Project utilizing this template and its associated site plans and maps. Complete the checklists in Appendix 1 to verify that all exhibits and components are included.

A.2 Identify Receiving Waters

Using Table A-1 below, list in order of upstream to downstream, the Receiving Waters that the Project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated Beneficial Uses, and proximity, if any, to a RARE Beneficial Use. Include a map of the Receiving Waters in Appendix 1. This map should identify the path of the storm water discharged from the site all the way to the outlet of the Santa Margarita River to the Pacific Ocean. Use the most recent 303(d) list available from the State Water Resources Control Board Website.
(http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/)

Table A-1 Identification of Receiving Waters

Receiving Waters	USEPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Murrieta Creek	Chlorpyrifos, Copper, Iron, Manganese, Nitrogen, Phosphorus, Toxicity	MUN, AGR, IND, PROC, REC2, WARM, WILD	Not a RARE water body
Santa Margarita River (Upper)	Phosphorus, Toxicity	MUN, AGR, IND, REC1, REC2, WARM, COLD, WILD, RARE	RARE, approximately 10 miles
Santa Margarita River (Lower)	Phosphorus, Nitrogen, Pathogens	MUN, AGR, IND, PROC, REC1, REC2, WARM, COLD, WILD, RARE	RARE, approximately 24 miles15
Santa Margarita Lagoon	Eutrophic	REC1, REC2, EST, WILD, RARE, MAR, MIGR, SPWN	RARE, 61 to site
Pacific Ocean	None	IND, NAV, REC-1, REC-2, COMM, BIOL, WILD, RARE, MAR, AQUA, MIGR, SPWN, SHELL	RARE, 63 mi to site

A.3 Drainage System Susceptibility to Hydromodification

Using Table A-2 below, list in order of the point of discharge at the project site down to the Santa Margarita River[2], each drainage system or receiving water that the project site is tributary to. Continue to fill each row with the material of the drainage system, and any exemption (if applicable). Based on the results, summarize the applicable hydromodification performance standards that will be documented in Section E. Exempted categories of receiving waters include:

- Existing storm drains that discharge directly to water storage reservoirs, lakes, or enclosed embayments, or
- Conveyance channels whose bed and bank are concrete lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- Other water bodies identified in an approved Watershed Management Area Analysis (WMAA) (See Exhibit G to the WQMP)

Include a map exhibiting each drainage system and the associated susceptibility in Appendix 1.

Table A-2 Identification of Susceptibility to Hydromodification

Drainage System	Drainage System Material	Hydromodification Exemption	Hydromodification Exempt
Onsite Storm Drain	Concrete	Engineered, Fully Hardened and Maintained (EFHM)Mur	☐ Y ☒ N
Murrieta Creek Master Drainage Plan – Line F-3	Concrete	Engineered, Fully Hardened and Maintained (EFHM)Mur	☒ Y ☐ N
Master Drainage Plan – Line F	Concrete	Engineered, Fully Hardened and Maintained (EFHM)Mur	☒ Y ☐ N
Line F Natural Channel	Natural	N/A	☒ Y ☐ N
Murrieta Creek	Natural Channel	Large River	☒ Y ☐ N

Summary of Performance Standards

☐ **Hydromodification Exempt** – Select if "Y" is selected in the Hydromodification Exempt column above, project is exempt from hydromodification requirements.

☒ **Not Exempt**-Select if "N" is selected in any row of the Hydromodification Exempt column above. Project is subject to hydrologic control requirements and may be subject to sediment supply requirements.

[2] Refer to Exhibit G of the WQMP for a map of exempt and potentially exempt areas. These maps are from the Draft SMR WMAA as of January 5, 2018 and will be replaced upon acceptance of the SMR WMAA.

A.4 Additional Permits/Approvals required for the Project:

Table A-3 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☐ Y	☒ N
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside Multiple Species Habitat Conservation Plan (MSHCP) Consistency Approval (e.g., Joint Project Review (JPR), Determination of Biological Equivalent or Superior Preservation (DBESP))	☐ Y	☒ N
Other *(please list in the space below as required)*	☐ Y	☐ N

If yes is answered to any of the questions above, the Copermittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for LID Bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your Low Impact Development (LID) design and explain your design decisions to others.

Apply the following LID Principles to the layout of the Priority Development Project (PDP) to the extent they are applicable and feasible. Putting thought upfront about how best to organize the various elements of a site can help to significantly reduce the PDP's potential impact on the environment and reduce the number and size of Structural LID BMPs that must be implemented. Integrate opportunities to accommodate the following LID Principles within the preliminary PDP site layout to maximize implementation of LID Principles.

Site Optimization

Complete checklist below to determine applicable Site Design BMPs for your site.

Project- Specific WQMP Site Design BMP Checklist

The following questions below are based upon Section 3.2 of the SMR WQMP will help you determine how to best optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

SITE DESIGN REQUIREMENTS

Answer the following questions below by indicating "Yes," "No," or "N/A" (Not Applicable). Justify all "No" and "N/A" answers by inserting a narrative at the end of the section. The narrative should include identification and justification of any constraints that would prevent the use of those categories of LID BMPs. Upon identifying Site Design BMP opportunities, include these on your WQMP Site plan in Appendix 1.

☒ Yes ☐ No ☐ N/A

Did you identify and preserve existing drainage patterns?

Integrating existing drainage patterns into the site plan helps to maintain the time of concentration and infiltration rates of runoff, decreasing peak flows, and may also help preserve the contribution of Critical Coarse Sediment (i.e., Bed Sediment Supply) from the PDP to the Receiving Water. Preserve existing drainage patterns by:

- Minimizing unnecessary site grading that would eliminate small depressions, where appropriate add additional "micro" storage throughout the site landscaping.
- Where possible conform the PDP site layout along natural landforms, avoid excessive grading and disturbance of vegetation and soils, preserve or replicate the sites natural drainage features and patterns.
- Set back PDP improvements from creeks, wetlands, riparian habitats and any other natural water bodies.
- Use existing and proposed site drainage patterns as a natural design element, rather than using expensive impervious conveyance systems. Use depressed landscaped areas, vegetated buffers, and bioretention areas as amenities and focal points within the site and landscape design.

Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer.
In areas where feasible, the existing drainage patterns were preserved.

☐ Yes ☒ No ☐ N/A

Did you identify and protect existing vegetation?

Identify any areas containing dense native vegetation or well-established trees, and try to avoid disturbing these areas. Soils with thick, undisturbed vegetation have a much higher capacity to store and infiltrate runoff than do disturbed soils. Reestablishment of a mature vegetative community may take decades. Sensitive areas, such as streams and floodplains should also be avoided.

- Define the development envelope and protected areas, identifying areas that are most suitable for development and areas that should be left undisturbed.
- Establish setbacks and buffer zones surrounding sensitive areas.
- Preserve significant trees and other natural vegetation where possible.

Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer.
The site contains existing dried brush and some existing trees. The trees will need to be removed due to the proposed BMP location.

Project- Specific WQMP Site Design BMP Checklist	
☒ Yes ☐ No ☐ N/A	**Did you identify and preserve natural infiltration capacity?** A key component of LID is taking advantage of a site's natural infiltration and storage capacity. A site survey and geotechnical investigation can help define areas with high potential for infiltration and surface storage. • Identify opportunities to locate LID Principles and Structural BMPs in highly pervious areas. Doing so will maximize infiltration and limit the amount of runoff generated. • Concentrate development on portions of the site with less permeable soils, and preserve areas that can promote infiltration.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *Geotechnical Report revealed that there is potential for infiltration in some areas. These areas will be utilized for infiltration.*	
☒ Yes ☐ No ☐ N/A	**Did you minimize impervious area?** Look for opportunities to limit impervious cover through identification of the smallest possible land area that can be practically impacted or disturbed during site development. • Limit overall coverage of paving and roofs. This can be accomplished by designing compact, taller structures, narrower and shorter streets and sidewalks, clustering buildings and sharing driveways, smaller parking lots (fewer stalls, smaller stalls, and more efficient lanes), and indoor or underground parking. • Inventory planned impervious areas on your preliminary site plan. Identify where permeable pavements, or other permeable materials, such as crushed aggregate, turf block, permeable modular blocks, pervious concrete or pervious asphalt could be substituted for impervious concrete or asphalt paving. This will help reduce the amount of Runoff that may need to be addressed through Structural BMPs. • Examine site layout and circulation patterns and identify areas where landscaping can be substituted for pavement, such as for overflow parking. • Consider green roofs. Green roofs are roofing systems that provide a layer of soil/vegetative cover over a waterproofing membrane. A green roof mimics pre-development conditions by filtering, absorbing, and evapotranspiring precipitation to help manage the effects of an otherwise impervious rooftop.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. Walkways and parking lots have been designed to minimum widths.	

Project- Specific WQMP Site Design BMP Checklist	
☒ Yes ☐ No ☐ N/A	**Did you identify and disperse runoff to adjacent pervious areas or small collection areas?** Look for opportunities to direct runoff from impervious areas to adjacent landscaping, other pervious areas, or small collection areas where such runoff may be retained. This is sometimes referred to as reducing Directly Connected Impervious Areas. • Direct roof runoff into landscaped areas such as medians, parking islands, planter boxes, etc., and/or areas of pervious paving. Instead of having landscaped areas raised above the surrounding impervious areas, design them as depressed areas that can receive Runoff from adjacent impervious pavement. For example, a lawn or garden depressed 3"-4" below surrounding walkways or driveways provides a simple but quite functional landscape design element. • Detain and retain runoff throughout the site. On flatter sites, smaller Structural BMPs may be interspersed in landscaped areas among the buildings and paving. • On hillside sites, drainage from upper areas may be collected in conventional catch basins and piped to landscaped areas and LID BMPs and/or Hydrologic Control BMPs in lower areas. Low retaining walls may also be used to create terraces that can accommodate LID BMPs. Wherever possible, direct drainage from landscaped slopes offsite and not to impervious surfaces like parking lots. • Reduce curb maintenance and provide for allowances for curb cuts. • Design landscaped areas or other pervious areas to receive and infiltrate runoff from nearby impervious areas. • Use Tree Wells to intercept, infiltrate, and evapotranspire precipitation and runoff before it reaches structural BMPs. Tree wells can be used to limit the size of Drainage Management Areas that must be treated by structural BMPs. Guidelines for Tree Wells are included in the Tree Well Fact Sheet in the LID BMP Design Handbook.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *Each drainage management area will have a biofiltration/sand filter basin. Impervious areas are graded to drain to landscaped areas where feasible.*	
☒ Yes ☐ No ☐ N/A	**Did you utilize native or drought tolerant species in site landscaping?** Wherever possible, use native or drought tolerant species within site landscaping instead of alternatives. These plants are uniquely suited to local soils and climate and can reduce the overall demands for potable water use associated with irrigation.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *Drought tolerant plants are proposed for this project.*	

Project- Specific WQMP Site Design BMP Checklist

☐ Yes ☐ No ☒ N/A

Did implement harvest and use of runoff?

Under the Regional MS4 Permit, Harvest and Use BMPs must be employed to reduce runoff on any site where they are applicable and feasible. However, Harvest and Use BMPs are effective for retention of stormwater runoff only when there is adequate demand for non-potable water during the wet season. If demand for non-potable water is not sufficiently large, the actual retention of stormwater runoff will be diminished during larger storms or during back-to-back storms.

For the purposes of planning level Harvest and Use BMP feasibility screening, Harvest and Use is only considered to be a feasible if the total average wet season demand for non-potable water is sufficiently large to use the entire DCV within 72 hours. If the average wet season demand for non-potable water is not sufficiently large to use the entire DCV within 72 hours, then Harvest and Use is not considered to be feasible and need not be considered further.

The general feasibility and applicability of Harvest and Use BMPs should consider:

- Any downstream impacts related to water rights that could arise from capturing storm water (not common).
- Conflicts with recycled water used – where the project is conditioned to use recycled water for irrigation, this should be given priority over storm water capture as it is a year-round supply of water.
- Code Compliance - If a particular use of captured storm water, and/or available methods for storage of captured storm water would be contrary to building codes in effect at the time of approval of the preliminary Project-Specific WQMP, then an evaluation of harvesting and use for that use would not be required.
- Wet season demand – the applicant shall demonstrate, to the acceptance of the [Insert Jurisdiction], that there is adequate demand for harvested water during the wet season to drain the system in a reasonable amount of time.

Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer.
N/A

☐ Yes ☐ No ☒ N/A

Did you keep the runoff from sediment producing pervious area hydrologically separate from developed areas that require treatment?

Pervious area that qualify as self-treating areas or off-site open space should be kept separate from drainage to structural BMPs whenever possible. This helps limit the required size of structural BMPs, helps avoid impacts to sediment supply, and helps reduce clogging risk to BMPs.

Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer.
N/A

Section C: Delineate Drainage Management Areas (DMAs)

This section provides streamlined guidance and documentation of the DMA delineation and categorization process, for additional information refer to the procedure in Section 3.3 of the SMR WQMP which discusses the methods of delineating and mapping your project site into individual DMAs. Complete Steps 1 to 4 to successfully delineate and categorize DMAs.

Step 1: Identify Surface Types and Drainage Pathways

Carefully delineate pervious areas and impervious areas (including roofs) throughout site and identify overland flow paths and above ground and below ground conveyances. Also identify common points (such as BMPs) that these areas drain to.

Step 2: DMA Delineation

Use the information in Step 1 to divide the entire PDP site into individual, discrete DMAs. Typically, lines delineating DMAs follow grade breaks and roof ridge lines. Where possible, establish separate DMAs for each surface type (e.g., landscaping, pervious paving, or roofs). Assign each DMA a unique code and determine its size in square feet. The total area of your site should total the sum of all of your DMAs (unless water from outside the project limits comingles with water from inside the project limits, i.e. run-on). Complete Table C-1

Table C-1 DMA Identification

DMA Name or Identification	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA 1	Mixed	630,021	To be Determined in Step 3
DMA 2	Mixed	508,281	
DMA 3A	Mixed	20,730	
DMA 3B	Mixed	97,069	
DMA 4	Mixed	335,719	
DMA A	Mixed	108,036	
DMA B	Mixed	97,254	

Add Columns as Needed

Step 3: DMA Classification

Determine how drainage from each DMA will be handled by using information from Steps 1 and 2 and by completing Steps 3.A to 3.C. Each DMA will be classified as one of the following four types:

- Type 'A': Self-Treating Areas:
- Type 'B': Self-Retaining Areas
- Type 'C': Areas Draining to Self-Retaining Areas
- Type 'D': Areas Draining to BMPs

Step 3.A – Identify Type 'A' Self-Treating Area

Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

☒ Yes ☐ No — Area is undisturbed from their natural condition OR restored with Native and/or California Friendly vegetative covers.

☒ Yes ☐ No — Area is irrigated, if at all, with appropriate low water use irrigation systems to prevent irrigation runoff.

☐ Yes ☒ No Runoff from the area will not comingle with runoff from the developed portion of the site, or across other landscaped areas that do not meet the above criteria.

If all answers indicate "Yes," complete Table C-2 to document the DMAs that are classified as Self-Treating Areas.

Table C-2 Type 'A', Self-Treating Areas

DMA Name or Identification	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
N/A			

Step 3.B – Identify Type 'B' Self-Retaining Area and Type 'C' Areas Draining to Self-Retaining Areas

Type 'B' Self-Retaining Area: A Self-Retaining Area is shallowly depressed 'micro infiltration' areas designed to retain the Design Storm rainfall that reaches the area, without producing any Runoff.

Indicate if the DMAs meet the following criteria by answering "Yes," "No," or "N/A".

☐ Yes ☒ No ☐ N/A Slopes will be graded toward the center of the pervious area.

☐ Yes ☒ No ☐ N/A Soils will be freely draining to not create vector or nuisance conditions.

☒ Yes ☐ No ☐ N/A Inlet elevations of area/overflow drains, if any, should be clearly specified to be three inches or more above the low point to promote ponding.

☐ Yes ☐ No ☒ N/A Pervious pavements (e.g., crushed stone, porous asphalt, pervious concrete, or permeable pavers) can be self-retaining when constructed with a gravel base course four or more inches deep below any underdrain discharge elevation.

If all answers indicate "Yes," DMAs may be categorized as Type 'B', proceed to identify Type 'C' Areas Draining to Self-Retaining Areas.

Type 'C' Areas Draining to Self-Retaining Areas: Runoff from impervious or partially pervious areas can be managed by routing it to Self-Retaining Areas consistent with the LID Principle discussed in SMR WQMP Section 3.2.5 for 'Dispersing Runoff to Adjacent Pervious Areas'.
Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

☐ Yes ☒ No The drainage from the tributary area must be directed to and dispersed within the Self-Retaining Area.

☐ Yes ☒ No Area must be designed to retain the entire Design Storm runoff without flowing offsite.

If all answers indicate "Yes," DMAs may be categorized as Type 'C'.

Complete Table C-3 and Table C-4 to identify Type 'B' Self-Retaining Areas and Type 'C' Areas Draining to Self-Retaining Areas.

Table C-3 Type 'B', Self-Retaining Areas

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C-4= [C]	Required Retention Depth (inches) [D] = $[B] + \frac{[B]\cdot[C]}{[A]}$
N/A						

Table C-4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Runoff factor [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]
N/A							

<u>Note:</u> (See Section 3.3 of SMR WQMP) Ensure that partially pervious areas draining to a Self-Retaining area do not exceed the following ratio:

$$\left(\frac{\mathbf{2}}{\boldsymbol{Impervious\ Fraction}}\right) : \mathbf{1}$$

(Tributary Area**:** Self-Retaining Area)

Step 3.C – Identify Type 'D' Areas Draining to BMPs

Areas draining to BMPs are those that could not be fully managed through LID Principles (DMA Types A through C) and will instead drain to an LID BMP and/or a Conventional Treatment BMP designed to manage water quality impacts from that area, and Hydromodification where necessary.

Complete Table C-5 to document which DMAs are classified as Areas Draining to BMPs

Table C-5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID Receiving Runoff from DMA
DMA 1	Basin 1
DMA 2	Basin 2
DMA 3A	Basin 3A & Basin 3B
DMA 3B	Basin 3B
DMA 4	Basin 4
DMA A	Basin A
DMA B	Basin B

Note: More than one DMA may drain to a single LID BMP; however, one DMA may not drain to more than one BMP.

Section D: Implement LID BMPs

The Regional MS4 Permit requires the use of LID BMPs to provide retention or treatment of the DCV and includes a BMP hierarchy which requires Full Retention BMPs (Priority 1) to be considered before Biofiltration BMPs (Priority 2) and Flow-Through Treatment BMPs and Alternative Compliance BMPs (Priority 3). LID BMP selection must be based on technical feasibility and should be considered early in the site planning and design process. Use this section to document the selection of LID BMPs for each DMA. Note that feasibility is based on the DMA scale and may vary between DMAs based on site conditions.

D.1 Full Infiltration Applicability

An assessment of the feasibility of utilizing full infiltration BMPs is required for all projects, *except where it can be shown that site design LID principals fully retain the DCV (i.e., all DMAs are Type A, B, or C), or where Harvest and Use BMPs fully retain the DCV. Check the following box if applicable:*

☐ Site design LID principals fully retain the DCV (i.e., all DMAs are Type A, B, or C), (Proceed to Section E).

If the above box remains unchecked, perform a site-specific evaluation of the feasibility of Infiltration BMPs using each of the applicable criteria identified in Chapter 2.3.3 of the SMR WQMP and complete the remainder of Section D.1.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Copermittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the SMR WQMP. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Infiltration Feasibility

Table D-1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the SMR WQMP in Chapter 2.3.3. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D-1 Infiltration Feasibility

Downstream Impacts (SMR WQMP Section 2.3.3.a)		
Does the project site…	**YES**	**NO**
…have any DMAs where infiltration would negatively impact downstream water rights or other Beneficial Uses[3]?		X
If Yes, list affected DMAs:		
Groundwater Protection (SMR WQMP Section 2.3.3.b)		
Does the project site…	**YES**	**NO**
…have any DMAs with industrial, and other land uses that pose a high threat to water quality, which cannot be treated by Bioretention BMPs? Or have DMAs with active industrial process areas?		X
If Yes, list affected DMAs:		
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet horizontally of a water supply well?		X
If Yes, list affected DMAs:		
…have any DMAs that would restrict BMP locations to within a 2:1 (horizontal: vertical) influence line extending from any septic leach line?		X
If Yes, list affected DMAs:		
…have any DMAs been evaluated by a licensed Geotechnical Engineer, Hydrogeologist, or Environmental Engineer, who has concluded that the soils do not have adequate physical and chemical characteristics for the protection of groundwater, and has treatment provided by amended media layers in Bioretention BMPs been considered in evaluating this factor?		X
If Yes, list affected DMAs:		
Public Safety and Offsite Improvements (SMR WQMP Section 2.3.3.c)		
Does the project site…	**YES**	**NO**
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
Infiltration Characteristics For LID BMPs (SMR WQMP Section 2.3.3.d)		
Does the project site…	**YES**	**NO**
…have factored infiltration rates of less than 0.8 inches / hour? (Note: on a case-by-case basis, the City may allow a factor of safety as low as 1.0 to support selection of full infiltration BMPs. Therefore, measured infiltration rates could be as low as 0.8 in/hr to support full infiltration. A higher factor of safety would be required for design in accordance with the LID BMP Deign Handbook).		X
If Yes, list affected DMAs:		
Cut/Fill Conditions (SMR WQMP Section 2.3.3.e)		
Does the project site…	**YES**	**NO**
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
Other Site-Specific Factors (SMR WQMP Section 2.3.3.f)		
Does the project site…	**YES**	**NO**
…have DMAs where the geotechnical investigation discovered other site-specific factors that would preclude effective and/or safe infiltration?		X
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs that rely solely on infiltration should not be used for those DMAs and you should proceed to the assessment for Biofiltration BMPs below. Biofiltration BMPs that provide partial infiltration may still be feasible and should be

[3] Such a condition must be substantiated by sufficient modeling to demonstrate an impact and would be subject to [Insert Jurisdiction] discretion. There is not a standardized method for assessing this criterion. Water rights evaluations should be site-specific.

assessed in Section D.2. Summarize concerns identified in the Geotechnical Report, if any, that resulted in a "YES" response above in the table below.

Table D-2 Geotechnical Concerns for Onsite Infiltration

Type of Geotechnical Concern	DMAs Feasible (By Name or ID)	DMAs Infeasible (By Name or ID)
Collapsible Soil		
Expansive Soil		
Slopes		
Liquefaction		
Other		

D.2 Biofiltration Applicability

This section should document the applicability of biofiltration BMPs for Type D DMAs that are not feasible for full infiltration BMPs. The key decisions to be documented in this section include:

1. Are biofiltration BMPs with partial infiltration feasible?
    a. Biofiltration BMPs must be designed to maximize incidental infiltration via a partial infiltration design unless it is demonstrated that this design is not feasible.
    b. These designs can be used at sites with low infiltration rates where other feasibility factors do not preclude incidental infiltration.

    Document summary in Table D-3.
2. If not, what are the factors that require the use of biofiltration with no infiltration? This may include:
    a. Geotechnical hazards
    b. Water rights issues
    c. Water balance issues
    d. Soil contamination or groundwater quality issues
    e. Very low infiltration rates (factored rates < 0.1 in/hr)
    f. Other factors, demonstrated to the acceptance of the City

    If this applies to any DMAs, then rationale must be documented in Table D-3.
3. Are biofiltration BMPs infeasible?
    a. If yes, then provide a site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee with jurisdiction over the Project site to discuss this option. Proceed to Section F to document your alternative compliance measures.

Table D-3 Evaluation of Biofiltration BMP Feasibility

DMA ID	Is Partial/ Incidental Infiltration Allowable? (Y/N)	Basis for Infeasibility of Partial Infiltration (provide summary and include supporting basis if partial infiltration not feasible)
DMA 1	Y	
DMA 2	Y	
DMA 3A	Y	
DMA 3B	Y	
DMA 4	Y	
DMA A	Y	
DMA B	Y	

Proprietary Biofiltration BMP Approval Criteria

If the project will use proprietary BMPs as biofiltration BMPs, then this section is completed to document that the proprietary BMPs are selected in accordance with Section 2.3.7 of the SMR WQMP. Proprietary Biofiltration BMPs must meet both of the following approval criteria:

1. Approval Criteria for All Proprietary BMPs, and
2. Acceptance Criteria for Proprietary Biofiltration BMPs.

When the use of proprietary biofiltration BMPs is proposed to meet the Pollutant Control performance standards, use Table D-4 to document that appropriate approval criteria have been met for the proposed BMPs. Add additional rows to document approval criteria are met for each type of BMP proposed.

Table D-4 Proprietary BMP Approval Requirement Summary

Proposed Proprietary Biofiltration BMP	Approval Criteria	Notes/Comments
Insert BMP Name and Manufacturer Here	☐ Proposed BMP has an active TAPE GULD Certification for the project pollutants of concern[4] or equivalent 3rd party demonstrated performance.	Insert text here
	☐ The BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification.	Insert text here
	☐ The BMP includes biological features including vegetation supported by engineered or other growing media.	Describe features here.
	☐ The BMP is designed to maximize infiltration, or supplemental infiltration is provided to achieve retention equivalent to Biofiltration with Partial	Describe supplemental retention practices if applicable.

[4] Use Table F-1 and F-2 to identify and document the pollutants of concern and include these tables in Appendix 5.

	Infiltration BMPs if factored infiltration rate is between 0.1 and 0.8 inches/hour.	
	☐ The BMP is sized using one of two Biofiltration LID sizing options in Section 2.3.2 of the SRM WQMP.	List sizing method used, resulting size (i.e. volume or flow), and provided size (for proposed unit)

D.3 Feasibility Assessment Summaries

From the Infiltration, Biofiltration with Partial Infiltration and Biofiltration with No Infiltration Sections above, complete Table D-5 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D-5 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy			No LID (Alternative Compliance)
	1. Infiltration	2. Biofiltration with Partial Infiltration	3. Biofiltration with No Infiltration	
DMA 1	☐	☒	☐	☐
DMA 2	☐	☒	☐	☐
DMA 3A	☐	☒	☐	☐
DMA 3B	☐	☒	☐	☐
DMA 4	☐	☒	☐	☐
DMA A	☐	☒	☐	☐
DMA B	☐	☒	☐	☐

For those DMAs where LID BMPs are not feasible, provide a narrative in Table D-6 below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section F below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

This is based on the clarification letter titled "San Diego Water Board's Expectations of Documentation to Support a Determination of Priority Development Project Infiltration Infeasibility" (April 28, 2017, Via email from San Diego Regional Water Quality Control Board to San Diego County Municipal Storm Water Copermittees[5]).

Table D-6 Summary of Infeasibility Documentation

Question	Narrative Summary (include reference to applicable appendix/attachment/report, as applicable)
a) When in the entitlement process did a geotechnical engineer analyze the site for infiltration feasibility?	November 26, 2019 (See attached Geotechnical Report)
b) When in the entitlement process were other investigations conducted (e.g., groundwater	December 12, 2012 (See attached Geotechnical Report)

[5] http://www.projectcleanwater.org/download/pdp-infiltration-infeasibility/

quality, water rights) to evaluate infiltration feasibility?	
c) What was the scope and results of testing, if conducted, or rationale for why testing was not needed to reach findings?	Infiltration rates vary from 0.01 in/hr to 0.43 in/hr
d) What public health and safety requirements affected infiltration locations?	N/A
e) What were the conclusions and recommendations of the geotechnical engineer and/or other professional responsible for other investigations?	See Conclusions and Recommendation Section of Geotechnical Report
f) What was the history of design discussions between the permittee and applicant for the proposed project, resulting in the final design determination related locations feasible for infiltration?	
g) What site design alternatives were considered to achieve infiltration or partial infiltration on site?	
h) What physical impairments (i.e., fire road egress, public safety considerations, utilities) and public safety concerns influenced site layout and infiltration feasibility?	
i) What LID Principles (site design BMPs) were included in the project site design?	

D.4 LID BMP Sizing

Each LID BMP must be designed to ensure that the DCV will be captured by the selected BMPs with no discharge to the storm drain or surface waters during the DCV size storm. Infiltration BMPs must at minimum be sized to capture the DCV to achieve pollutant control requirements.

Biofiltration BMPs must at a minimum be sized to:

- Treat 1.5 times the DCV not reliably retained on site using a volume-base or flow-based sizing method, or
- Include static storage volume, including pore spaces and pre-filter detention volume, at least 0.75 times the portion of the DCV not reliably retained on site.

First**,** calculate the DCV for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using the methods included in Section 3 of the LID BMP Design Handbook. Utilize the worksheets found in the LID BMP Design Handbook or consult with the Copermittee to assist you in correctly sizing your LID BMPs. Use **Error! Reference source not found.** below to document the DCV for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.4.1 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 1 BIORETENTION BASIN (BASIN 1)*		
	[A]		[B]	[C]	[A] x [C]			
1D.1	*387,119*	*Concrete or Asphalt*	*1.00*	*0.892*	*345,310*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
1D.2	*154,275*	*Roof*	*1.00*	*0.892*	*137,613*			
1D.3	*88,627*	*Landscape*	*0.10*	*0.110*	*9,789.5*			
	630,021				492,713	0.7	28,742	214,696

Table D.4.2 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 2 BIORETENTION BASIN (BASIN 2)*		
	[A]		[B]	[C]	[A] x [C]			
2D.1	*229,950*	*Concrete or Asphalt*	*1.00*	*0.892*	*205,115*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
2D.2	*82,648*	*Roof*	*1.00*	*0.892*	*73,722*			
2D.3	*195,683*	*Landscape*	*0.10*	*0.110*	*21,614.8*			
					-			
	508,281				300,452	0.7	17,526	194,132

Table D.4.2 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 3A BIORETENTION BASIN (BASIN 3A)*		
	[A]		[B]	[C]	[A] x [C]			
3AD.1	*14,580*	*Concrete or Asphalt*	*1.00*	*0.892*	*13,005*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
3AD.2	-	*Roof*	*1.00*	*0.892*	-			
3AD.3	*6,150*	*Landscape*	*0.10*	*0.110*	*679*			
	20,730				13,685	0.7	798	5,675

Table D.4.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 3B BIORETENTION BASIN (BASIN 3B)*		
	[A]		[B]	[C]	[A] x [C]			
3BD.1	*59,565*	*Concrete or Asphalt*	*1.00*	*0.892*	*53,132*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
3BD.2	*14,189*	*Roof*	*1.00*	*0.892*	*12,657*			
3BD.3	*23,315*	*Landscape*	*0.10*	*0.110*	*2,575.3*			
	97,069				68,364	0.7	3,988	23,940

Table D.4.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 4 BIORETENTION BASIN (BASIN 4)*		
	[A]		[B]	[C]	[A] x [C]			
4D.1	*200,538*	*Concrete or Asphalt*	*1.00*	*0.892*	*178,880*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
4D.2	*28,458*	*Roof*	*1.00*	*0.892*	*25,384*			
4D.3	*106,723*	*Landscape*	*0.10*	*0.110*	*11,788.4*			
	335,719				216,053	0.7	12,603	136,028

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA A Bioretention Basin*		
	[A]		[B]	[C]	[A] x [C]			
AD.1	*90,464*	*Concrete or Asphalt*	*1.00*	*0.892*	*80,694*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
AD.2	-	*Roof*	*1.00*	*0.892*	-			
AD.3	*63,787*	*Landscape*	*0.10*	*0.110*	*7,045.8*			
			0.25	*0.198*	-			
	154,251				87,740	0.7	5,118	40,729

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA B Bioretention Basin*		
	[A]		[B]	[C]	[A] x [C]			
BD.1	*50,426*	*Concrete or Asphalt*	*1.00*	*0.892*	*44,980*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
BD.2	-	*Roof*	*1.00*	*0.892*	-			
BD.3	*36,768*	*Landscape*	*0.10*	*0.110*	*4,061.3*			
	-		*0.25*	*0.198*	-			
	87,194				49,041	0.7	2,861	18,297

[B], [C] is obtained as described in Section 2.6.1.b of the SMR WQMP

[E] is obtained from Exhibit A in the SMR WQMP

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6.

Complete Table D-7 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. You can add rows to the table as needed. Alternatively, the Santa Margarita Hydrology Model (SMRHM) can be used to size LID BMPs to address the DCV and, if applicable, to size Hydrologic Control BMPs to meet the Hydrologic Performance Standard described in the SMR WQMP, as identified in Section E.

Table D-7 LID BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	Design Capture Volume (ft^3)	Proposed Volume (ft^3)
Basin 1	1	Bioretention Basin	28,742	214,696
Basin 2	2	Bioretention Basin	17,526	194,132
Basin 3A	3A	Bioretention Basin	798	5675
Basin 3B	3B	Bioretention Basin	3,988	23,940
Basin 4	4	Bioretention Basin	12,603	136,028
Basin A	A	Bioretention Basin	5,118	40,729
Basin B	B	Bioretention Basin	2,861	18,297

If bioretention will include a capped underdrain, then include sizing calculations demonstrating that the BMP will meet infiltration sizing requirements with the underdrain capped and also meet biofiltration sizing requirements if the underdrain is uncapped.

Section E: Implement Hydrologic Control BMPs and Sediment Supply BMPs

If a completed Table 1.2 demonstrates that the project is exempt from Hydromodification Performance Standards, specify N/A and proceed to Section G.

☐ N/A Project is Exempt from Hydromodification Performance Standards.

If a PDP is not exempt from hydromodification requirements than the PDP must satisfy the requirements of the performance standards for hydrologic control BMPs and Sediment Supply BMPs. The PDP may choose to satisfy hydrologic control requirements using onsite or offsite BMPs (i.e. Alternative Compliance). Sediment supply requirements cannot be met via alternative compliance. If N/A is not selected above, select one of the two options below and complete the applicable sections.

☒ Project is Not Hydromodification Exempt and chooses to implement Hydrologic Control and Sediment Supply BMPs Onsite (complete Section E).

☐ Project is Not Hydromodification Exempt and chooses to implement Hydrologic Control Requirements using Alternative Compliance (complete Section F). Selection of this option must be approved by the Copermittee.

E.1 Hydrologic Control BMP Selection

Capture of the DCV and achievement of the Hydrologic Performance Standard may be met by combined and/or separate structural BMPs. The user should consider the full suite of Hydrologic Control BMPs to manage runoff from the post-development condition and meet the Hydrologic Performance Standard identified in this section.

The Hydrologic Performance Standard consists of matching or reducing the flow duration curve of post-development conditions to that of pre-existing, naturally occurring conditions, for the range of geomorphically significant flows (10% of the 2-year runoff event up to the 10-year runoff event). Select each of the hydrologic control BMP types that are applied to meet the above performance standard on the site.

☒ LID principles as defined in Section 3.2 of the SMR WQMP.

☒ Structural LID BMPs that may be modified or enlarged, if necessary, beyond the DCV.

☐ Structural Hydrologic Control BMPs that are distinct from the LID BMPs above. The LID BMP Design Handbook provides information not only on Hydrologic Control BMP design, but also on BMP design to meet the combined LID requirement and Hydrologic Performance Standard. The Handbook specifies the type of BMPs that can be used to meet the Hydrologic Performance Standard.

E.2 Hydrologic Control BMP Sizing

Hydrologic Control BMPs must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA for the range of geomorphically significant flows. Using SMRHM, (or another acceptable continuous simulation model if approved by the Copermittee) the applicant shall demonstrate that the performance of the Hydrologic Control BMPs complies with the Hydrologic Performance Standard. Complete Table E-1 below and identify, for each DMA, the type of Hydrologic Control BMP, if the SMRHM model confirmed the

management (Identified as "passed" in SMRHM), the total volume capacity of the Hydrologic Control BMP, the Hydrologic Control BMP footprint at top floor elevation, and the drawdown time of the Hydrologic Control BMP. SMRHM summary reports should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table E-1 Hydrologic Control BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	SMRHM Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
Basin 1	1	Bioretention Basin	☐		1.12	
Basin 2	2	Bioretention Basin	☐		0.97	
Basin 3A	3A	Bioretention Basin	☐		0.09	
Basin 3B	3B	Bioretention Basin	☐		0.20	
Basin 4	4	Bioretention Basin	☐		0.82	
Basin A	A	Bioretention Basin	☐		0.59	
Basin B	B	Bioretention Basin	☐		0.23	

If a bioretention BMP with capped underdrain is used and hydromodification requirements apply, then sizing calculations must demonstrate that the BMP meets flow duration control criteria with the underdrain capped and uncapped. Both calculations must be included.

E.3 Implement Sediment Supply BMPs

The sediment supply performance standard applies to PDPs for which hydromodification applied that have the potential to impact Potential Critical Coarse Sediment Yield Areas. Refer to Exhibit G of the WQMP to determine if there are onsite Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas. Select one of the two options below and include the Potential Critical Coarse Sediment Yield Area Exhibit showing your project location in Appendix 7.

☒ There are no mapped Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas on the site. The Sediment Supply Performance Standard is met with no further action.

☐ There are mapped Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas on the site, the Sediment Supply Performance Standard will be met through Option 1 or Option 2 below.

The applicant may refer to Section 3.6.4 of the SMR WQMP for a description of the methodology to meet the Sediment Supply Performance Standard. Select the applicable compliance pathway and complete the appropriate sections to demonstrate compliance with the Sediment Supply Performance Standard if the second box is selected above:

☐ Avoid impacts related to any PDP activities to Potential Critical Coarse Sediment Yield Areas. Proceed to Section E.3.1.

☐ Complete a Site-Specific Critical Coarse Sediment Analysis. Proceed to Section E.3.2.

E.3.1 Option 1: Avoid Potential Critical Coarse Sediment Yield Areas and Potential Sediment Source Areas

The simplest approach for complying with the Sediment Supply Performance Standard is to avoid impacts to areas identified as Potential Critical Coarse Sediment Yield Areas or Potential Sediment Supply Areas. If a portion of PDP is identified as a Potential Critical Coarse Sediment Yield Area or a Potential Sediment Source Area, that PDP may still achieve compliance with the Sediment Supply Performance Standards if Potential Critical Coarse Sediment Yield Areas and Potential Sediment Supply Areas are avoided, i.e. areas are not developed and thereby delivery of Critical Coarse Sediment to the receiving waters is not impeded by site developments.

Provide a narrative describing how the PDP has avoided impacts to Potential Critical Coarse Sediment Yield Areas and/or Potential Sediment Source Areas below.

N/A

If it is not feasible to avoid these areas, proceed to Option 2 to complete a Site-Specific Critical Coarse Sediment Analysis.

E.3.2 Option 2: Site-Specific Critical Coarse Sediment Analysis

Perform a stepwise assessment to ensure the maintenance of the pre-project source(s) of Critical Coarse Sediment (i.e., Bed Sediment Supply):

1. Determine whether the site or a portion of the site is a Significant Source of Bed Sediment Supply to the Receiving Channel (i.e., an actual verified Critical Coarse Sediment Yield Area);
2. Avoid areas identified as actual verified Critical Coarse Sediment Yield Areas in the PDP design and maintain pathways for discharge of Bed Sediment Supply from these areas to receiving waters.

Step 1: Identify if the site is an actual verified Critical Coarse Sediment Yield Area supplying Bed Sediment Supply to the receiving channel

☐ **Step 1.A** – Is the Bed Sediment of onsite streams similar to that of receiving streams?

Rate the similarity: ☐ High
☐ Medium
☐ Low

Results from the geotechnical and sieve analysis to be performed both onsite and in the receiving channel should be documented in Appendix 7. Of particular interest, the results of the sieve analysis, the soil erodibility factor, a description of the topographic relief of the project area, and the lithology of onsite soils should be reported in Appendix 7.

☐ **Step 1.B** – Are onsite streams capable of delivering Bed Sediment Supply from the site, if any, to the receiving channel?

Rate the potential: ☐ High
☐ Medium
☐ Low

Results from the analyses of the sediment delivery potential to the receiving channel should be documented in Appendix 7 and identify, at a minimum, the Sediment Source, the distance to the receiving channel, the onsite channel density, the project watershed area, the slope, length, land use, and rainfall intensity.

☐ **Step 1.C** – Will the receiving channel adversely respond to a change in Bed Sediment Load?

Rate the need for bed sediment supply:

☐ High

☐ Medium

☐ Low

Results from the in-stream analysis to be performed both onsite should be documented in Appendix 7. The analysis should, at a minimum, quantify the bank stability and the degree of incision, provide a gradation of the Bed Sediment within the receiving channel, and identify if the channel is sediment supply-limited.

☐ **Step 1.D** – Summary of Step 1

Summarize in Table E.3 the findings of Step 1 and associate a score (in parenthesis) to each step. The sum of the three individual scores determines if a stream is a significant contributor to the receiving stream.

- Sum is equal to or greater than eight - Site is a significant source of sediment bed material – all on-site streams must be preserved or by-passed within the site plan. The applicant shall proceed to Step 2 for all onsite streams.
- Sum is greater than five but lower than eight. Site is a source of sediment bed material – some of the on-site streams must be preserved (with identified streams noted). The applicant shall proceed to Step 2 for the identified streams only.
- Sum is equal to or lower than five. Site is not a significant source of sediment bed material. The applicant may advance to Section F.
-

Table E-2 Triad Assessment Summary

Step	Rating			Total Score
1.A	☐ High (3)	☐ Medium (2)	☐ Low (1)	
1.B	☐ High (3)	☐ Medium (2)	☐ Low (1)	
1.C	☐ High (3)	☐ Medium (2)	☐ Low (1)	
Significant Source Rating of Bed Sediment to the receiving channel(s)				

Step 2: Avoid Development of Critical Coarse Sediment Yield Areas, Potential Sediment Sources Areas, and Preserve Pathways for Transport of Bed Sediment Supply to Receiving Waters

Onsite streams identified as a actual verified Critical Coarse Sediment Yield Areas should be avoided in the site design and transport pathways for Critical Coarse Sediment should be preserved

Check those that apply:

☐ The site design does avoid all onsite channels identified as actual verified Critical Coarse Sediment Yield Areas

AND

☐ The drainage design bypasses flow and sediment from onsite upstream drainages identified as actual verified Critical Coarse Sediment Yield Areas to maintain Critical Coarse Sediment supply to receiving waters

(If both are yes, the applicant may disregard subsequent steps of Section E.3 and directly advance directly to Section G).

- *Or* -

☐ The site design **does NOT avoid** all onsite channels identified as actual verified Critical Coarse Sediment Yield Areas

OR

☐ The project impacts transport pathways of Critical Coarse Sediment from onsite upstream drainages.

(If either of these are the case, the applicant may proceed with the subsequent steps of Section E.3).

Provide in Appendix 7 a site map that identifies all onsite channels and highlights those onsite channels that were identified as a Significant Source of Bed Sediment. The site map shall demonstrate, if feasible, that the site design avoids those onsite channels identified as a Significant Source of Bed Sediment. In addition, the applicant shall describe the characteristics of each onsite channel identified as a Significant Source of Bed Sediment. If the design plan cannot avoid the onsite channels, please provide a rationale for each channel individually.

The site map shall demonstrate that the drainage design bypasses those onsite channels that supply Critical Coarse Sediment to the receiving channel(s). In addition, the applicant shall describe the characteristics of each onsite channel identified as an actual verified Critical Coarse Sediment Yield Area.

Identified Channel #1 - Insert narrative description here

Identified Channel #2 - Insert narrative description here

Identified Channel #3 - Insert narrative description here

E.3.3 Sediment Supply BMPs to Result in No Net Impact to Downstream Receiving Waters

If impacts to Critical Coarse Sediment Yield Areas cannot be avoided, sediment supply BMPs must be implemented such there is no net impact to receiving waters. Sediment supply BMPs may consist of approaches that permit flux of bed sediment supply from Critical Coarse Sediment Yield Areas within the project boundary. This approach is subject to acceptance by the [Insert Jurisdiction]. It may require extensive documentation and analysis by qualified professionals to support this demonstration.

Appendix H of the San Diego Model BMP Design Manual provides additional information on site-specific investigation of Critical Coarse Sediment Supply areas.

http://www.projectcleanwater.org/download/2018-model-bmp-design-manual/

Documentation of sediment supply BMPs should be detailed in Appendix 7.

Section F: Alternative Compliance

Alternative Compliance may be used to achieve compliance with pollutant control and/or hydromodification requirements for a given PDP. Alternative Compliance may be used under two scenarios, check the applicable box if the PDP is proposing to use Alternative Compliance to satisfy all or a portion of the Pollutant Control and/or Hydrologic Control requirements (but not sediment supply requirements)

☐ If it is not feasible to fully implement Infiltration or Biofiltration BMPs at a PDP site, Flow-Through Treatment Control BMPs may be used to treat pollutants contained in the portion of DCV not reliably retained on site and Alternative Compliance measures must also be implemented to mitigate for those pollutants in the DCV that are not retained or removed on site prior to discharging to a receiving water.

☐ Alternative Compliance is selected to comply with either pollutant control or hydromodification flow control requirements even if complying with these requirements is potentially feasible on-site. If such voluntary Alternative Compliance is implemented, Flow-Through Treatment Control BMPs must still be used to treat those pollutants in the portion of the DCV not reliably retained on site prior to discharging to a receiving water.

Refer to Section 2.7 of the SMR WQMP and consult the City for currently available Alternative Compliance pathways. Coordinate with the Copermittee if electing to participate in Alternative Compliance and complete the sections below to document implementation of the Flow-Through BMP component of the program.

F.1 Identify Pollutants of Concern

The purpose of this section is to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs and to document compliance and.

Utilize Table A-1 from Section A, which noted your project's Receiving Waters, to identify impairments for Receiving Waters (including downstream receiving waters) by completing Table F-1. Table F-1 includes the watersheds identified as impaired in the Approved 2010 303(d) list; check box corresponding with the PDP's receiving water. The most recent 303(d) lists are available from the State Water Resources Control Board website:
https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml).https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

Table F-1 Summary of Approved 2010 303(d) listed waterbodies and associated pollutants of concern for the Riverside County SMR Region and downstream waterbodies.

	Water Body	Nutrients[1]	Metals[2]	Toxicity	Bacteria and Pathogens	Pesticides and Herbicides	Sulfate	Total Dissolved Solids
☐	De Luz Creek	X	X				X	
☐	Long Canyon Creek		X		X	X		
☒	Murrieta Creek	X	X	X		X		
☐	Redhawk Channel	X	X		X	X		X
☐	Santa Gertudis Creek	X	X		X	X		
☐	Santa Margarita Estuary	X						
☒	Santa Margarita River (Lower)	X			X			
☒	Santa Margarita River (Upper)	X		X				
☐	Temecula Creek	X	X	X		X		X
☐	Warm Springs Creek	X	X		X	X		

[1] Nutrients include nitrogen, phosphorus and eutrophic conditions caused by excess nutrients.

[2] Metals includes copper, iron, and manganese.

Use Table F-2 to identify the pollutants identified with the project site. Indicate the applicable PDP Categories and/or Project Features by checking the boxes that apply. If the identified General Pollutant Categories are the same as those listed for your Receiving Waters, then these will be your Pollutants of Concern; check the appropriate box or boxes in the last row.

Table F-2 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)		General Pollutant Categories									
		Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease	Total Dissolved Solids	Sulfate
☒	Detached Residential Development	P	N	P	P	N	P	P	P	N	N
☒	Attached Residential Development	P	N	P	P	N	P	P	P[(2)]	N	N
☒	Commercial/Industrial Development	P[(3)]	P[(7)]	P[(1)]	P[(1)]	P	P[(1)]	P	P	N	N
☐	Automotive Repair Shops	N	P	N	N	P[(4, 5)]	N	P	P	N	N
☐	Restaurants (>5,000 ft^2)	P	N	N	P[(1)]	N	N	P	P	N	N
☐	Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P	N	N
☒	Parking Lots (>5,000 ft^2)	P[(6)]	P[(7)]	P[(1)]	P[(1)]	P[(4)]	P	P	P	N	N
☒	Streets, Highways, and Freeways	P[(6)]	P[(7)]	P[(1)]	P[(1)]	P[(4)]	P	P	P	N	N
☐	Retail Gasoline Outlets	N	P[(7)]	N	N	P[(4)]	N	P	P	N	N
Project Priority Pollutant(s) of Concern		☒	☒	☒	☒	☒	☒	☒	☒	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste products; otherwise not expected

(4) Including petroleum hydrocarbons

(5) Including solvents

(6) Bacterial indicators are routinely detected in pavement runoff

(7) A potential source of metals, primarily copper and zinc. Iron, magnesium, and aluminum are commonly found in the environment and are commonly associated with soils, but are not primarily of anthropogenic stormwater origin in the municipal environment.

F.2 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential Pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must be selected to address the Project Priority Pollutants of Concern (identified above) and meet the acceptance criteria described in Section 2.3.7 of the SMR WQMP. Documentation of acceptance criteria must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table F-3 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
N/A		

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Copermittee Approved Study and provided in Appendix 6.

F.3 Sizing Criteria

Utilize Table F-4 below to appropriately size flow-through BMPs to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.1 of the SMR WQMP for further information.

Table F-4 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*	
	[A]		[B]	[C]	[A] x [C]		
N/A							
						Design Storm (in)	*Design Flow Rate (cfs)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{[G]}$

[B], [C] is obtained as described in Section 2.6.1.b from the SMR WQMP
[E] either 0.2 inches or 2 times the 85th percentile hourly rainfall intensity
[G] = 43,560,.

F.4 Hydrologic Performance Standard – Alternative Compliance Approach

Alternative compliance options are only available if the governing Copermittee has acknowledged the infeasibility of onsite Hydrologic Control BMPs and approved an alternative compliance approach. See Section 3.5 and 3.6 of the SMR WQMP.

Select the pursued alternative and describe the specifics of the alternative:

☐ Offsite Hydrologic Control Management within the same channel system

N/A

☐ In-Stream Restoration Project

N/A

For Offsite Hydrologic Control BMP Option

Each Hydrologic Control BMP must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA by more than ten percent over a one-year period. Using SMRHM, the applicant shall demonstrate that the performance of each designed Hydrologic Control BMP is equivalent with the Hydrologic Performance Standard for onsite conditions. Complete Table F-5 below and identify, for each Hydrologic Control BMP, the equivalent DMA the Hydrologic Control BMP mitigates, that the SMRHM model passed, the total volume capacity of the BMP, the BMP footprint at top floor elevation, and the drawdown time of the BMP. SMRHM summary reports for the alternative approach should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table F-5 Offsite Hydrologic Control BMP Sizing

BMP Name / Type	Equivalent DMA (ac)	SMRHM Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
N/A		☐			
		☐			
		☐			
		☐			

For Instream Restoration Option

Attach to Appendix 7 the technical report detailing the condition of the receiving channel subject to the proposed hydrologic and sediment regimes. Provide the full design plans for the in-stream restoration project that have been approved by the Copermittee. Utilize the San Diego Regional Water Quality Equivalency Guidance Document.

Section G: Implement Trash Capture BMPs

The City may require full trash capture BMPs to be installed as part of the project. Consult with the City to determine applicability.

Trash Capture BMPs may be applicable to Type 'D' DMAs, as defined in Section 2.3.4 of the SMR WQMP. Trash Capture BMPs are designed to treat Q_{TRASH}, the runoff flow rate generated during the 1-year 1-hour precipitation depth. Utilize Table G-1 to size Trash Capture BMP. Refer to Table G-2 to determine the Trash Capture Design Storm Intensity (E).

Table G-1 Sizing Trash Capture BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*	
	[A]		[B]	[C]	[A] x [C]		
N/A							
						Trash Capture Design Storm Intensity (in)	*Trash Capture Design Flow Rate (cubic feet or cfs)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{[G]}$

[B], [C] is obtained as described in Section 2.6.1.b from the SMR WQMP
[G] = 43,560

Table G-2 Approximate precipitation depth/intensity values for calculation of the Trash Capture Design Storm

City	1-year 1-hour Precipitation Depth/Intensity (inches/hr)
Murrieta	0.47
Temecula	0.50
Wildomar	0.37

Use Table G-3 to summarize and document the selection and sizing of Trash Capture BMPs.

Table G-3 Trash Capture BMPs

BMP Name / ID	DMA No(s)	BMP Type / Description	Required Trash Capture Flowrate (cfs)	Provided Trash Capture Flowrate (cfs)
N/A				

Section H: Source Control BMPs

Source Control BMPs include permanent, structural features that may be required in your Project plans, such as roofs over and berms around trash and recycling areas, and Operational BMPs, such as regular sweeping and "housekeeping," that must be implemented by the site's occupant or user. The Maximum Extent Practicable (MEP) standard typically requires both types of BMPs. In general, Operational Source Control BMPs cannot be substituted for a feasible and effective Structural Source Control BMP. Complete checklist below to determine applicable Source Control BMPs for your site.

Project-Specific WQMP Source Control BMP Checklist

All development projects must implement Source Control BMPs. Source Control BMPs are used to minimize pollutants that may discharge to the MS4. Refer to Chapter 3 (Section 3.8) of the SMR WQMP for additional information. Complete Steps 1 and 2 below to identify Source Control BMPs for the project site.

Step 1: Identify Pollutant Sources

Review project site plans and identify the applicable pollutant sources. "Yes" indicates that the pollutant source is applicable to project site. "No" indicates that the pollutant source is not applicable to project site.

☒ Yes ☐ No	Storm Drain Inlets		☐ Yes ☒ No	Outdoor storage areas	
☐ Yes ☒ No	Floor Drains		☐ Yes ☒ No	Material storage areas	
☐ Yes ☒ No	Sump Pumps		☐ Yes ☒ No	Fueling areas	
☐ Yes ☒ No	Pets Control/Herbicide Application		☐ Yes ☒ No	Loading Docks	
☐ Yes ☒ No	Food Service Areas		☐ Yes ☒ No	Fire Sprinkler Test/Maintenance water	
☒ Yes ☐ No	Trash Storage Areas		☒ Yes ☐ No	Plazas, Sidewalks and Parking Lots	
☐ Yes ☒ No	Industrial Processes		☒ Yes ☐ No	Pools, Spas, Fountains and other water features	
☐ Yes ☒ No	Vehicle and Equipment Cleaning and Maintenance/Repair Areas				

Step 2: Required Source Control BMPs

List each Pollutant source identified above in column 1 and fill in the corresponding Structural Source Control BMPs and Operational Control BMPs by referring to the Stormwater Pollutant Sources/Source Control Checklist included in Appendix 8. The resulting list of structural and operational source control BMPs must be implemented as long as the associated sources are present on the project site. Add additional rows as needed.

Pollutant Source	Structural Source Control BMP	Operational Source Control BMP
Storm Drain Inlets	Bioretention Basin	
Trash Storage Areas	Bioretention Basin	
Plazas, Sidewalks and Parking Lots	Bioretention Basin	
Pools, Spas, Fountains and other water features	Bioretention Basin	

Section I: Coordinate Submittal with Other Site Plans

Populate Table I-1 below to assist the plan checker in an expeditious review of your project. During construction and at completion, City inspectors will verify the installation of BMPs against the approved plans. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table I-1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
Basin 1	Bioretention Basin	Sheet X
Basin 2	Bioretention Basin	Sheet X
Basin 3A	Bioretention Basin	Sheet X
Basin 3B	Bioretention Basin	Sheet X
Basin 4	Bioretention Basin	Sheet X
Basin A	Bioretention Basin	Sheet X
Basin B	Bioretention Basin	Sheet X

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. The Copermittee with jurisdiction over the Project site can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Use Table I-2 to identify other applicable permits that may impact design of the site. If yes is answered to any of the items below, the Copermittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Table I-2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☒ Y	☐ N
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*	☐ Y	☐ N

Section J: Operation, Maintenance and Funding

The Copermittee with jurisdiction over the Project site will periodically verify that BMPs on your Project are maintained and continue to operate as designed. To make this possible, the Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement maintenance of BMPs in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized Operations and Maintenance or inspections but will require typical landscape maintenance as noted in Chapter 5, in the SMR WQMP. Include a brief description of typical landscape maintenance for these areas.

The Copermittee with jurisdiction over the Project site will also require that you prepare and submit a detailed BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a BMP Operation and Maintenance Plan are in Chapter 5 of the SMR WQMP.

Maintenance Mechanism: Insert text here.

Will the proposed BMPs be maintained by a Homeowners' Association (HOA) or Property Owners Association (POA)?

☒ Y ☐ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Section K: Acronyms, Abbreviations and Definitions

Regional MS4 Permit	Order No. R9-2013-0001 as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100 an NPDES Permit issued by the San Diego Regional Water Quality Control Board.
Applicant	Public or private entity seeking the discretionary approval of new or replaced improvements from the Copermittee with jurisdiction over the project site. The Applicant has overall responsibility for the implementation and the approval of a Priority Development Project. The WQMP uses consistently the term "user" to refer to the applicant such as developer or project proponent. The WQMP employs also the designation "user" to identify the Registered Professional Civil Engineer responsible for submitting the Project-Specific WQMP, and designing the required BMPs.
Best Management Practice (BMP)	Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal storm water permits, BMPs are typically used in place of numeric effluent limits.
BMP Fact Sheets	BMP Fact Sheets are available in the LID BMP Design Handbook. Individual BMP Fact Sheets include sitting considerations, and design and sizing guidelines for seven types of structural BMPs (infiltration basin, infiltration trench, permeable pavement, harvest-and-use, bioretention, extended detention basin, and sand filter).
California Stormwater Quality Association (CASQA)	Publisher of the California Stormwater Best Management Practices Handbooks, available at www.cabmphandbooks.com.
Conventional Treatment Control BMP	A type of BMP that provides treatment of storm water runoff. Conventional treatment control BMPs, while designed to treat particular Pollutants, typically do not provide the same level of volume reduction as LID BMPs, and commonly require more specialized maintenance than LID BMPs. As such, the Regional MS4 Permit and this WQMP require the use of LID BMPs wherever feasible, before Conventional Treatment BMPs can be considered or implemented.
Copermittees	The Regional MS4 Permit identifies the Cities of Murrieta, Temecula, and Wildomar, the County, and the District, as Copermittees for the SMR.
County	The abbreviation refers to the County of Riverside in this document.

CEQA	California Environmental Quality Act - a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.
CIMIS	California Irrigation Management Information System - an integrated network of 118 automated active weather stations all over California managed by the California Department of Water Resources.
CWA	Clean Water Act - is the primary federal law governing water pollution. Passed in 1972, the CWA established the goals of eliminating releases of high amounts of toxic substances into water, eliminating additional water pollution by 1985, and ensuring that surface waters would meet standards necessary for human sports and recreation by 1983. CWA Section 402(p) is the federal statute requiring NPDES permits for discharges from MS4s.
CWA Section 303(d) Waterbody	Impaired water in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of urban runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.
Design Storm	The Regional MS4 Permit has established the 85th percentile, 24-hour storm event as the "Design Storm". The applicant may refer to Exhibit A to identify the applicable Design Storm Depth (D85) to the project.
DCV	Design Capture Volume (DCV) is the volume of runoff produced from the Design Storm to be mitigated through LID Retention BMPs, Other LID BMPs and Volume Based Conventional Treatment BMPs, as appropriate.
Design Flow Rate	The design flow rate represents the minimum flow rate capacity that flow-based conventional treatment control BMPs should treat to the MEP, when considered.
DCIA	Directly Connected Impervious Areas - those impervious areas that are hydraulically connected to the MS4 (i.e. street curbs, catch basins, storm drains, etc.) and thence to the structural BMP without flowing over pervious areas.
Discretionary Approval	A decision in which a Copermittee uses its judgment in deciding whether and how to carry out or approve a project.
District	Riverside County Flood Control and Water Conservation District.
DMA	A Drainage Management Area - a delineated portion of a project site that is hydraulically connected to a common structural BMP or conveyance point. The Applicant may refer to Section 3.3 for further guidelines on how to delineate DMAs.

Drawdown Time	Refers to the amount of time the design volume takes to pass through the BMP. The specified or incorporated drawdown times are to ensure that adequate contact or detention time has occurred for treatment, while not creating vector or other nuisance issues. It is important to abide by the drawdown time requirements stated in the fact sheet for each specific BMP.
Effective Area	Area which 1) is suitable for a BMP (for example, if infiltration is potentially feasible for the site based on infeasibility criteria, infiltration must be allowed over this area) and 2) receives runoff from impervious areas.
ESA	An Environmental Sensitive Area (ESA) designates an area "in which plants or animals life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments". (Reference: California Public Resources Code § 30107.5).
ET	Evapotranspiration (ET) is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is also an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity
FAR	The Floor Area Ratio (FAR) is the total square feet of a building divided by the total square feet of the lot the building is located on.
Flow-Based BMP	Flow-based BMPs are conventional treatment control BMPs that are sized to treat the design flow rate.
FPPP	Facility Pollution Prevention Plan
HCOC	Hydrologic Condition of Concern - Exists when the alteration of a site's hydrologic regime caused by development would cause significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects.
HMP	Hydromodification Management Plan – Plan defining Performance Standards for PDPs to manage increases in runoff discharge rates and durations.
Hydrologic Control BMP	BMP to mitigate the increases in runoff discharge rates and durations and meet the Performance Standards set forth in the HMP.
HSG	Hydrologic Soil Groups – soil classification to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSGs are A (very low runoff potential/high infiltration rate), B, C, and D (high runoff potential/very low infiltration rate)

Hydromodification	The Regional MS4 Permit identifies that increased volume, velocity, frequency and discharge duration of storm water runoff from developed areas has the potential to greatly accelerate downstream erosion, impair stream habitat in natural drainages, and negatively impact beneficial uses.
JRMP	A separate Jurisdictional Runoff Management Plan (JRMP) has been developed by each Copermittee and identifies the local programs and activities that the Copermittee is implementing to meet the Regional MS4 Permit requirements.
LID	Low Impact Development (LID) is a site design strategy with a goal of maintaining or replicating the pre-development hydrologic regime through the use of design techniques. LID site design BMPs help preserve and restore the natural hydrologic cycle of the site, allowing for filtration and infiltration which can greatly reduce the volume, peak flow rate, velocity, and pollutant loads of storm water runoff.
LID BMP	A type of storm water BMP that is based upon Low Impact Development concepts. LID BMPs not only provide highly effective treatment of storm water runoff, but also yield potentially significant reductions in runoff volume – helping to mimic the pre-project hydrologic regime, and also require less ongoing maintenance than Treatment Control BMPs. The applicant may refer to Chapter 2.
LID BMP Design Handbook	The LID BMP Design Handbook was developed by the Copermittees to provide guidance for the planning, design and maintenance of LID BMPs which may be used to mitigate the water quality impacts of PDPs within the County.
LID Bioretention BMP	LID Bioretention BMPs are bioretention areas are vegetated (i.e., landscaped) shallow depressions that provide storage, infiltration, and evapotranspiration, and provide for pollutant removal (e.g., filtration, adsorption, nutrient uptake) by filtering storm water through the vegetation and soils. In bioretention areas, pore spaces and organic material in the soils help to retain water in the form of soil moisture and to promote the adsorption of pollutants (e.g., dissolved metals and petroleum hydrocarbons) into the soil matrix. Plants use soil moisture and promote the drying of the soil through transpiration. The Regional MS4 Permit defines "retain" as to keep or hold in a particular place, condition, or position without discharge to surface waters.
LID Biofiltration BMP	BMPs that reduce stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration, and other biological and chemical processes. As storm water passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and plants, and collected through an underdrain.

LID Harvest and Reuse BMP	BMPs used to facilitate capturing storm water runoff for later use without negatively impacting downstream water rights or other Beneficial Uses.
LID Infiltration BMP	BMPs to reduce storm water runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Typical LID Infiltration BMPs include infiltration basins, infiltration trenches and pervious pavements.
LID Retention BMP	BMPs to ensure full onsite retention without runoff of the DCV such as infiltration basins, bioretention, chambers, trenches, permeable pavement and pavers, harvest and reuse.
LID Principles	Site design concepts that prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
MEP	Maximum Extent Practicable - standard established by the 1987 amendments to the Clean Water Act (CWA) for the reduction of Pollutant discharges from MS4s. Refer to Attachment C of the Regional MS4 Permit for a complete definition of MEP.
MF	Multi-family – zoning classification for parcels having 2 or more living residential units.
MS4	Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26.
New Development Project	Defined by the Regional MS4 Permit as 'Priority Development Projects' if the project, or a component of the project meets the categories and thresholds described in Section 1.1.1.
NPDES	National Pollution Discharge Elimination System - Federal program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.
NRCS	Natural Resources Conservation Service

PDP	Priority Development Project - Includes New Development and Redevelopment project categories listed in Provision E.3.b of the Regional MS4 Permit.
Priority Pollutants of Concern	Pollutants expected to be present on the project site and for which a downstream water body is also listed as Impaired under the CWA Section 303(d) list or by a TMDL.
Project-Specific WQMP	A plan specifying and documenting permanent LID Principles and storm water BMPs to control post-construction Pollutants and storm water runoff for the life of the PDP, and the plans for operation and maintenance of those BMPs for the life of the project.
Receiving Waters	Waters of the United States.
Redevelopment Project	The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair. Project that meets the criteria described in Section 1.
Runoff Fund	Runoff Funds have not been established by the Copermittees and are not available to the Applicant. If established, a Runoff Fund will develop regional mitigation projects where PDPs will be able to buy mitigation credits if it is determined that implementing onsite controls is infeasible.
San Diego Regional Board	San Diego Regional Water Quality Control Board - The term "Regional Board", as defined in Water Code section 13050(b), is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200. State agency responsible for managing and regulating water quality in the SMR.
SCCWRP	Southern California Coastal Water Research Project
Site Design BMP	Site design BMPs prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
SF	Parcels with a zoning classification for a single residential unit.
SMC	Southern California Stormwater Monitoring Coalition
SMR	The Santa Margarita Region (SMR) represents the portion of the Santa Margarita Watershed that is included within the County of Riverside.

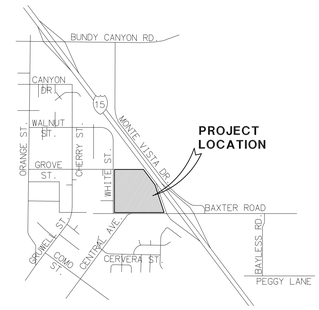
Source Control BMP	Source Control BMPs land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between Pollutants and runoff.
Structural BMP	Structures designed to remove pollutants from stormwater runoff and mitigate hydromodification impacts.
SWPPP	Storm Water Pollution Prevention Plan
Tentative Tract Map	Tentative Tract Maps are required for all subdivision creating five (5) or more parcels, five (5) or more condominiums as defined in Section 783 of the California Civil Code, a community apartment project containing five (5) or more parcels, or for the conversion of a dwelling to a stock cooperative containing five (5) or more dwelling units.
TMDL	Total Maximum Daily Load - the maximum amount of a Pollutant that can be discharged into a waterbody from all sources (point and non-point) and still maintain Water Quality Standards. Under CWA Section 303(d), TMDLs must be developed for all waterbodies that do not meet Water Quality Standards after application of technology-based controls.
USEPA	United States Environmental Protection Agency
Volume-Based BMP	Volume-Based BMPs applies to BMPs where the primary mode of pollutant removal depends upon the volumetric capacity such as detention, retention, and infiltration systems.
WQMP	Water Quality Management Plan
Wet Season	The Regional MS4 Permit defines the wet season from October 1 through April 30.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

Complete the checklist below to verify all exhibits and components are included in the Project-Specific WQMP. Refer Section 4 of the SMR WQMP and Section D of this Template.

Map and Site Plan Checklist
Indicate all Maps and Site Plans are included in your Project-Specific WQMP by checking the boxes below.
☐ Vicinity and Location Map
☐ Existing Site Map (unless exiting conditions are included in WQMP Site Plan)
☐ WQMP Site Plan
☐ Parcel Boundary and Project Footprint
☐ Existing and Proposed Topography
☐ Drainage Management Areas (DMAs)
☐ Proposed Structural Best Management Practices (BMPs)
☐ Drainage Paths
☐ Drainage infrastructure, inlets, overflows
☐ Source Control BMPs
☐ Site Design BMPs
☐ Buildings, Roof Lines, Downspouts
☐ Impervious Surfaces
☐ Pervious Surfaces (i.e. Landscaping)
☐ Standard Labeling



VICINITY MAP

NOT TO SCALE

DMA	LAND USE
1	SINGLE FAMILY HOMES
2	MULTIFAMILY HOMES
3A	HOTEL
3B	HOTEL
4	MEDICAL OFFICE BLD

DMA 1
14.5

DMA 2
11.7

DMA 3A
0.48

DMA 3B
2.23

DMA 4
7.71

DMA A
4.13

BASIN 1

BASIN 2

BASIN 3A

BASIN 3B

BASIN 4

BASIN A

BASIN B

HOTEL
REVIEW IN DETAILS

BAXTER ROAD

LEGEND

- DMA AREA NUMBER / AREA IN ACRES (DMA 3 / 0.60)
- BIO-RETENTION BASIN
- LANDSCAPE AREA
- OFF-SITE AREA TO BE MAINTAINED BY CITY*
- CONCRETE/ASPHALT
- ROOF AREA - ROOF DRAINS TO BE SHOWN IN FINAL WQMP
- TRASH/RECYCLE AREA
- DMA BOUNDARY
- PROPOSED STORM DRAIN

NOTES:

1. TRASH BINS IN SINGLE FAMILY HOMES SHALL BE KEPT IN INDIVIDUAL GARAGES. ONLY TO BE PUT OUT ON TRASH COLLECTION DAY.
2. STREET SWEEPING TO OCCUR DAY AFTER TRASH COLLECTION DAY.
3. IRRIGATION RUNOFF IS PROHIBITED.

* OFF-SITE IMPROVEMENTS TO BE COMPLETED WITH BAXTER TOWN CENTER OR BAXTER VILLAGE, WHICHEVER COMES FIRST. SEE SEPARATE EXHIBIT.

NOTE:
ALL CATCH BASINS AND INLETS THAT DISCHARGE INTO AN EXISTING OR PROPOSED STORM DRAIN MUST BE STENCILED TO DISCOURAGE ILLEGAL DUMPING OF POLLUTANTS. STENCIL SHALL READ "ONLY RAIN IN THE DRAIN" OR SOMETHING EQUIVALENT. OWNERS TO MAINTAIN AND REPLACE AS NEEDED.

60 30 0 60 120 180

SCALE: 1"=60'

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR., SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

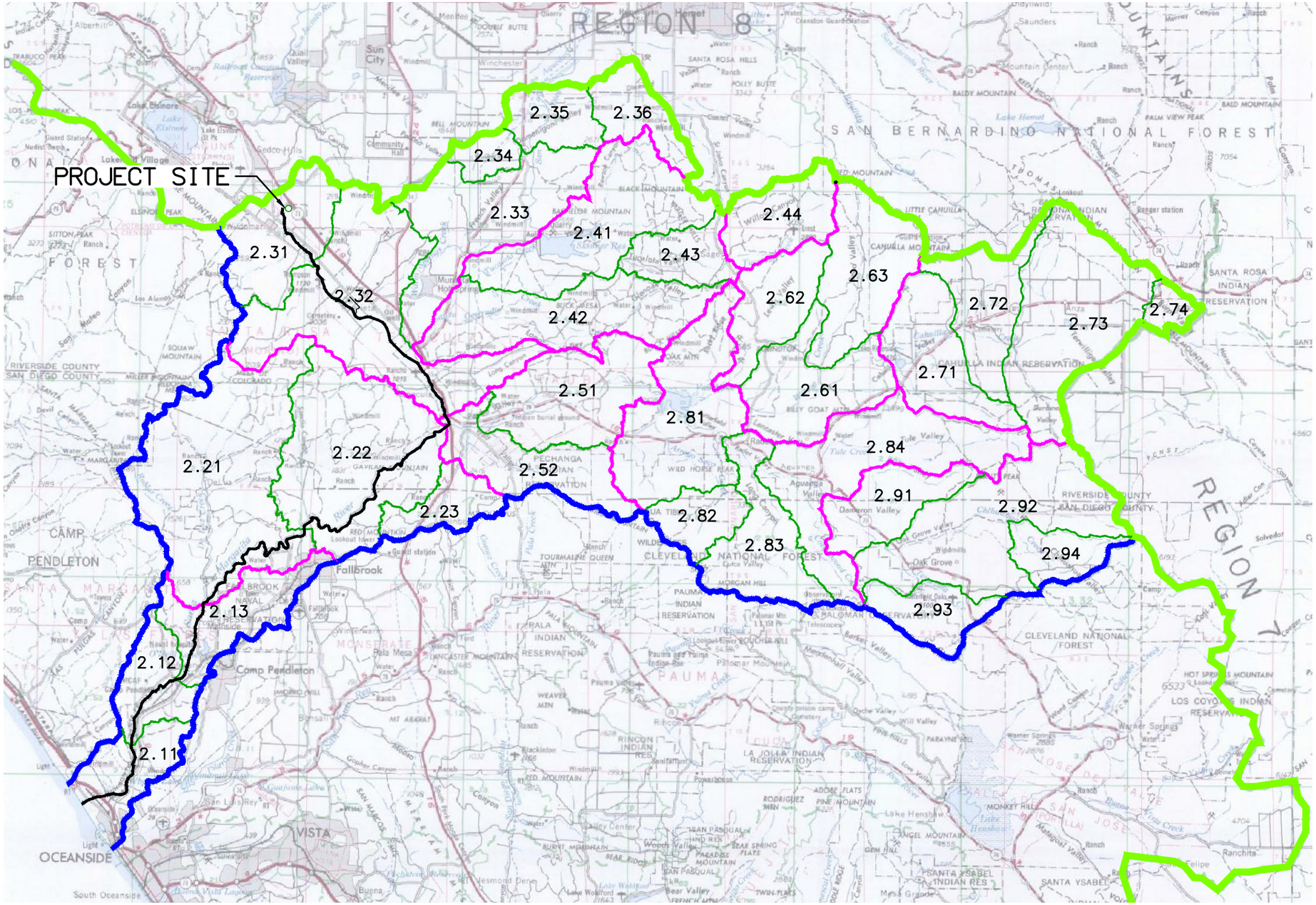
BAXTER VILLAGE

CITY OF WILDOMAR, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

WQMP
DMA EXHIBIT

PROPOSED CONDITIONS

H:\PDATA\133555\ADMIN\REPORTS\WQMP\DWG\133555 - WQMP - DMA EXHIBIT PROP.DWG JESSICA.JONES 12/19/19 5:09 pm



LEGEND

- REGIONAL BOUNDARY
- HYDROLOGIC UNIT BOUNDARY (HU)
- HYDROLOGIC AREA BOUNDARY (HA)
- HYDROLOGIC SUBAREA BOUNDARY (SA)
- FLOW PATH

902 SANTA MARGARITA HYDROLOGIC UNIT

902.1 Ysidora HA
2.11 Lower Ysidora HSA
2.12 Chappo HSA
2.13 Upper Ysidora HSA

902.2 DeLuz HA
2.21 DeLuz Creek HSA
2.22 Gavilan HSA
2.23 Vallecitos HSA

902.3 Murrieta HA
2.31 Wildomar HSA
2.32 Murrieta HSA
2.33 French HSA
2.34 Lower Domenigoni HSA
2.35 Domenigoni HSA
2.36 Diamond HSA

902.4 Auld HA
2.41 Bachelor Mountain HSA
2.42 Gertrudis HSA
2.43 Lower Tucalota HSA
2.44 Tucalota HSA

902.5 Pechanga HA
2.51 Pauba HSA
2.52 Wolf HSA

902.6 Wilson HA
2.61 Lancaster Valley HSA
2.62 Lewis HSA
2.63 Reed Valley HSA

902.7 Cave Rocks HA
2.71 Lower Coahuilla HSA
2.72 Upper Coahuilla HSA
2.73 Anza HSA
2.74 Burnt HSA

902.8 Aguanga HA
2.81 Vail HSA
2.82 Devils Hole HSA
2.83 Redec HSA
2.84 Tule Creek HSA

902.9 Oakgrove HA
2.91 Lower Culp HSA
2.92 Previtt Canyon HSA
2.93 Dodge HSA
2.94 Chihuahua HSA

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DR.,
SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042
MBAKERINTL.COM

RECEIVING WATERS MAP

BAXTER VILLAGE

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

PROJECT SITE

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | HEMET | CANYON LAKE | LAKE ELSINORE | WILDOMAR | MENIFEE | MURRIETA | TEMECULA

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Appendix 2: Construction Plans

Grading and Drainage Plans

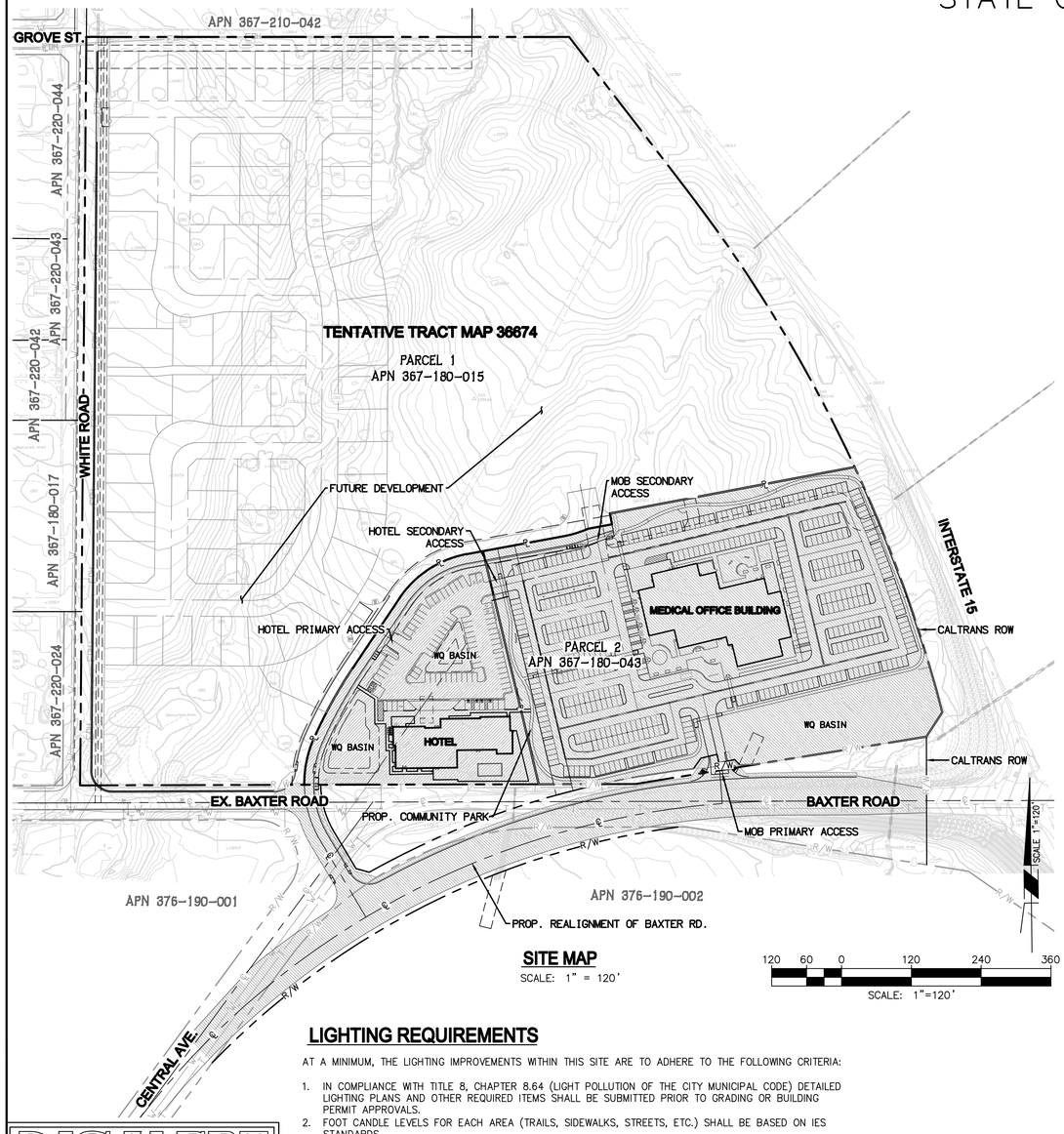
Examples of material to provide in Appendix 2 may include but are not limited to the following:

- Site grading plans from the Project's Civil Plan Set,
- Drainage plans showing the exiting condition and proposed drainage system from the project's drainage report,
- Other plan sheets containing elements that impact site grading and drainage.

Refer to Section 4 of the SMR WQMP and Section I of this Template.

BAXTER VILLAGE
SITE PLAN OF DEVELOPMENT

FOR THE HOTEL AND MEDICAL OFFICE BUILDING SITES
OF TENTATIVE TRACT MAP # 36674
CITY OF WILDOMAR, COUNTY OF RIVERSIDE
STATE OF CALIFORNIA



SITE MAP
SCALE: 1" = 120'

120 60 0 120 240 360
SCALE: 1"=120'

GENERAL DESCRIPTION

1. EXISTING LAND USE: VACANT
2. GENERAL PLAN: MUPA – MIXED USE PLANNING AREA
3. PROPOSED GENERAL PLAN – COMMERCIAL RETAIL (CR)
4. EXISTING ZONING: SCENIC HIGHWAY COMMERCIAL
5. PROPOSED ZONING: SCENIC HIGHWAY COMMERCIAL
6. PROPOSED LAND USE: COMMERCIAL RETAIL
7. PROPOSED WATER AND SEWER SERVICE WILL BE PROVIDED BY: ELSINORE VALLEY MUNICIPAL WATER DISTRICT
8. ALL UTILITIES WILL BE UNDERGROUND
   GAS ---------- SOUTHERN CALIFORNIA GAS COMPANY
   ELECTRIC ---------- SOUTHERN CALIFORNIA EDISON
   TELEPHONE ---------- VERIZON
9. SCHOOL DISTRICT: LAKE ELSINORE UNIFIED SCHOOL DISTRICT
10. PROPOSED NUMBER OF LOTS: 8 COMMERCIAL, 1 OPEN SPACE & 2 BASINS
11. THIS TENTATIVE MAP IS EXCLUSIVELY UNDER THE OWNERSHIP OF THE SUBDIVIDER AND INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE SUBDIVIDER.
12. THOMAS BROTHER'S GUIDE – PAGE 897, COORDINATES C & D, AND 5 & 6
13. SITE INFORMATION:

GROSS AREA HOTEL	2.4 AC
MOB	7.19 AC
TOTAL GROSS AREA	9.58 AC
TOTAL FLA	XX,000 SF
PARKING REQ'D	XX SPACES (XX/1000 SF)
PARKING PROVIDED	XX SPACES

NOTE: WITH THE EXCEPTION OF EMERGENCY VEHICLE ACCESS POINTS, THERE ARE NO GATES PROPOSED FOR THIS COMMUNITY.

LEGAL DESCRIPTION FOR APN # 367-180-015

PARCEL 1

THE WEST ONE-HALF OF THE SOUTHWEST ONE-QUARTER OF THE SOUTHEAST ONE-QUARTER OF SECTION 26, TOWNSHIP 6 SOUTH, RANGE 4 WEST, SAN BERNARDINO BASE AND MERIDIAN, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ACCORDING TO THE UNITED STATES GOVERNMENT SURVEY THEREOF.

LEGAL DESCRIPTION FOR APN # 367-180-043

PARCEL 2

PARCEL 2 OF LOT LINE ADJUSTMENT NO. 2017-005, IN THE CITY OF WILDOMAR, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, RECORDED OCTOBER 31, 2017 AS INSTRUMENT NO. 2017-0453307 OF OFFICIAL RECORDS IN THE OFFICE OF THE COUNTY RECORDER OF SAID RIVERSIDE COUNTY.

PROPOSED EASEMENT NOTES

1 INDICATES AN EASEMENT FOR ACCESS AND PUBLIC UTILITIES TO BE RESERVED ON THE FINAL MAP.

2 INDICATES AN EASEMENT FOR STORM DRAIN PURPOSES TO BE RESERVED ON FINAL MAP.

BENCHMARK

RIV. CO. BM. # E-6-70
ELEVATION=1304.204
DATUM=NGVD29

BASIS OF BEARING

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM, ZONE VI, NAD83 (EPOCH 2007.0) AS DETERMINED LOCALLY BY A LINE BETWEEN CONTINUOUS OPERATING REFERENCE STATIONS (CORS) BILL AND DVLS BEING N05-05-38.82E AS DERIVED FROM GEODETIC VALUES PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER (CSRC) AND/OR NATIONAL GEODETIC SURVEY (NGS), RESPECTIVELY.

SOURCE OF TOPOGRAPHY

ASSOCIATED DATA COMPILED FROM AERIAL PHOTOGRAPHY
DATED 01-22-13 BY:

INLAND AERIAL SURVEYS, INC.
7117 ARLINGTON AVENUE, SUITE A
RIVERSIDE, CA 92503
Ph (951) 687-4252 Fx (951) 687-4120
ias@inlandaerial.com

LIGHTING REQUIREMENTS

AT A MINIMUM, THE LIGHTING IMPROVEMENTS WITHIN THIS SITE ARE TO ADHERE TO THE FOLLOWING CRITERIA:

1. IN COMPLIANCE WITH TITLE 8, CHAPTER 8.64 (LIGHT POLLUTION OF THE CITY MUNICIPAL CODE) DETAILED LIGHTING PLANS AND OTHER REQUIRED ITEMS SHALL BE SUBMITTED PRIOR TO GRADING OR BUILDING PERMIT APPROVALS.
2. FOOT CANDLE LEVELS FOR EACH AREA (TRAILS, SIDEWALKS, STREETS, ETC.) SHALL BE BASED ON IES STANDARDS.
3. LIGHTING CONTROL PER CA. TITLE 24 REQUIREMENTS.

OWNER / APPLICANT

STRATA BAXTER, LLC
4370 LA JOLLA VILLAGE DRIVE #960
SAN DIEGO, CA 92122
(858)546-0900 (p)
(858)546-8725 (f)

HOTEL SITE:

ARCHITECT

AO ARCHITECTS
144 N. ORANGE ST.,
ORANGE, CA 92866
(714)639-9860 (p)

ENGINEER

MICHAEL BAKER INTERNATIONAL
40810 COUNTY CENTER DRIVE, SUITE 200
TEMECULA, CALIFORNIA 92591-6022
PHONE:951.676.8042 FAX: 951.676.7240

MOB SITE:

ARCHITECT

CANNON DESIGN
2355 MAIN ST., SUITE 220
IRVINE, CALIFORNIA 92614
(949)265-8970

ENGINEER

VCA ENGINEERS, INC.
2151 MICHELSON DRIVE, SUITE 242
IRVINE, CALIFORNIA 92612
PHONE:949.679.0870 FAX: 949.679.9370

UTILITIES

SEWER:	ELSINORE VALLEY MUNICIPAL WATER DISTRICT
WATER:	ELSINORE VALLEY MUNICIPAL WATER DISTRICT
GAS:	SOUTHERN CALIFORNIA GAS COMPANY
ELECTRIC:	SOUTHERN CALIFORNIA EDISON COMPANY
TELEPHONE:	GENERAL TELEPHONE
CABLE TELEVISION:	SOUTHLAND CABLEVISION

JOB ADDRESS

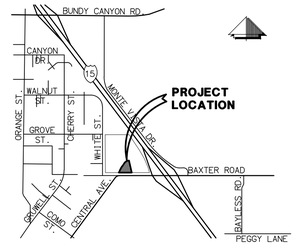
THE SITE IS BORDERED BY BAXTER ROAD TO THE SOUTH, WHITE ROAD TO THE WEST AND THE 15 FWY. TO THE EAST/ NORTHEAST AND APN 367-210-042 TO THE NORTH.

ASSESORS PARCEL NUMBERS

367-180-015, 043

ABBREVIATIONS

AC	ASPHALT CONCRETE
CL	CENTERLINE
RL	RIDGELINE
TS	TOP OF SLOPE
TC	TOP OF CURB
FL	FLOW LINE
HP	HIGH POINT
LP	LOW POINT
EG	EXISTING GRADE
FG	FINISHED GRADE
FS	FINISHED SURFACE
GB	GRADE BREAK
FH	FIRE HYDRANT
STLT	STREET LIGHT
C&G	CURB & GUTTER
R/W	RIGHT OF WAY
S/W	SIDEWALK
SD	STORM DRAIN
EX	EXISTING
PROP	PROPOSED
PL	PROPERTY LINE
FF	FINISH FLOOR
WTR	WATER
SWR	SEWER



VICINITY MAP
NOT TO SCALE
TOWNSHIP 6 S, RANGE 4 W, SECTION 26
THOMAS GUIDE RIV CO 2008
897 C5, C6, D5, D6

LEGEND

FINISHED CONTOUR 1190
EXISTING CONTOUR (1190)
TOP
TOE
DAYLIGHT
LOT NUMBERS 25
PAD ELEVATION PE = 18.5
PROPOSED FINISHED GRADE 17.0
PROPOSED RATE OF GRADE 1.0%
BOUNDARY LINE
RIGHT OF WAY
CENTERLINE
PROPOSED LOT LINE
PROPOSED EASEMENT
RESTRICTED ACCESS
PROPOSED STORM DRAIN SD
PROP CATCH BASIN
PROPOSED SEWER LINE S
PROPOSED WATER LINE W
SIDEWALK
FIRE HYDRANT
FIRE TURN TEMPLATE R=37'
DIRECTION OF FLOW
BROW DITCH
ENTRY MONUMENT (PER LANDSCAPE PLANS)
BIKE RACKS
SECURE BIKE RACKS
ELECTRIC VEHICLE PARKING E

INDEX OF SHEETS:

UNADJUSTED TOTAL EARTHWORK QUANTITIES

DIGALERT
DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

The private engineer signing these plans is responsible for assuring the accuracy and acceptability of the design hereon. In the event of discrepancies arising after city acceptance or during construction, the private engineer shall be responsible for determining an acceptable solution and revising the plans for acceptance by the city.

MARK	BY	DATE	REVISIONS	APPR.	DATE
	ENGINEER			CITY	

CITY OF WILDOMAR
ACCEPTED BY:
Date:
Daniel A. York, Director of Public Works/ City Engineer, PE 43212
ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

SEAL-ENGINEER:
REGISTERED PROFESSIONAL ENGINEER JOHN D. TANNER III No. 60132 CIVIL STATE OF CALIFORNIA

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DRIVE, SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042 · MBAKERINTL.COM
PREPARED BY: JOHN D. TANNER III
R.C.E. No. 60132 DATE

BENCHMARK:
Elevation = 1304.204
Datum = NGVD29
BENCHMARK # E-6-70

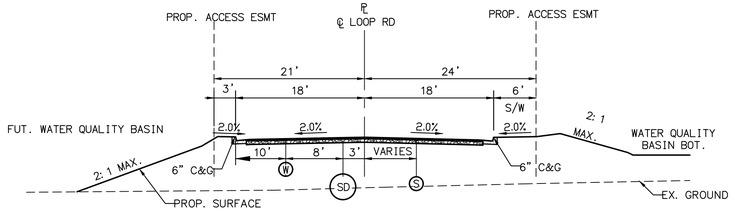
THIS SURVEY WAS PERFORMED ON 01/23/13 BY INLAND AERIAL SURVEYS, INC.
L.S. (number), EXP. (date)

SCALE:
H: As Noted V: As Noted

PA NO. 14-0002
CITY OF WILDOMAR
BAXTER VILLAGE - HOTEL & MOB
SITE PLAN OF DEVELOPMENT
TITLE SHEET, NOTES, INDEX MAP

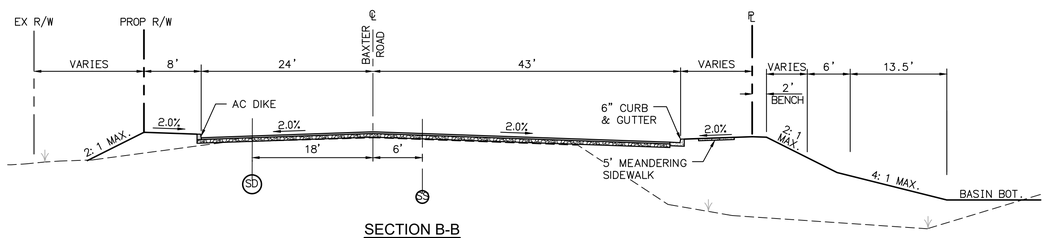
SHEET No. 1
OF X SHTS

H:\PDATA\133555\CADD\LAND\PLV\GRADING\CONCEPTUAL\HOTEL\133555-CG-HOTEL-001.DWG OLGA.SHEVCHENKO 3/6/20 3:02 PM



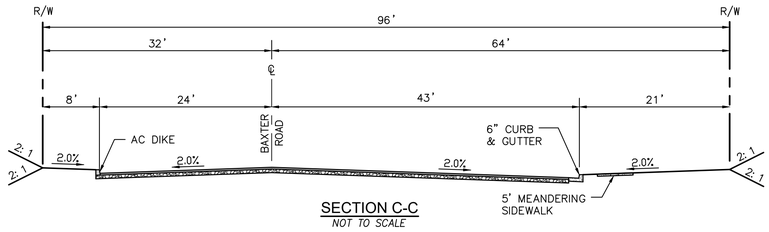
SECTION A-A

TYPICAL UTILITY LOCATION
NOT TO SCALE



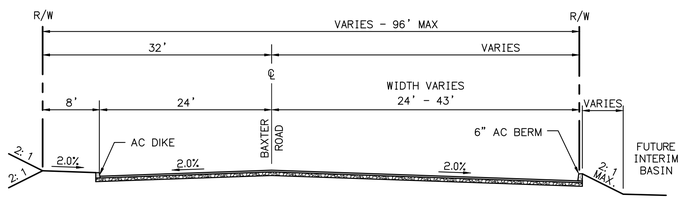
SECTION B-B

TYPICAL UTILITY LOCATION
NOT TO SCALE



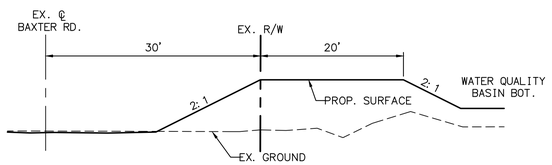
SECTION C-C

NOT TO SCALE



SECTION D-D

NOT TO SCALE



SECTION E-E

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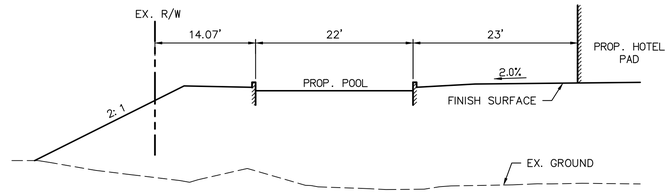
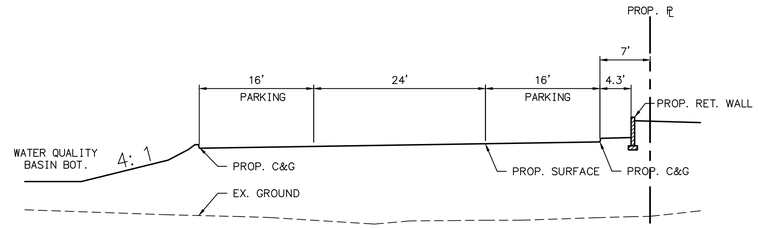


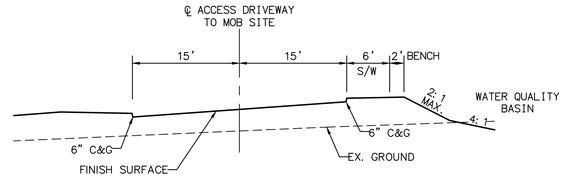
SECTION F-F

NOT TO SCALE



SECTION G-G

NOT TO SCALE



SECTION H-H

NOT TO SCALE

DIGALERT
DIAL BEFORE YOU DIG
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MARK	BY	DATE	REVISIONS	APPR.	DATE

ENGINEER — CITY

CITY OF WILDOMAR
ACCEPTED BY:
Date:
Daniel A. York, Director of Public Works/ City Engineer, PE 43212
ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

SEAL-ENGINEER:
REGISTERED PROFESSIONAL ENGINEER — JOHN D. TANNER III — No. 60132 — CIVIL — STATE OF CALIFORNIA

Michael Baker INTERNATIONAL
40810 COUNTY CENTER DRIVE, SUITE 200
TEMECULA, CA 92591
PHONE: (951) 676-8042 · MBAKERINTL.COM
PREPARED BY: JOHN D. TANNER III
R.C.E. No. 60132 DATE

BENCHMARK:
Elevation = 1304.204
Datum = NGVD29
BENCHMARK # E-6-70

THIS SURVEY WAS PERFORMED ON 01/22/13 BY INLAND AERIAL SURVEYS, INC.
L.S. (number), EXP. (date)

SCALE:
H: As Noted V: As Noted

PA NO. 14-0002

CITY OF WILDOMAR

BAXTER VILLAGE - HOTEL & MOB

SITE PLAN OF DEVELOPMENT

TYPICAL DETAILS, SECTIONS

SHEET No. 2
OF X SHTS

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TENTATIVE TRACT MAP 36674

PARCEL 1
APN 367-180-015

PARCEL 2
APN 367-180-043

HOTEL SITE

MEDICAL OFFICE BUILDING SITE

APN 376-190-001

APN 376-190-002

WHITE ROAD

INTERSTATE 15

CENTRAL STREET

EX. BAXTER ROAD

30' RCFC&WCD EASEMENT

STORM DRAIN EASEMENT TO THE CITY OF WILDOMAR

25' ACCESS & UTILITY EASEMENT

20' RCFC&WCD EASEMENT

20' EX. SD EASEMENT

20' FUT. SD EASEMENT

PROP. PL

PROP. R/W

PROP. ℄

EXIST. CALTRANS STORM DRAIN

EXIST. CALTRANS R/W

EXIST. R/W & TRACT BOUNDARY

EXIST. PP

EXIST. VERIZON UNDERGROUND CABLE

EXIST. VERIZON CONDUIT

EXIST. CULVERT

EXIST. 8"W

EXIST. 12"PVC WATER

EXIST. 16"CMLC WATER

EXIST. STREET LIGHT

EX. R/W

EX. ℄

SCALE 1"=50'

50 25 0 50 100 150

SCALE: 1"=50'

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PREPARED BY: JOHN D. TANNER III

R.C.E. No. 60132 DATE

BENCHMARK:
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BENCHMARK # E-6-70

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PA NO. 14-0002

CITY OF WILDOMAR

BAXTER VILLAGE - HOTEL & MOB

SITE PLAN OF DEVELOPMENT

TOPOGRAPHY MAP AND EXISTING UTILITIES

SHEET No. 3

OF X SHTS

TENTATIVE TRACT MAP 36674

PARCEL 1
APN 367-180-015

FUTURE DEVELOPMENT

FUT. WATER QUALITY BASIN

45' ACCESS & UTILITY EASMT.

6'
18'
18'
5'
36'
8'

PROP. AC DIKE

PROP. S/W

PROP. C&G

FUTURE DEVELOPMENT

LOOP ROAD

PROP. PL

WATER QUALITY BASIN

PROP. S/W

TE

111.7'
93.7'

PROP. SW
PROP. C&G

WATER QUALITY BASIN

EXIST. R/W & TRACT BOUNDARY

HOTEL

20.6'
22.2'
31.1'
52.4'
27.5'

PROPOSED COMMUNITY PARK
7,500 SF

PARCEL 2
APN 367-180-043

PROP. PL

243.6'

MEDICAL OFFICE BUILDING

112.1'

PROP. S/W

200.8'

INTERSTATE 15

EXIST. CALTRANS R/W

PROP. S/W

177.2'

WATER QUALITY BASIN

PROP. R/W

PROP. R/W

EX. R/W

PROP. C&G

PROP. S/W

PROP. AC DIKE

EXIST. CALTRANS R/W

EX. R/W AND TRACT BOUNDARY

EX. BAXTER RD.

EX. BAXTER RD

PROP. S/W

EX. ℄ BAXTER ROAD

EX. ℄ CENTRAL AVE.

PROP. R/W

PROP. R/W

PROP. C&G

EX. R/W

PROP. S/W

PROP. BAXTER ROAD

PROP. AC DIKE

EX. R/W

PROP. C&G

EX. R/W

PROP. AC DIKE

PROP. PAVEMENT

PROP. R/W

APN 376-190-001

APN 376-190-002

CENTRAL AVE.

EX. ℄ CENTRAL AVE.

SCALE 1"=40'

40 20 0 40 80 120

SCALE: 1"=40'

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CIVIL
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TEMECULA, CA 92591
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R.C.E. No. 60132 DATE

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CITY OF WILDOMAR

BAXTER VILLAGE - HOTEL & MOB

SITE PLAN OF DEVELOPMENT

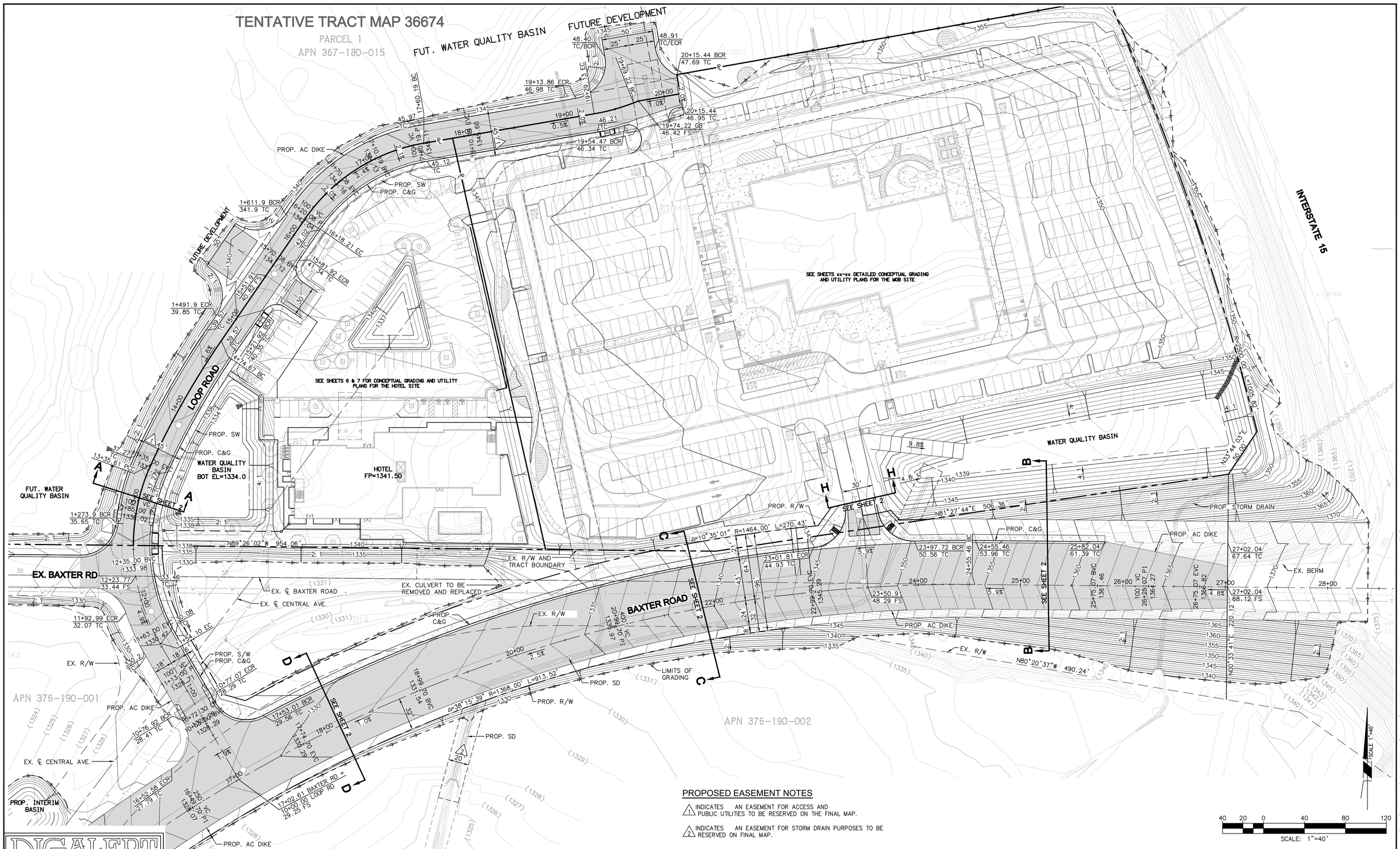
HOTEL AND MOB SITE PLAN

SHEET No. 4

OF X SHTS

TENTATIVE TRACT MAP 36674

PARCEL 1
APN 367-180-015



PROPOSED EASEMENT NOTES

1 INDICATES AN EASEMENT FOR ACCESS AND PUBLIC UTILITIES TO BE RESERVED ON THE FINAL MAP.

2 INDICATES AN EASEMENT FOR STORM DRAIN PURPOSES TO BE RESERVED ON FINAL MAP.

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TEMECULA, CA 92591
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PREPARED BY: JOHN D. TANNER III
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BENCHMARK # E-6-70

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CITY OF WILDOMAR

BAXTER VILLAGE - HOTEL & MOB

SITE PLAN OF DEVELOPMENT

CONCEPTUAL GRADING PLAN BAXTER RD. & LOOP RD.

SHEET No. 5 OF X SHTS

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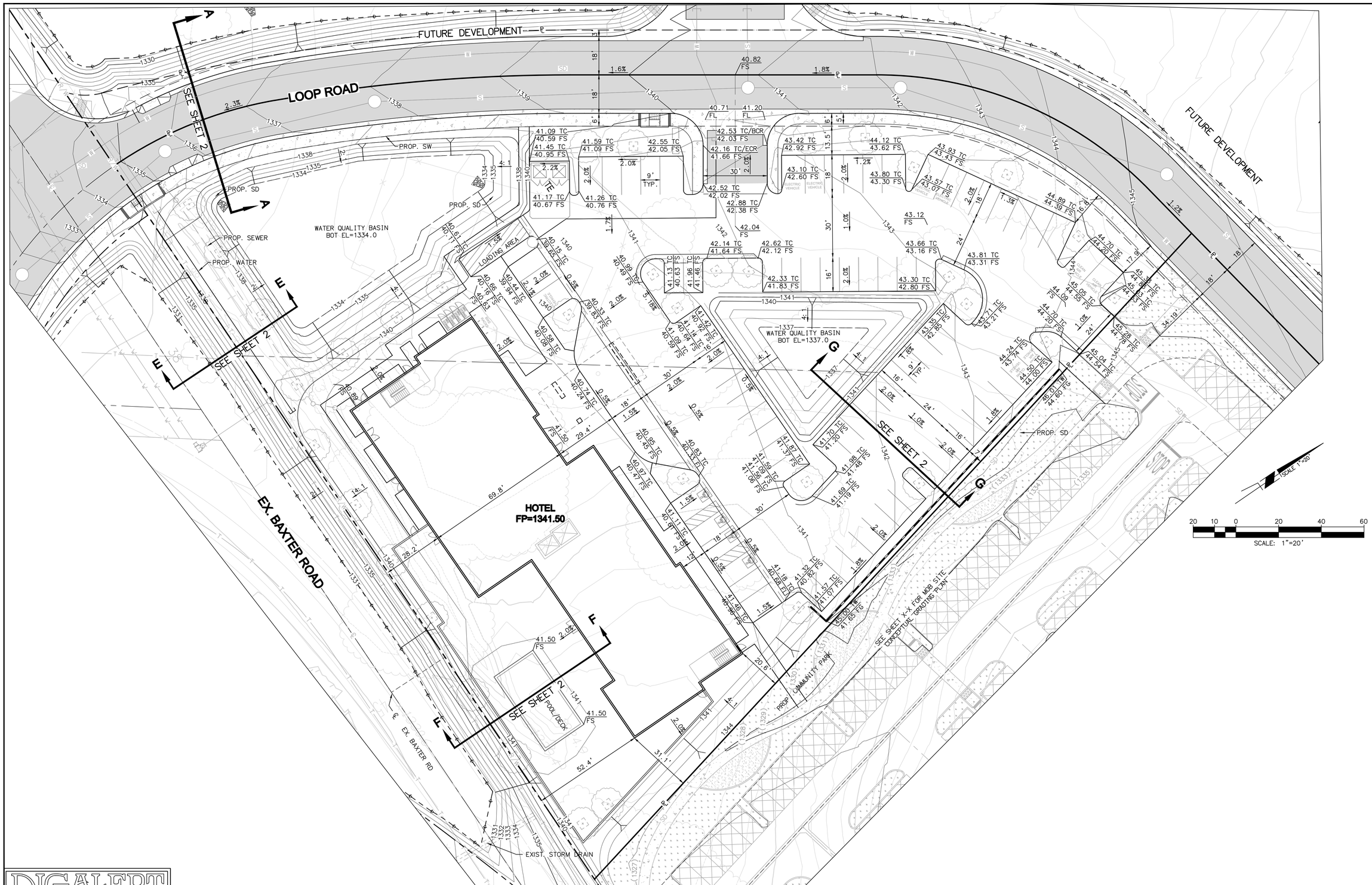

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CITY OF WILDOMAR

BAXTER VILLAGE - HOTEL & MOB

SITE PLAN OF DEVELOPMENT

CONCEPTUAL GRADING PLAN FOR HOTEL SITE

SHEET No. 6

OF X SHTS

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TENTATIVE TRACT MAP 36674

PARCEL 1
APN 367-180-015

FUTURE DEVELOPMENT
FUT. WATER QUALITY BASIN
FUTURE DEVELOPMENT
FUTURE DEVELOPMENT
PROP. 24" INTERIM SD WITH RISER
PROP. 36" INTERIM SD WITH RISER
48.91 TC/ECR
RCFC&WCD EASEMENT
STORM DRAIN EASEMENT TO THE CITY OF WILDOMAR
19+74.22 GB
46.42 FS
20+00
19+00
18+00
17+00
16+00
15+00
14+00
13+51.91
40.82
ACCESS & UTILITY EASEMENT
PROP. SW
PROP. C&G
PROP. SD
IE=1330.0
FUT. WATER QUALITY BASIN
PROP. SD
IE=1334.0
WATER QUALITY BASIN
BOT EL=1334.0
HOTEL
FP=1341.50
SEE SHEETS 6 & 7 FOR CONCEPTUAL GRADING AND UTILITY PLANS FOR THE HOTEL SITE
SEE SHEETS xx-xx DETAILED CONCEPTUAL GRADING AND UTILITY PLANS FOR THE MOB SITE
PROP. 48"SD
RCFC&WCD EASEMENT
LOOP ROAD
EX. R/W AND TRACT BOUNDARY
EXIST. VERIZON UNDERGROUND CABLE
N89°26'02"W 954.06'
EX. ℄ BAXTER ROAD
PROP. 8" W
EX. BAXTER RD
12+23.77
33.44 FS
8" WATER CONNECTION POINT
EX. CULVERT TO BE REMOVED AND REPLACED
EX. VERIZON CONDUIT
BAXTER ROAD
PROP. C&G
EX. ℄ CENTRAL AVE.
EX. R/W
PROP. S/W
PROP. C&G
EX. 8"W
EX. 12"PVC WATER
APN 376-190-001
PROP. AC DIKE
EX. 16"CMLC WATER
17+02.61 BAXTER RD = 10+00.00 LOOP RD
29.25 FS
EX. ℄ CENTRAL AVE.
EX. VERIZON CONDUIT
INTERIM SW
PROP. 8" S
PROPOSED SEWER TO CONTINUE SOUTHERLY ON CENTRAL STREET (4,300 LF +/-) TO CONNECTION POINT AT THE FRONT STREET INTERSECTION. EXISTING SEWER INVERT ELEVATION AT CONNECTION POINT = 1228.6 PER TRACT 30114 WILDOMAR CHANNEL OFFSITE SEWER IMPROVEMENT PLANS (IP 030054)
PROP. SD
PROP. R/W
PROP. AC DIKE
PROP. 8" S
PROP. SD
PROP. R/W
EX. R/W
APN 376-190-002
8" SS
IE = 39.7±
SSMH
RIM = 47.3
IE=39.3±
PROP. SD WITH RISER
IE=1336.0
WATER QUALITY BASIN
PROP. R/W
PROP. C&G
N81°27'44"E 506.36'
PROP. STORM DRAIN
EX. BERM
EXIST. CULVERT
N00°33'41"E 220.12'
N33°44'03"E 50.00'
Δ=23°03'06" R=2500.00' L=1005.87'
INTERSTATE 15
EX. STORM DRAIN
Δ=10°35'01" R=1464.00' L=270.43'
N80°20'37"W 490.24'
Δ=4°38'15" R=1368.00' L=913.52'
22+00
23+00
23+50.91
48.30 FS
24+00
25+00
26+00
27+00
28+00

PROPOSED EASEMENT NOTES

1 INDICATES AN EASEMENT FOR ACCESS AND PUBLIC UTILITIES TO BE RESERVED ON THE FINAL MAP.

2 INDICATES AN EASEMENT FOR STORM DRAIN PURPOSES TO BE RESERVED ON FINAL MAP.

SCALE: 1"=##'

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R.C.E. No. 60132 DATE

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Datum = NGVD29
BENCHMARK # E-6-70

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PA NO. 14-0002

CITY OF WILDOMAR

BAXTER VILLAGE - HOTEL & MOB

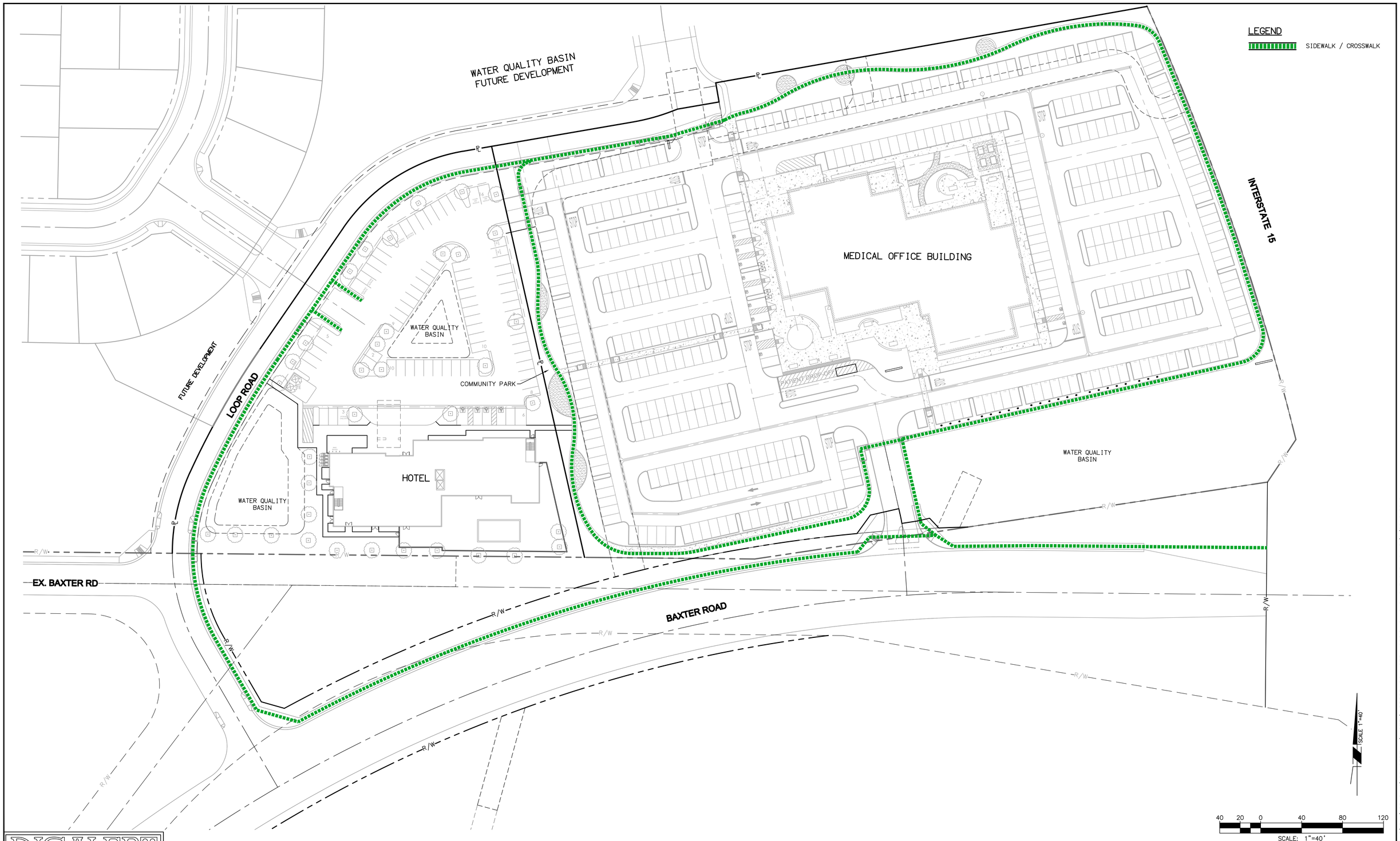
SITE PLAN OF DEVELOPMENT

UTILITY PLAN FOR BAXTER RD. AND HOTEL SITE

SHEET No. 7

OF X SHTS

H:\PDATA\135555\CADD\LAND\DLV\GRADING\CONCEPTUAL\HOTEL\135555-CG-HOTEL-007.DWG OLGA.SHEVCHENKO 3/6/20 2:50 PM



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CITY OF WILDOMAR

BAXTER VILLAGE - HOTEL & MOB

SITE PLAN OF DEVELOPMENT

PEDESTRIAN CIRCULATION EXHIBIT - PHASE 1

SHEET No. 8

OF X SHTS

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Appendix 3: Soils Information

Geotechnical Study, Other Infiltration Testing Data, and/or Other Documentation

Examples of material to provide in Appendix 3 may include but are not limited to the following:

- Geotechnical Study/Report prepared for the project,
- Additional soils testing data (if not included in the Geotechnical Study),
- Exhibits/Maps/Other Documentation of the Hydrologic Soils Groups (HSG)s at the project site.

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections A and D of this Template.

Project No. T2540-22-03
November 26, 2019

Strata Equity Group
4370 La Jolla Village Drive, Suite 960
San Diego, California 92122

Attention: Mr. Eric Flodine

Subject: PERCOLATION TEST RESULTS
BAXTER CENTRAL
TRACT 34301
NWC BAXTER ROAD AND INTERSTATE 15
WILDOMAR, CALIFORNIA

References: 1. Michael Baker International, *Baxter Central Basin Sizing Minimum Requirements*, dated October 10, 2019.

2. Geocon West, Inc., *Preliminary Geotechnical and Fault Rupture Hazard Investigation Tract 34301 NWC Baxter Road and Interstate 15 Wildomar, California.*, revised March 26, 2015.

Dear Mr. Flodine:

In accordance with the authorization of our proposal IE-2491 dated October 28, 2019, Geocon West, Inc. (Geocon) herein submits the results of our percolation testing for proposed infiltration basins A, B, 1, 2, 3, and 4 associated with Tact 34301 in Wildomar, California (*Vicinity Map*, Figure 1). Percolation testing for the proposed infiltration basins was performed in accordance with the Riverside County Flood Control and Water Conservation District *Design Handbook for Low Impact Development Best Management Practices Appendix A-Infiltration Testing (Handbook).*

Field work included excavating 5 deep geotechnical borings and 14 percolation borings utilizing a CME 75 truck-mounted drill rig with an 8-inch diameter hollow stem auger on November 11 and 12, 2019. Percolation testing was performed on November 12 through 14. One deep geotechnical boring was excavated within each of the proposed basins, with the exception of Basin 1, where a previous boring (see Reference 2) was used. Percolation testing was performed 2 feet below the bottom of the proposed basins for Basins A, B, 1, and 3. Groundwater was encountered at an elevation of 1,339 and 1,334 feet above mean seal level for Basins 2 and 4, respectively. After consultation with the design team, percolation testing in Basins 2 and 4 was performed at approximately 10 feet above the encountered groundwater level.

Geologic units encountered during excavation include alluvium (Qal) and Pauba Formation (Qps). The alluvium consists of loose to medium dense, dry to damp, silty sand that varies in color from light yellow brown to brown. The Pauba Formation consists of medium dense to hard, dry to saturated, silty sandstone to sandy siltstone that are light reddish brown to dark brown. Minor amounts of olive claystone were also encountered.

The bottoms of the percolation test holes were covered with 2 inches of gravel. A 3-inch diameter perforated pipe fitted with a filter fabric sock was placed in the hole to mitigate potential caving. Additional gravel was placed around the annular space between the pipe and the boring wall to prevent the pipe from floating when water was added to the holes. The basin test holes were presoaked with 5 gallons of water. Locations of the percolation tests are shown on the *Percolation Test Location Map*, Figure 2, which used the Basin Sizing Minimum Requirements Plan (Reference 1) as a base. Boring logs are included as Figures 3 through 22, with Figure 22 being the previous geotechnical boring from Reference 2. Field data sheets for the percolation tests are included as Figures 23 through 36. Grain size analyses are included as Figures 37 through 50. Test results for the infiltration basins are provided in the table below. All test holes had a radius of 4 inches and were read every 30 mins. A safety factor of 3 is required per the Handbook.

INFILTRATION TEST RESULTS

Percolation Test Number	Proposed Basin	Depth (ft)	Change in head over time: ΔH (inches)	Average head: Havg (inches)	Percolation Rate (Min/inches)	Infiltration Rate: It (inches/hour)
P-1	3	15.0	0.4	49.6	83.3	0.03
P-2	3	11.0	1.6	36.9	19.2	0.16
P-3	1	14.0	0.1	63.9	250.0	0.01
P-4	1	10.0	4.4	39.4	6.8	0.43
P-5	1	11.0	1.3	35.9	22.7	0.29
P-6	B	12.0	0.4	40.5	83.3	0.03
P-7	B	11.0	0.5	31.0	62.5	0.06
P-8	2	8.0	1.8	27.9	16.7	0.24
P-9	2	2.0	0.1	16.1	250.0	0.08
P-10	4	4.0	0.0	34.6	*	*
P-11	4	7.0	0.1	47.2	250.0	0.02
P-12	A	20.0	0.0	66.0	*	*
P-13	A	21.0	1.2	74.2	25.0	0.06
P-14	A	22.0	0.8	31.6	35.7	0.10

**Indicates a rate slower than the accuracy required by the Handbook.*

Compaction of soils should not be performed at the bottom of the proposed infiltration systems, as this could impact the actual infiltration rate.

An on-going maintenance program for the infiltration systems should be implemented to remove silt build-up within the system, as the migration of silt particles into the system over time can reduce the effectiveness of the system.

Should you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON WEST, INC.

Luke C. Weidman
Staff Geologist, GIT 891

Paul D. Theriault
CEG 2374

LIMITATIONS AND UNIFORMITY OF CONDITIONS

Attachments: Figure 1, Vicinity Map
Figure 2, Percolation Test Location Map
Figures 3 to 22, Boring Logs
Figures 23 to 36, Percolation Test Data
Figures 37 to 50, Grain Size Analyses

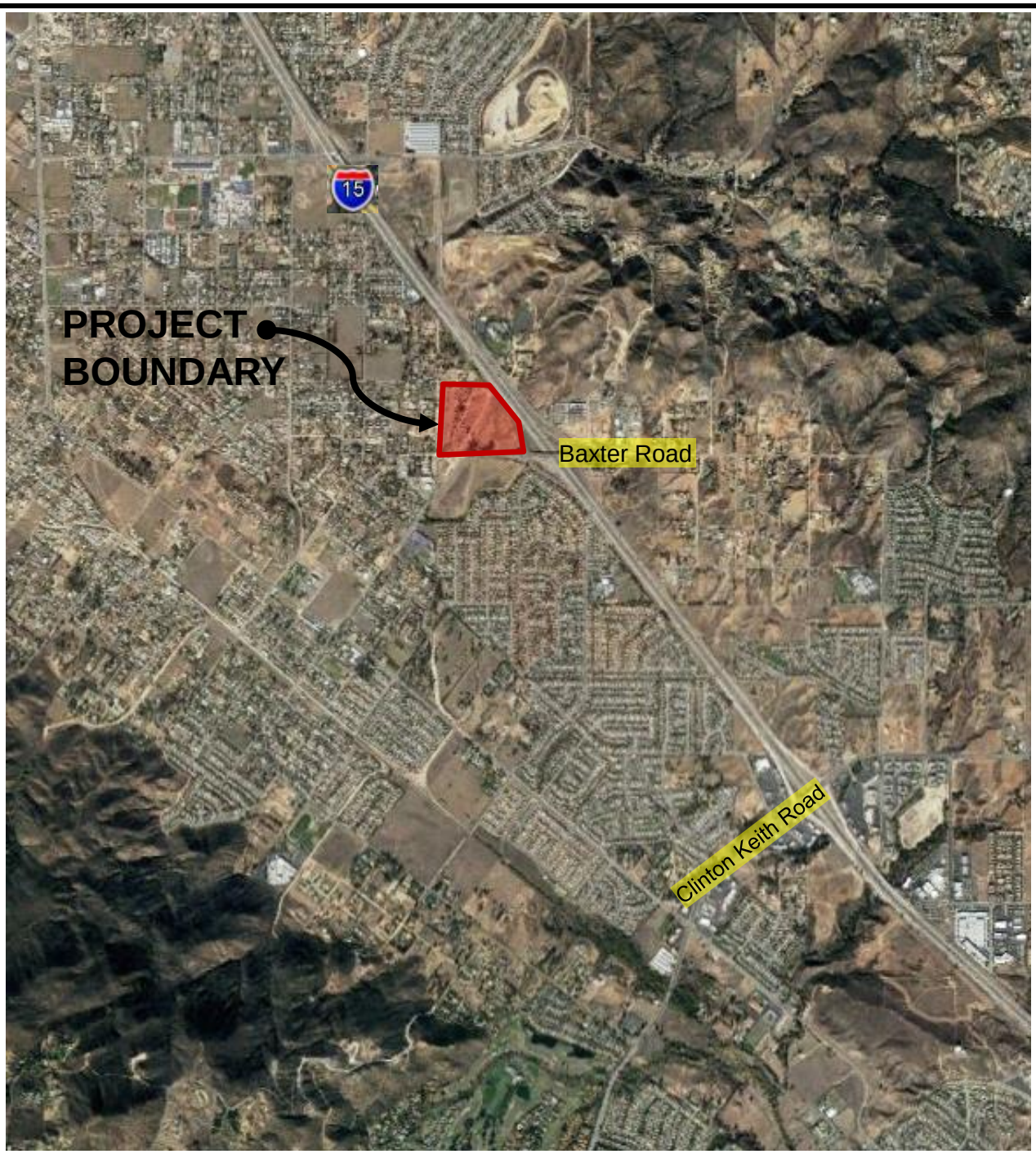
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in this and the referenced investigations. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials was not part of the scope of services provided by Geocon.

2. This report is issued with the understanding that it is the responsibility of the owner, or of their representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

4. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.



SOURCE: Google Earth, 2019

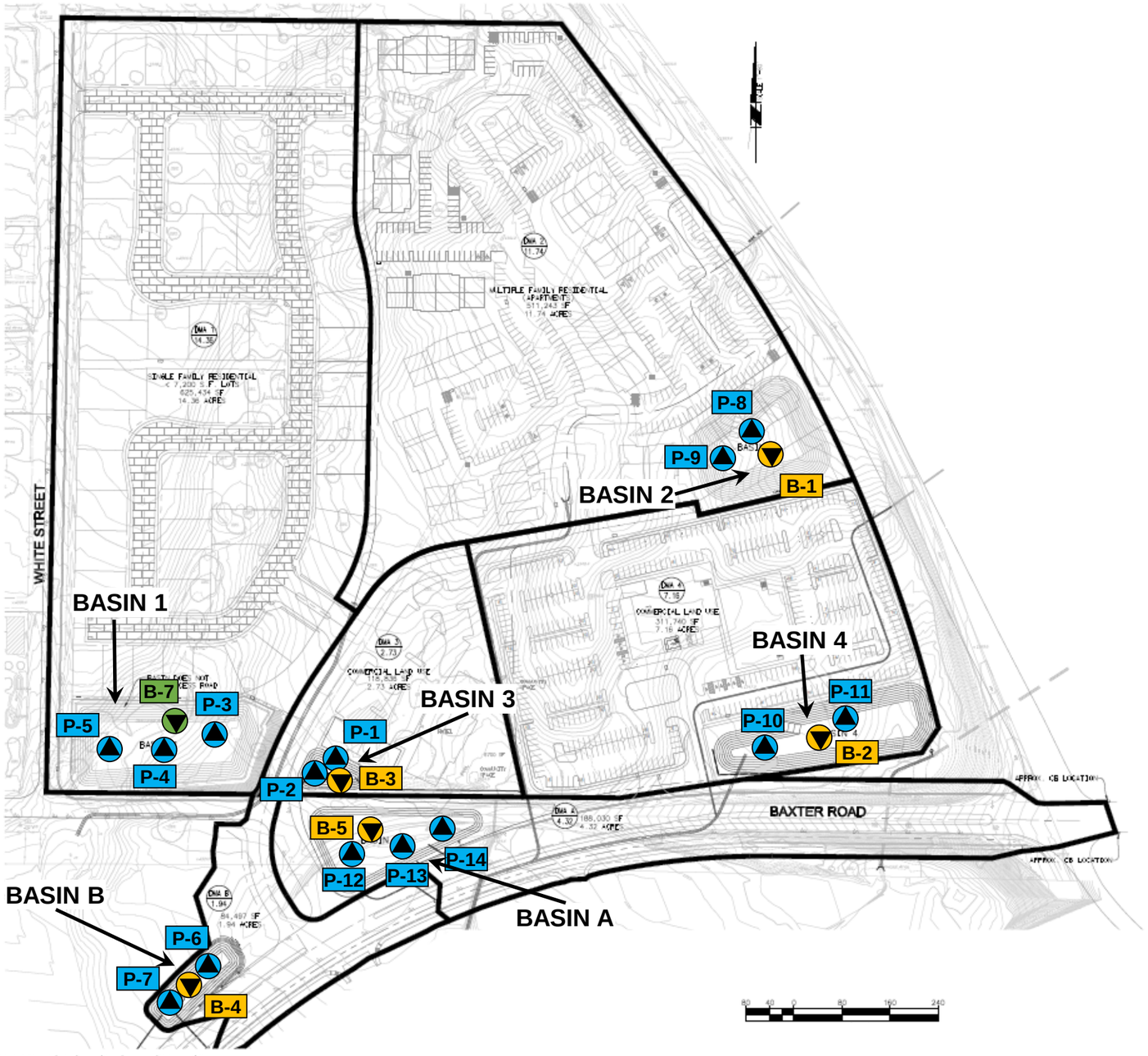
VICINITY MAP

GEOCON WEST, INC.
GEOTECHNICAL, ENVIRONMENTAL, MATERIALS
41571 CORNING PLACE #101, MURRIETA, CALIFORNIA 92562
PHONE 951-304-2300 FAX 951-304-2392

LCW		

BAXTER CENTRAL
TRACT 34301
NWC BAXTER ROAD AND INTERSTATE 15
WILDOMAR, CALIFORNIA

NOVEMBER 2019	PROJECT NO. T2540-22-03	FIG. 1



GEOCON LEGEND

Locations are approximate

P-14 …. PERCOLATION TEST LOCATION, THIS REPORT

B-5 …. GEOTECHNICAL BORING LOCATION, THIS REPORT

B-7 …. GEOTECHNICAL BORING LOCATION, GEOCON, 2015

VICINITY MAP
NOT TO SCALE

Source: Michael Baker International, *Baxter Central*, October 3, 2019.

GEOCON WEST, INC.
GEOTECHNICAL, ENVIRONMENTAL, MATERIALS
41571 CORNING PLACE #101, MURRIETA, CALIFORNIA 92562
PHONE 951-304-2300 FAX 951-304-2392

PERCOLATION TEST LOCATION MAP

BAXTER CENTRAL
TRACT 34301
NWC BAXTER ROAD AND INTERSTATE 15
WILDOMAR, CALIFORNIA

LCW			NOVEMBER 2019	PROJECT NO. T2540-22-03	FIG. 2

PROJECT NO. T2540-22-03

BORING B-1

ELEV. (MSL.) **1355** DATE COMPLETED **11/11/19**

EQUIPMENT **CME 75 4x4** BY: **Theriault**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, brown; fine to coarse sand, upper foot plowed.			
2				SC	Clayey SAND, damp, reddish brown; fine to coarse sand			
4				SM	Silty SAND, moist, yellowish brown; fine to medium sand			
6					-Becomes reddish brown; fine to coarse sand			
8					- Becomes olive; fine to medium sand; some coarse sand			
10				SC	Clayey SAND, olive; fine to medium sand			
12				SM	Silty SAND, olive; fine to coarse sand; some gravel; slow advance. H2O added to extract cuttings.			
14								
16			▼					
18				CL	Sandy CLAY, moist, olive; fine to medium sand			
20								
22					- Some gravel			
24				SC	Clayey SAND with gravel, moist, olive; fine to coarse sand			
26								
28								

Figure 3,
Log of Boring B-1, Page 1 of 2

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-1** ELEV. (MSL.) **1355** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30								
32								
34								
36								
					Total Depth = 37' Groundwater encountered at elevation 1339 Backfilled with cuttings 11/11/2019			

Figure 3,
Log of Boring B-1, Page 2 of 2

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

BORING B-2

ELEV. (MSL.) **1348** DATE COMPLETED **11/11/19**

EQUIPMENT **CME 75 4x4** BY: **Theriault**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, yellowish brown; fine to coarse sand, some gravel, upper foot plowed.			
8					- Becomes moist			
10					- Slow advance			
12					- Some clay			
14			▼					
22				SM	Silty SAND with fine gravel, light brown			
26				GS	Sandy GRAVEL; ~90% gravel, fine to medium sand; some silt			
28								

Figure 4,
Log of Boring B-2, Page 1 of 2

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-2** ELEV. (MSL.) **1348** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
					Total Depth = 30' Groundwater encountered at elevation 1334 Backfilled with cuttings 11/11/2019			

Figure 4,
Log of Boring B-2, Page 2 of 2

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-3** ELEV. (MSL.) **1331** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, reddish brown; fine to coarse sand, upper foot plowed.			
2								
4								
6								
8								
10					- Becomes moist; strong brown; slow advance			
12								
14				SC	Clayey SAND, moist, reddish brown; fine to coarse sand			
16								
18								
20								
22								
24								
					Total Depth = 25' Groundwater not encountered Backfilled with cuttings 11/11/2019			

Figure 5,
Log of Boring B-3, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-4** ELEV. (MSL.) **1323** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, dark reddish brown; fine to medium sand; some coarse sand.			
2								
4								
6					-Becomes damp			
8								
10								
12								
14								
16				CL	Sandy CLAY hard, olive moist; fine to coarse sand			
18								
20								
22					Total Depth = 22' Groundwater not encountered Backfilled with cuttings 11/11/2019			

Figure 6,
Log of Boring B-4, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

BORING B-5

ELEV. (MSL.) **1331** DATE COMPLETED **11/12/19**

EQUIPMENT **CME 75 4x4** BY: **Battiato**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qal)** Silty SAND, medium dense, dry, light brown; fine to coarse sand			
2								
4				SM	**PAUBA FORMATION (Qps)** Silty SAND, dense, damp, light brown; coarse sand. -Slow advance			
6								
8					- Becomes reddish brown; increase in coarse sand			
10								
12								
14								
16								
18				ML	SILT, hard, damp, yellowish brown; difficulty drilling			
20								
22								
24								
26								
28								

Figure 7,
Log of Boring B-5, Page 1 of 2

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-5** ELEV. (MSL.) **1331** DATE COMPLETED **11/12/19** EQUIPMENT **CME 75 4x4** BY: **Battiato**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30								
32					Total Depth = 32' Groundwater not encountered Backfilled with cuttings 11/12/2019			

Figure 7,
Log of Boring B-5, Page 2 of 2

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-1** ELEV. (MSL.) **1331** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, reddish brown; fine to medium sand; some coarse sand; trace gravel.			
2								
4								
6					-Becomes damp			
8					- Becomes strong brown; moist			
10								
12								
14	P1@14-15							
					Total Depth = 15' Groundwater not encountered Backfilled with cuttings 11/12/2019			

Figure 8,
Log of Boring P-1, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-2** ELEV. (MSL.) **1331** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, reddish brown; fine to medium sand; some coarse sand; trace gravel.			
2								
4								
6					-Becomes damp			
8								
10	P-2@10-11							
					Total Depth = 11' Groundwater not encountered Backfilled with cuttings 11/12/2019			

Figure 9,
Log of Boring P-2, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-3** ELEV. (MSL.) **1325** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault** MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qal)** Silty SAND, loose, dry, brown; fine to coarse sand			
2								
4				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, damp, reddish brown; fine to medium sand; some coarse sand.			
6								
8					-Becomes moist; some clay			
10								
12								
14	P3@14-15							
					Total Depth =15' Groundwater not encountered Backfilled with cuttings 11/12/2019			

Figure 10,
Log of Boring P-3, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-4** ELEV. (MSL.) **1320** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**ALLUVIUM (Qal)** Silty SAND, loose, dry, brown; fine to coarse sand			
2								
4								
6				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, damp, reddish brown; fine to medium sand; some coarse sand, trace gravel.			
8								
10	P-4@9-10				Total Depth =10' Groundwater not encountered Backfilled with cuttings 11/12/2019			

Figure 11,
Log of Boring P-4, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-5** ELEV. (MSL.) **1318** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**ALLUVIUM (Qal)** Silty SAND, loose, dry, brown; fine to coarse sand			
2								
4								
6					-Becomes damp			
8				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, moist, dark brown; fine to medium sand; some coarse sand; few gravel.			
10	P-5@10-11							
					Total Depth =11' Groundwater not encountered Backfilled with cuttings 11/12/2019			

Figure 12,
Log of Boring P-5, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-6** ELEV. (MSL.) **1325** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, moist, dark brown; fine to medium sand; some coarse sand.			
2								
4								
6					-Becomes damp			
8								
10								
12	P-6@11-12				-Few gravel Total Depth =12' Groundwater not encountered Backfilled with cuttings 11/12/2019			

Figure 13,
Log of Boring P-6, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-7** ELEV. (MSL.) **1322** DATE COMPLETED **11/11/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, dark reddish brown; fine to coarse sand.			
2								
4								
6								
8					-Becomes moist			
10	P-7@10-11				-Trace gravel			
					Total Depth =11' Groundwater not encountered Backfilled with cuttings 11/12/2019			

Figure 14,
Log of Boring P-7, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-8** ELEV. (MSL.) **1355** DATE COMPLETED **11/12/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, light reddish brown; fine to medium sand; trace coarse sand			
2					-Becomes damp			
4					-Becomes dark yellowish brown; fine to coarse sand; trace gravel and cobble			
6								
8	P-9@7-8				Total Depth =8' Groundwater not encountered Backfilled with cuttings 11/13/2019			

Figure 15,
Log of Boring P-8, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-9** ELEV. (MSL.) **1351** DATE COMPLETED **11/12/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, light reddish brown; fine to medium sand; some coarse sand; trace gravel			
	P-10@1-2							
2					Total Depth =2' Groundwater not encountered Backfilled with cuttings 11/13/2019			

Figure 16,
Log of Boring P-9, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-10** ELEV. (MSL.) **1347** DATE COMPLETED **11/12/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, light reddish brown; fine to medium sand; some coarse sand; trace gravel			
2								
	P-11@3-4							
4					Total Depth =4' Groundwater not encountered Backfilled with cuttings 11/13/2019			

Figure 17,
Log of Boring P-10, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-11** ELEV. (MSL.) **1350** DATE COMPLETED **11/12/19** EQUIPMENT **CME 75 4x4** BY: **Theriault**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, medium dense, dry, reddish brown; fine to coarse sand			
2					-Becomes damp			
4								
6	P-12@6-7				-Trace gravel			
					Total Depth =7' Groundwater not encountered Backfilled with cuttings 11/13/2019			

Figure 18,
Log of Boring P-11, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-12** ELEV. (MSL.) **1329** DATE COMPLETED **11/12/19** EQUIPMENT **CME 75 4x4** BY: **Battiato** MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, loose to medium dense, dry, light yellowish brown; fine to coarse sand			
2								
4								
6								
8					-Becomes light reddish brown			
10								
12								
14								
16								
18								
20	P-14@20				-Trace gravel			
					Total Depth =21.5' Groundwater not encountered Backfilled with cuttings 11/14/2019			

Figure 19,
Log of Boring P-12, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2540-22-03

BORING P-13

ELEV. (MSL.) **1330** DATE COMPLETED **11/12/19**

EQUIPMENT **CME 75 4x4** BY: **Battiato**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qal)** Silty SAND, loose, dry, light yellow brown; fine to coarse sand			
2								
4				SM	**PAUBA FORMATION (Qps)** Silty SAND, loose, dry, brown; fine to coarse sand			
6								
8								
10								
12								
14								
16								
18					- Becomes dark brown			
20								
22	P-15@21				-Becomes very dense; moist reddish brown with mottling; trace gravel			
					Total Depth =22.5' Groundwater not encountered Backfilled with cuttings 11/14/2019			

Figure 20,
Log of Boring P-13, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2540-22-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P-14** ELEV. (MSL.) **1330** DATE COMPLETED **11/12/19** EQUIPMENT **CME 75 4x4** BY: **Theriault** MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**PAUBA FORMATION (Qps)** Silty SAND, loose, dry, brown; fine to coarse sand			
2								
4								
6					-Becomes damp; medium dense			
8								
10								
12								
14					-Becomes dense; slow advance			
16								
18								
20					-Becomes olive brown; trace gravel			
22	P-15@21				Total Depth =22' Groundwater not encountered Backfilled with cuttings 11/14/2019			

Figure 21,
Log of Boring P-14, Page 1 of 1

T2540-22-03 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2540-22-02

BORING B-7

ELEV. (MSL.) **1320** DATE COMPLETED **11/7/2012**

EQUIPMENT **CME 75 HSA** BY: **PDT**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B7@0-5				**PAUBA SANDSTONE (Qps):** Silty SANDSTONE, dense, damp, brown, fine to medium grained, trace coarse grained sand, weakly cemented, porous up to 1/8", rootlets			
2	B7@2.5					57	132.2	6.3
4	B7@5				-becomes olive brown, non porous	48	116.0	5.3
6	B7@7.5				-becomes damp, light grayish brown, fine to coarse grained	69		
8	B7@10				-becomes reddish brown	50/5"		
10	B7@12.5					50/4"		
12	B7@15				Clayey SANDSTONE, medium dense, moist, reddish brown, fine to coarse grained, weakly cemented	45		
14					-becomes brown			
16					-becomes reddish brown with orange mottling			
18	B7@20					72		
20					Total depth: 21' No groundwater encountered No caving Backfilled with cuttings and tamped Penetration resistance for 140-lb hammer falling 30 inches by auto-hammer			

Figure 22,
Log of Boring B-7, Page 1 of 1

T2540-22-02 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PERCOLATION TEST REPORT							
Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-1			**Date Excavated:**		11/11/2019
Length of Test Pipe:			180.0	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			9.6	inches	**Presoak Date:**		11/11/2019
Depth of Test Hole:			170.4	inches	**Perc Test Date:**		11/12/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weldman
Water level measured from BOTTOM of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	9:28 AM 9:53 AM	25	25	46.1	45.1	1.0	26.0
2	9:53 AM 10:18 AM	25	50	45.1	44.6	0.5	52.1
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Head**	**Head**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	10:18 AM 10:48 AM	30	30	54.2	53.5	0.7	41.7
2	10:48 AM 11:18 AM	30	60	53.5	53.0	0.5	62.5
3	11:18 AM 11:48 AM	30	90	53.0	52.6	0.5	62.5
4	11:48 AM 12:18 PM	30	120	52.6	52.1	0.5	62.5
5	12:18 PM 12:48 PM	30	150	52.1	51.6	0.5	62.5
6	12:48 PM 1:18 PM	30	180	51.6	51.5	0.1	250.0
7	1:18 PM 1:48 PM	30	210	51.5	51.0	0.5	62.5
8	1:48 PM 2:18 PM	30	240	51.0	50.8	0.2	125.0
9	2:18 PM 2:48 PM	30	270	50.8	50.4	0.4	83.3
10	2:48 PM 3:18 PM	30	300	50.4	50.2	0.2	125.0
11	3:18 PM 3:48 PM	30	330	50.2	49.8	0.4	83.3
12	3:48 PM 4:18 PM	30	360	49.8	49.4	0.4	83.3
Infiltration Rate (in/hr):			0.03				
Radius of test hole (in):			4				**Figure 23**
Average Head (in):			49.6				

PERCOLATION TEST REPORT							
Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-2			**Date Excavated:**		11/11/2019
Length of Test Pipe:			134.6	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			7.2	inches	**Presoak Date:**		11/11/2019
Depth of Test Hole:			127.4	inches	**Perc Test Date:**		11/12/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	9:28 AM 9:53 AM	25	25	37.2	35.2	2.0	12.3
2	9:53 AM 10:18 AM	25	50	35.2	34.1	1.1	23.1
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Head**	**Head**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	10:18 AM 10:48 AM	30	30	41.3	40.1	1.2	25.0
2	10:48 AM 11:18 AM	30	60	40.1	39.2	0.8	35.7
3	11:18 AM 11:48 AM	30	90	39.2	38.0	1.2	25.0
4	11:48 AM 12:18 PM	30	120	38.0	35.2	2.9	10.4
5	12:18 PM 12:48 PM	30	150	35.2	31.7	3.5	8.6
6	12:48 PM 1:18 PM	30	180	31.7	29.4	2.3	13.2
7	1:18 PM 1:48 PM	30	210	29.4	26.9	2.5	11.9
8	1:48 PM 2:18 PM	30	240	26.9	26.5	0.4	83.3
9	2:18 PM 2:48 PM	30	270	40.9	39.8	1.1	27.8
10	2:48 PM 3:18 PM	30	300	39.8	38.8	1.1	27.8
11	3:18 PM 3:48 PM	30	330	38.8	37.7	1.1	27.8
12	3:48 PM 4:18 PM	30	360	37.7	36.1	1.6	19.2
Infiltration Rate (in/hr):			0.16				
Radius of test hole (in):			4				**Figure 24**
Average Head (in):			36.9				

PERCOLATION TEST REPORT							
Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-3			**Date Excavated:**		11/11/2019
Length of Test Pipe:			166.6	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			6.0	inches	**Presoak Date:**		11/11/2019
Depth of Test Hole:			160.6	inches	**Perc Test Date:**		11/12/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	9:32 AM 9:57 AM	25	25	61.1	60.6	0.5	52.1
2	9:57 AM 10:22 AM	25	50	60.6	60.4	0.2	104.2
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Head**	**Head**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	10:22 AM 10:52 AM	30	30	66.4	66.0	0.4	83.3
2	10:52 AM 11:22 AM	30	60	66.0	65.8	0.2	125.0
3	11:22 AM 11:52 AM	30	90	65.8	65.6	0.1	250.0
4	11:52 AM 12:22 PM	30	120	65.6	65.3	0.4	83.3
5	12:22 PM 12:52 PM	30	150	65.3	65.2	0.1	250.0
6	12:52 PM 1:22 PM	30	180	65.2	64.9	0.2	125.0
7	1:22 PM 1:52 PM	30	210	64.9	64.8	0.1	250.0
8	1:52 PM 2:22 PM	30	240	64.8	64.7	0.1	250.0
9	2:22 PM 2:52 PM	30	270	64.7	64.4	0.2	125.0
10	2:52 PM 3:22 PM	30	300	64.4	64.2	0.2	125.0
11	3:22 PM 3:52 PM	30	330	64.2	64.0	0.2	125.0
12	3:52 PM 4:22 PM	30	360	64.0	63.8	0.1	250.0
Infiltration Rate (in/hr):			0.01				
Radius of test hole (in):			4				**Figure 25**
Average Head (in):			63.9				

PERCOLATION TEST REPORT							
Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-4			**Date Excavated:**		11/11/2019
Length of Test Pipe:			122.2	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			6.0	inches	**Presoak Date:**		11/11/2019
Depth of Test Hole:			116.2	inches	**Perc Test Date:**		11/12/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	9:33 AM 9:58 AM	25	25	34.8	33.0	1.8	13.9
2	9:58 AM 10:23 AM	25	50	33.0	31.6	1.4	17.4
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Head**	**Head**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	10:23 AM 10:53 AM	30	30	37.6	31.8	5.8	5.2
2	10:53 AM 11:23 AM	30	60	31.8	25.0	6.8	4.4
3	11:23 AM 11:53 AM	30	90	43.7	40.7	3.0	10.0
4	11:53 AM 12:23 PM	30	120	40.7	34.8	5.9	5.1
5	12:23 PM 12:53 PM	30	150	34.8	27.2	7.6	4.0
6	12:53 PM 1:23 PM	30	180	27.1	21.0	6.1	4.9
7	1:23 PM 1:53 PM	30	210	44.9	42.1	2.8	10.9
8	1:53 PM 2:23 PM	30	240	42.1	36.6	5.5	5.4
9	2:23 PM 2:53 PM	30	270	36.6	32.8	3.8	7.8
10	2:53 PM 3:23 PM	30	300	32.8	23.8	9.0	3.3
11	3:23 PM 3:53 PM	30	330	44.2	41.6	2.5	11.9
12	3:53 PM 4:23 PM	30	360	41.6	37.2	4.4	6.8
Infiltration Rate (in/hr):			0.43				
Radius of test hole (in):			4				**Figure 26**
Average Head (in):			39.4				

PERCOLATION TEST REPORT							
Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-5			**Date Excavated:**		11/11/2019
Length of Test Pipe:			134.2	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			3.6	inches	**Presoak Date:**		11/11/2019
Depth of Test Hole:			130.6	inches	**Perc Test Date:**		11/12/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	9:34 AM 9:59 AM	25	25	62.8	62.8	0.0	#DIV/0!
2	9:59 AM 10:24 AM	25	50	59.8	53.0	6.7	3.7
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Head**	**Head**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	10:24 AM 10:54 AM	30	30	56.6	50.5	6.1	4.9
2	10:54 AM 11:24 AM	30	60	50.5	47.3	3.2	9.3
3	11:24 AM 11:54 AM	30	90	47.3	43.8	3.5	8.6
4	11:54 AM 12:24 PM	30	120	43.8	40.2	3.6	8.3
5	12:24 PM 12:54 PM	30	150	40.2	37.3	2.9	10.4
6	12:54 PM 1:24 PM	30	180	37.3	34.6	2.8	10.9
7	1:24 PM 1:54 PM	30	210	34.6	32.2	2.4	12.5
8	1:54 PM 2:24 PM	30	240	32.2	30.2	1.9	15.6
9	2:24 PM 2:54 PM	30	270	30.2	28.8	1.4	20.8
10	2:54 PM 3:24 PM	30	300	28.8	27.0	1.8	16.7
11	3:24 PM 3:54 PM	30	330	27.0	25.2	1.8	16.7
12	3:54 PM 4:24 PM	30	360	25.2	23.9	1.3	22.7
Infiltration Rate (in/hr):			0.29				
Radius of test hole (in):			4				**Figure 27**
Average Head (in):			35.9				

PERCOLATION TEST REPORT

Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-6			**Date Excavated:**		11/11/2019
Length of Test Pipe:			144.0	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			7.2	inches	**Presoak Date:**		11/11/2019
Depth of Test Hole:			136.8	inches	**Perc Test Date:**		11/12/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:25 AM 9:50 AM	25	25	38.4	37.7	0.7	34.7
2	9:50 AM 10:15 AM	25	50	37.7	37.1	0.6	41.7
			Soil Criteria: Normal				

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	10:15 AM 10:45 AM	30	30	44.3	43.8	0.5	62.5
2	10:45 AM 11:15 AM	30	60	43.8	43.3	0.5	62.5
3	11:15 AM 11:45 AM	30	90	43.3	43.0	0.4	83.3
4	11:45 AM 12:15 PM	30	120	43.0	42.5	0.5	62.5
5	12:15 PM 12:45 PM	30	150	42.5	42.0	0.5	62.5
6	12:45 PM 1:15 PM	30	180	42.0	41.9	0.1	250.0
7	1:15 PM 1:45 PM	30	210	41.9	41.6	0.2	125.0
8	1:45 PM 2:15 PM	30	240	41.6	41.5	0.1	250.0
9	2:15 PM 2:45 PM	30	270	41.5	41.4	0.1	250.0
10	2:45 PM 3:15 PM	30	300	41.4	41.0	0.4	83.3
11	3:15 PM 3:45 PM	30	330	41.0	40.7	0.4	83.3
12	3:45 PM 4:15 PM	30	360	40.7	40.3	0.4	83.3

Infiltration Rate (in/hr):			0.03				
Radius of test hole (in):			4				**Figure 28**
Average Head (in):			40.5				

PERCOLATION TEST REPORT

Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-7			**Date Excavated:**		11/11/2019
Length of Test Pipe:			133.7	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			6.0	inches	**Presoak Date:**		11/11/2019
Depth of Test Hole:			127.7	inches	**Perc Test Date:**		11/12/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:25 AM 9:50 AM	25	25	28.6	27.0	1.6	16.0
2	9:50 AM 10:15 AM	25	50	27.0	26.2	0.8	29.8
			Soil Criteria: Normal				

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	10:15 AM 10:45 AM	30	30	32.2	31.6	0.6	50.0
2	10:45 AM 11:15 AM	30	60	31.6	30.7	0.8	35.7
3	11:15 AM 11:45 AM	30	90	30.7	30.2	0.5	62.5
4	11:45 AM 12:15 PM	30	120	30.1	29.5	0.6	50.0
5	12:15 PM 12:45 PM	30	150	29.5	28.9	0.6	50.0
6	12:45 PM 1:15 PM	30	180	28.9	26.3	2.6	11.4
7	1:15 PM 1:45 PM	30	210	26.3	23.5	2.8	10.9
8	1:45 PM 2:15 PM	30	240	23.5	21.7	1.8	16.7
9	2:15 PM 2:45 PM	30	270	32.8	32.3	0.5	62.5
10	2:45 PM 3:15 PM	30	300	32.3	31.7	0.6	50.0
11	3:15 PM 3:45 PM	30	330	31.7	31.2	0.5	62.5
12	3:45 PM 4:15 PM	30	360	31.2	30.7	0.5	62.5

Infiltration Rate (in/hr):			0.06				
Radius of test hole (in):			4				**Figure 29**
Average Head (in):			31.0				

PERCOLATION TEST REPORT							
Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-8			**Date Excavated:**		11/11/2019
Length of Test Pipe:			98.2	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			13.4	inches	**Presoak Date:**		11/12/2019
Depth of Test Hole:			84.7	inches	**Perc Test Date:**		11/13/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	9:26 AM 9:51 AM	25	25	24.7	23.2	1.6	16.0
2	9:51 AM 10:16 AM	25	50	23.2	22.3	0.8	29.8
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Head**	**Head**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	10:16 AM 10:46 AM	30	30	35.8	35.2	0.6	50.0
2	10:46 AM 11:16 AM	30	60	35.2	34.6	0.6	50.0
3	11:16 AM 11:46 AM	30	90	34.6	34.3	0.2	125.0
4	11:46 AM 12:16 PM	30	120	34.3	34.0	0.4	83.3
5	12:16 PM 12:46 PM	30	150	34.0	33.7	0.2	125.0
6	12:46 PM 1:16 PM	30	180	33.7	33.5	0.2	125.0
7	1:16 PM 1:46 PM	30	210	33.5	33.4	0.1	250.0
8	1:46 PM 2:16 PM	30	240	33.4	32.5	0.8	35.7
9	2:16 PM 2:46 PM	30	270	32.5	31.9	0.6	50.0
10	2:46 PM 3:16 PM	30	300	31.9	31.4	0.5	62.5
11	3:16 PM 3:46 PM	30	330	31.4	28.8	2.6	11.4
12	3:46 PM 4:16 PM	30	360	28.8	27.0	1.8	16.7
Infiltration Rate (in/hr):			0.24				
Radius of test hole (in):			4				**Figure 30**
Average Head (in):			27.9				

PERCOLATION TEST REPORT

Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-9			**Date Excavated:**		11/11/2019
Length of Test Pipe:			24.6	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			3.6	inches	**Presoak Date:**		11/12/2019
Depth of Test Hole:			21.0	inches	**Perc Test Date:**		11/13/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:27 AM 9:52 AM	25	25	18.0	13.8	4.2	6.0
2	9:52 AM 10:17 AM	25	50	13.8	12.4	1.4	17.4
			Soil Criteria: Normal				

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	10:17 AM 10:47 AM	30	30	16.0	14.4	1.6	19.2
2	10:47 AM 11:17 AM	30	60	14.0	13.6	0.5	62.5
3	11:17 AM 11:47 AM	30	90	13.6	13.2	0.4	83.3
4	11:47 AM 12:17 PM	30	120	14.4	13.9	0.5	62.5
5	12:17 PM 12:47 PM	30	150	13.9	13.2	0.7	41.7
6	12:47 PM 1:17 PM	30	180	16.3	16.0	0.4	83.3
7	1:17 PM 1:47 PM	30	210	16.0	15.5	0.5	62.5
8	1:47 PM 2:17 PM	30	240	15.5	15.0	0.5	62.5
9	2:17 PM 2:47 PM	30	270	15.0	13.7	1.3	22.7
10	2:47 PM 3:17 PM	30	300	13.7	13.3	0.4	83.3
11	3:17 PM 3:47 PM	30	330	15.1	15.0	0.1	250.0
12	3:47 PM 4:17 PM	30	360	15.0	14.9	0.1	250.0

Infiltration Rate (in/hr):	0.08		
Radius of test hole (in):	4		**Figure 31**
Average Head (in):	16.1		

PERCOLATION TEST REPORT

Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-10			**Date Excavated:**		11/11/2019
Length of Test Pipe:			48.6	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			7.4	inches	**Presoak Date:**		11/12/2019
Depth of Test Hole:			41.2	inches	**Perc Test Date:**		11/13/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:29 AM 9:54 AM	25	25	30.4	28.8	1.6	16.0
2	9:54 AM 10:19 AM	25	50	28.8	28.7	0.1	208.3
			Soil Criteria: Normal				

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	10:19 AM 10:49 AM	30	30	36.1	35.8	0.4	83.3
2	10:49 AM 11:19 AM	30	60	35.8	35.3	0.5	62.5
3	11:19 AM 11:49 AM	30	90	35.3	35.0	0.2	125.0
4	11:49 AM 12:19 PM	30	120	35.0	34.8	0.2	125.0
5	12:19 PM 12:49 PM	30	150	34.8	34.7	0.1	250.0
6	12:49 PM 1:19 PM	30	180	34.7	34.7	0.0	2500.0
7	1:19 PM 1:49 PM	30	210	34.7	34.6	0.0	1250.0
8	1:49 PM 2:19 PM	30	240	34.6	34.6	0.0	1250.0
9	2:19 PM 2:49 PM	30	270	34.6	34.6	0.0	1250.0
10	2:49 PM 3:19 PM	30	300	34.6	34.6	0.0	1250.0
11	3:19 PM 3:49 PM	30	330	34.6	34.6	0.0	2500.0
12	3:49 PM 4:19 PM	30	360	34.6	34.5	0.0	2500.0

Infiltration Rate (in/hr):			0.00				
Radius of test hole (in):			4				**Figure 32**
Average Head (in):			34.6				

PERCOLATION TEST REPORT

Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-11			**Date Excavated:**		11/11/2019
Length of Test Pipe:			84.6	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			4.8	inches	**Presoak Date:**		11/12/2019
Depth of Test Hole:			79.8	inches	**Perc Test Date:**		11/13/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:30 AM 9:55 AM	25	25	45.5	44.2	1.3	18.9
2	9:55 AM 10:20 AM	25	50	44.2	43.7	0.5	52.1

Soil Criteria: Normal

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	10:20 AM 10:50 AM	30	30	48.5	48.2	0.2	125.0
2	10:50 AM 11:20 AM	30	60	48.2	48.0	0.2	125.0
3	11:20 AM 11:50 AM	30	90	48.0	47.6	0.4	83.3
4	11:50 AM 12:20 PM	30	120	47.6	47.4	0.2	125.0
5	12:20 PM 12:50 PM	30	150	47.4	47.3	0.1	250.0
6	12:50 PM 1:20 PM	30	180	47.3	47.0	0.2	125.0
7	1:20 PM 1:50 PM	30	210	47.0	47.0	0.0	1250.0
8	1:50 PM 2:20 PM	30	240	47.0	47.0	0.0	1250.0
9	2:20 PM 2:50 PM	30	270	47.0	47.0	0.0	1250.0
10	2:50 PM 3:20 PM	30	300	47.0	46.9	0.0	1250.0
11	3:20 PM 3:50 PM	30	330	46.9	46.9	0.0	1250.0
12	3:50 PM 4:20 PM	30	360	46.9	46.8	0.1	250.0

Infiltration Rate (in/hr):	0.02			
Radius of test hole (in):	4			**Figure 33**
Average Head (in):	47.2			

PERCOLATION TEST REPORT

Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-12			**Date Excavated:**		11/11/2019
Length of Test Pipe:			242.5	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			7.2	inches	**Presoak Date:**		11/13/2019
Depth of Test Hole:			235.3	inches	**Perc Test Date:**		11/14/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:15 AM 9:40 AM	25	25	66.0	66.0	0.0	#DIV/0!
2	9:40 AM 10:05 AM	25	50	66.0	66.0	0.0	#DIV/0!
			Soil Criteria: Normal				

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	10:05 AM 10:35 AM	30	30	66.0	66.0	0.0	25000.0
2	10:35 AM 11:05 AM	30	60	66.0	66.0	0.0	25000.0
3	11:05 AM 11:35 AM	30	90	66.0	66.0	0.0	25000.0
4	11:35 AM 12:05 PM	30	120	66.0	66.0	0.0	25000.0
5	12:05 PM 12:35 PM	30	150	66.0	66.0	0.0	25000.0
6	12:35 PM 1:05 PM	30	180	66.0	66.0	0.0	25000.0
7	1:05 PM 1:35 PM	30	210	66.0	66.0	0.0	25000.0
8	1:35 PM 2:05 PM	30	240	66.0	66.0	0.0	25000.0
9	2:05 PM 2:35 PM	30	270	66.0	66.0	0.0	25000.0
10	2:35 PM 3:05 PM	30	300	66.0	66.0	0.0	25000.0
11	3:05 PM 3:35 PM	30	330	66.0	66.0	0.0	25000.0
12	3:35 PM 4:05 PM	30	360	66.0	66.0	0.0	25000.0

Infiltration Rate (in/hr):			0.00				
Radius of test hole (in):			4				**Figure 34**
Average Head (in):			66.0				

PERCOLATION TEST REPORT

Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-13			**Date Excavated:**		11/11/2019
Length of Test Pipe:			253.9	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			2.4	inches	**Presoak Date:**		11/13/2019
Depth of Test Hole:			251.5	inches	**Perc Test Date:**		11/14/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:16 AM 9:41 AM	25	25	95.0	92.8	2.3	11.0
2	9:41 AM 10:06 AM	25	50	92.8	89.6	3.1	8.0
			Soil Criteria: Normal				

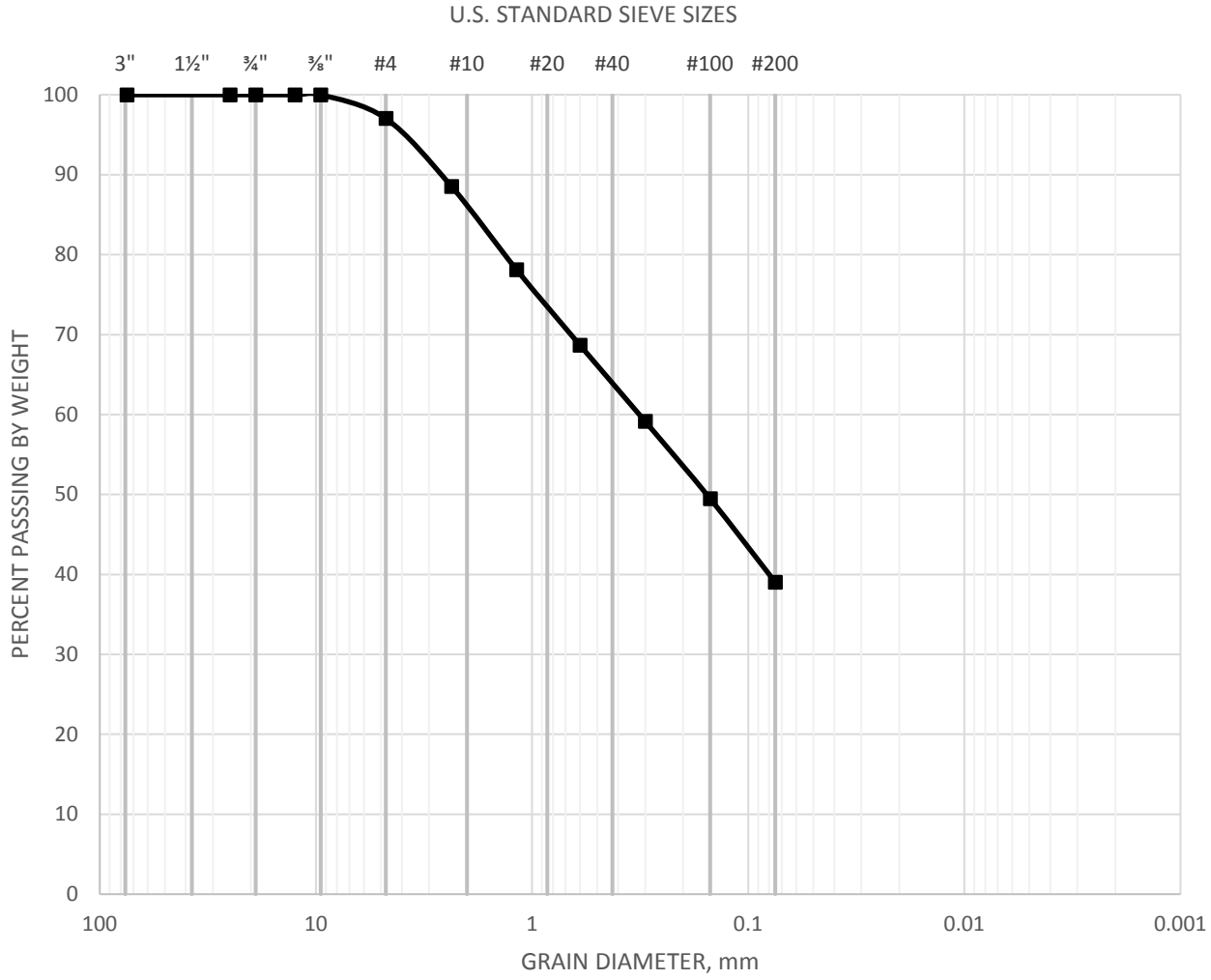
Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	10:06 AM 10:36 AM	30	30	92.0	89.5	2.5	11.9
2	10:36 AM 11:06 AM	30	60	89.5	87.4	2.2	13.9
3	11:06 AM 11:36 AM	30	90	87.4	85.9	1.4	20.8
4	11:36 AM 12:06 PM	30	120	85.9	83.5	2.4	12.5
5	12:06 PM 12:36 PM	30	150	83.5	82.3	1.2	25.0
6	12:36 PM 1:06 PM	30	180	82.3	81.0	1.3	22.7
7	1:06 PM 1:36 PM	30	210	81.0	79.8	1.2	25.0
8	1:36 PM 2:06 PM	30	240	79.8	78.5	1.3	22.7
9	2:06 PM 2:36 PM	30	270	78.5	77.3	1.2	25.0
10	2:36 PM 3:06 PM	30	300	77.3	76.1	1.2	25.0
11	3:06 PM 3:36 PM	30	330	76.1	74.8	1.3	22.7
12	3:36 PM 4:06 PM	30	360	74.8	73.6	1.2	25.0

Infiltration Rate (in/hr):			0.06				
Radius of test hole (in):			4				**Figure 35**
Average Head (in):			74.2				

PERCOLATION TEST REPORT							
Project Name:		Baxter and Central			**Project No.:**		T2540-22-03
Test Hole No.:		P-14			**Date Excavated:**		11/11/2019
Length of Test Pipe:			265.1	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			6.0	inches	**Presoak Date:**		11/13/2019
Depth of Test Hole:			259.1	inches	**Perc Test Date:**		11/14/2019
Check for Sandy Soil Criteria Tested by:				Weidman	**Percolation Tested by:**		Weidman
Water level measured from BOTTOM of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	9:17 AM 9:42 AM	25	25	52.7	47.5	5.2	4.8
2	9:42 AM 10:07 AM	25	50	47.5	43.0	4.6	5.5
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Head**	**Head**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(in)**	**(min/inch)**
1	10:07 AM 10:37 AM	30	30	49.0	46.1	2.9	10.4
2	10:37 AM 11:07 AM	30	60	46.1	43.6	2.5	11.9
3	11:07 AM 11:37 AM	30	90	43.6	41.8	1.8	16.7
4	11:37 AM 12:07 PM	30	120	41.8	39.6	2.2	13.9
5	12:07 PM 12:37 PM	30	150	39.6	38.2	1.4	20.8
6	12:37 PM 1:07 PM	30	180	38.2	37.1	1.1	27.8
7	1:07 PM 1:37 PM	30	210	37.1	36.0	1.1	27.8
8	1:37 PM 2:07 PM	30	240	36.0	34.4	1.6	19.2
9	2:07 PM 2:37 PM	30	270	34.4	33.6	0.8	35.7
10	2:37 PM 3:07 PM	30	300	33.6	32.8	0.8	35.7
11	3:07 PM 3:37 PM	30	330	32.8	32.0	0.7	41.7
12	3:37 PM 4:07 PM	30	360	32.0	31.2	0.8	35.7
Infiltration Rate (in/hr):			0.10				
Radius of test hole (in):			4				**Figure 36**
Average Head (in):			31.6				

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-1	silty SAND with trace gravel (SM), reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

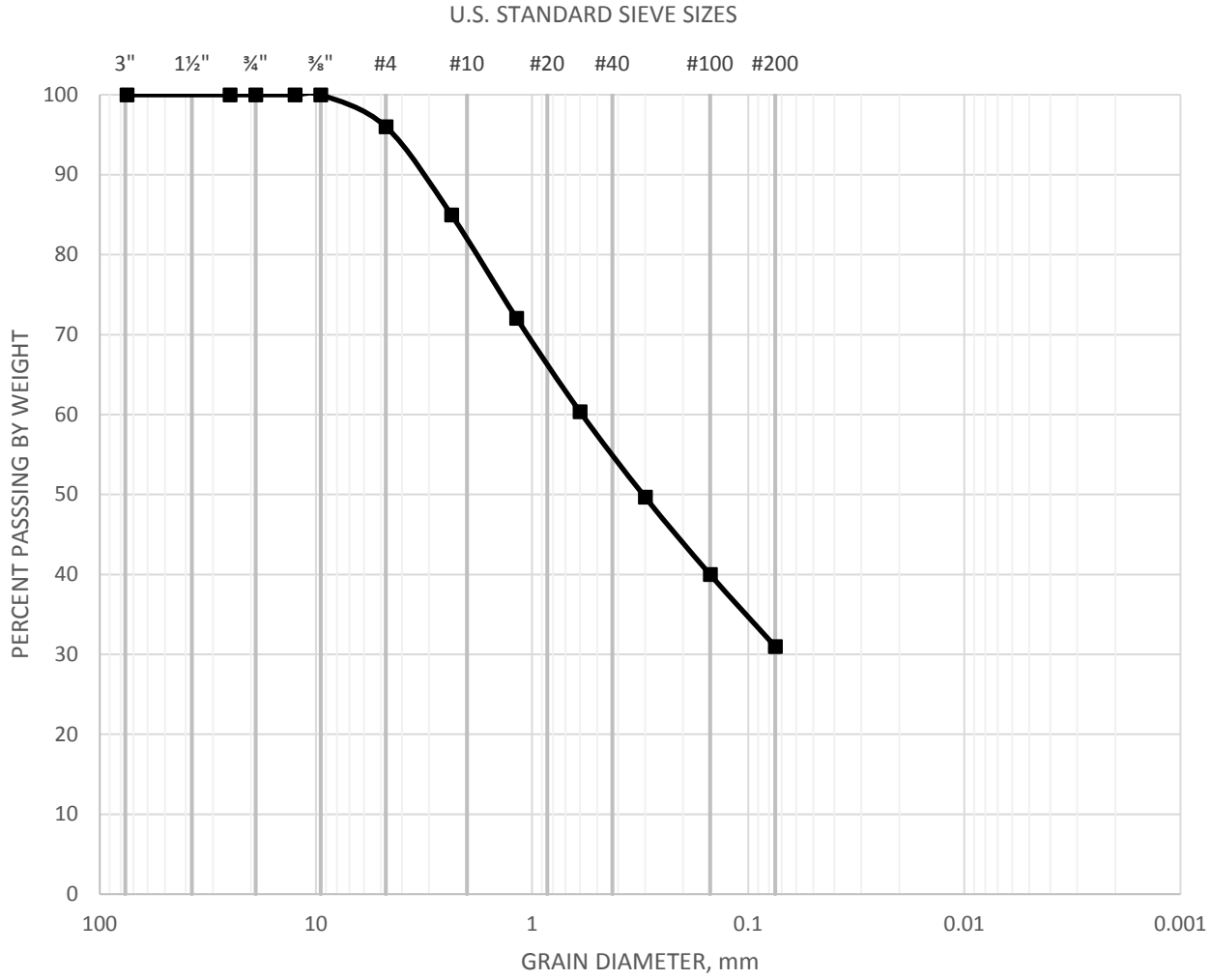
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 37

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-2	silty SAND with trace gravel (SM), reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

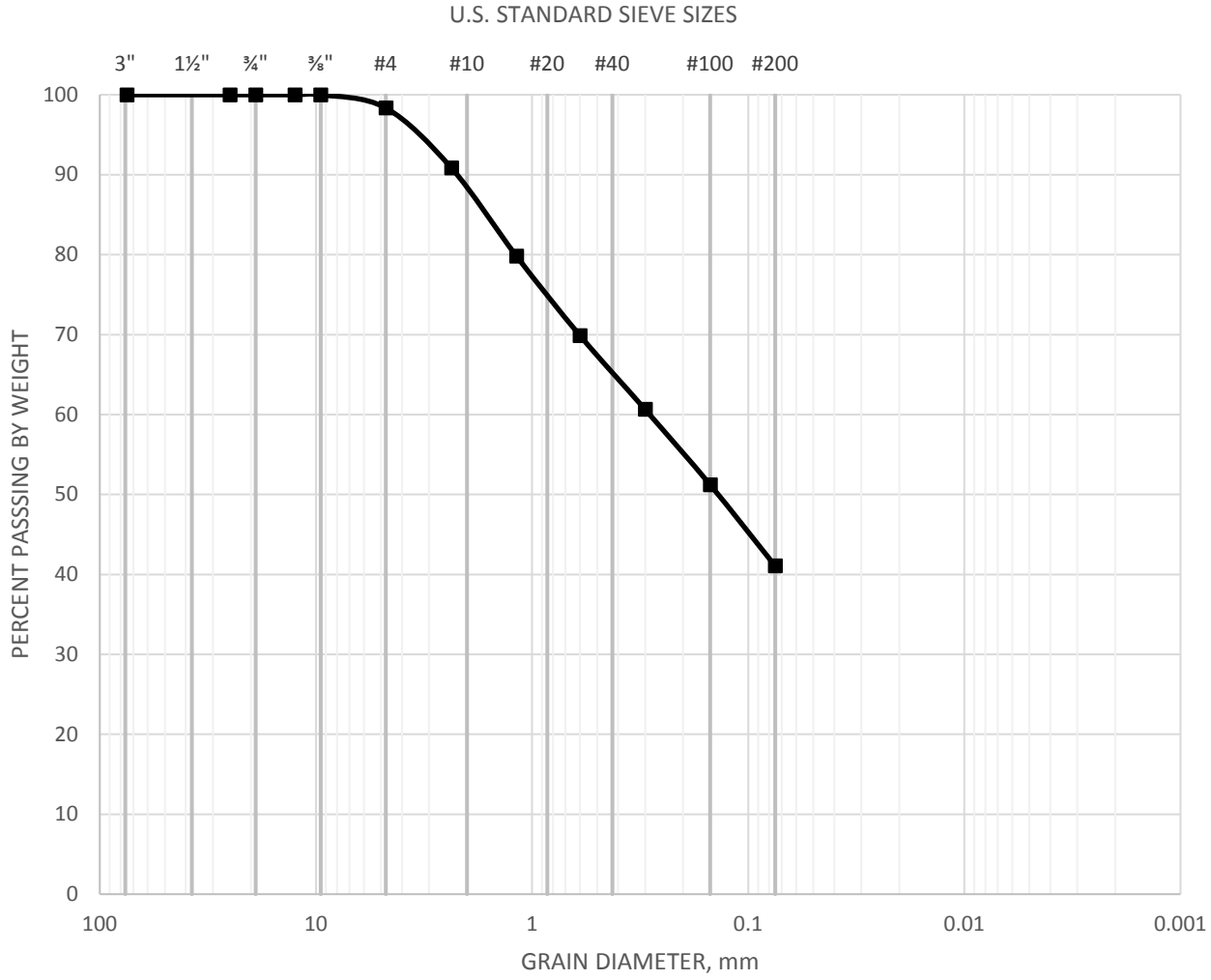
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 38

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-3	silty SAND with trace gravel (SM), reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

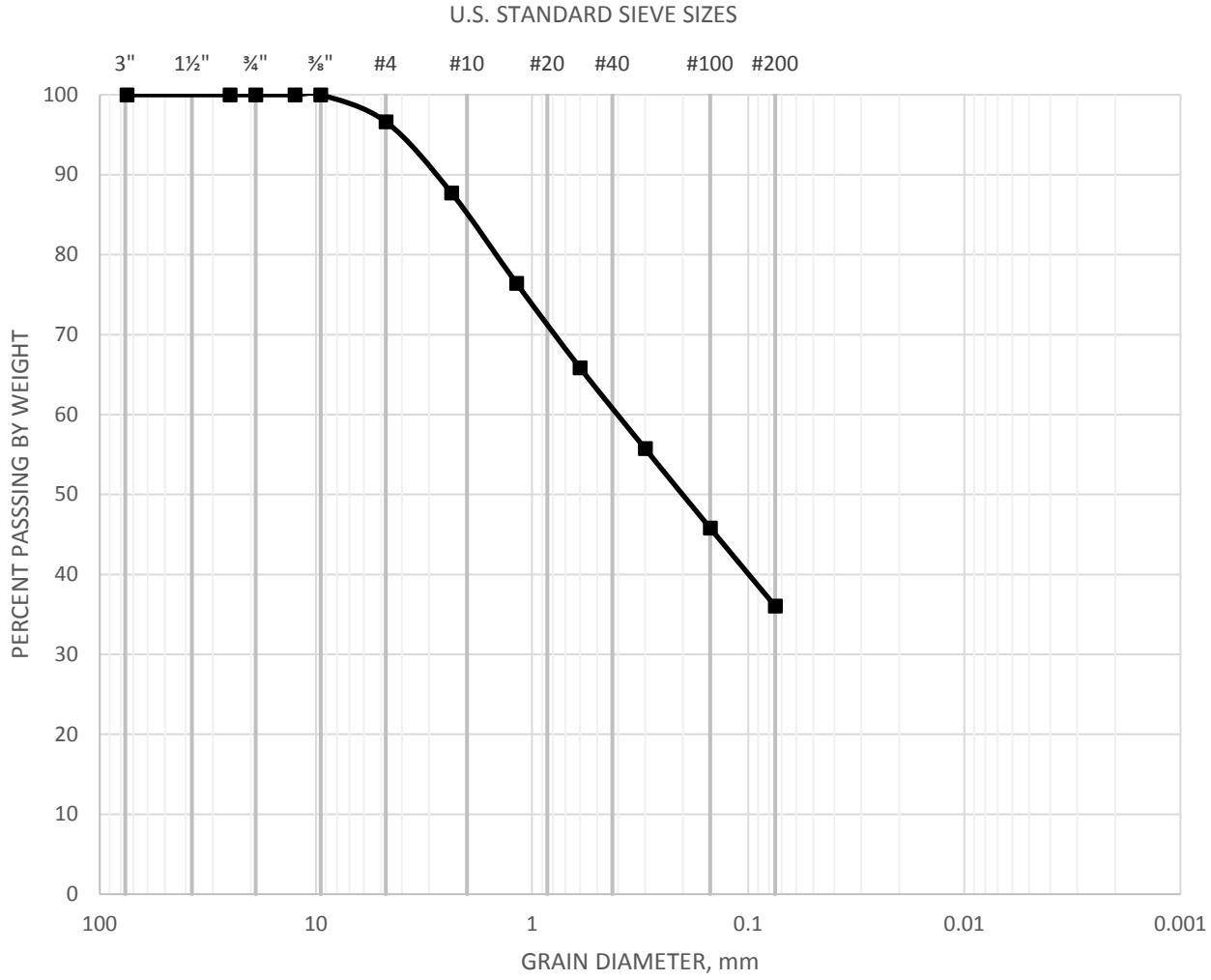
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 39

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-4	silty SAND with trace gravel (SM), reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

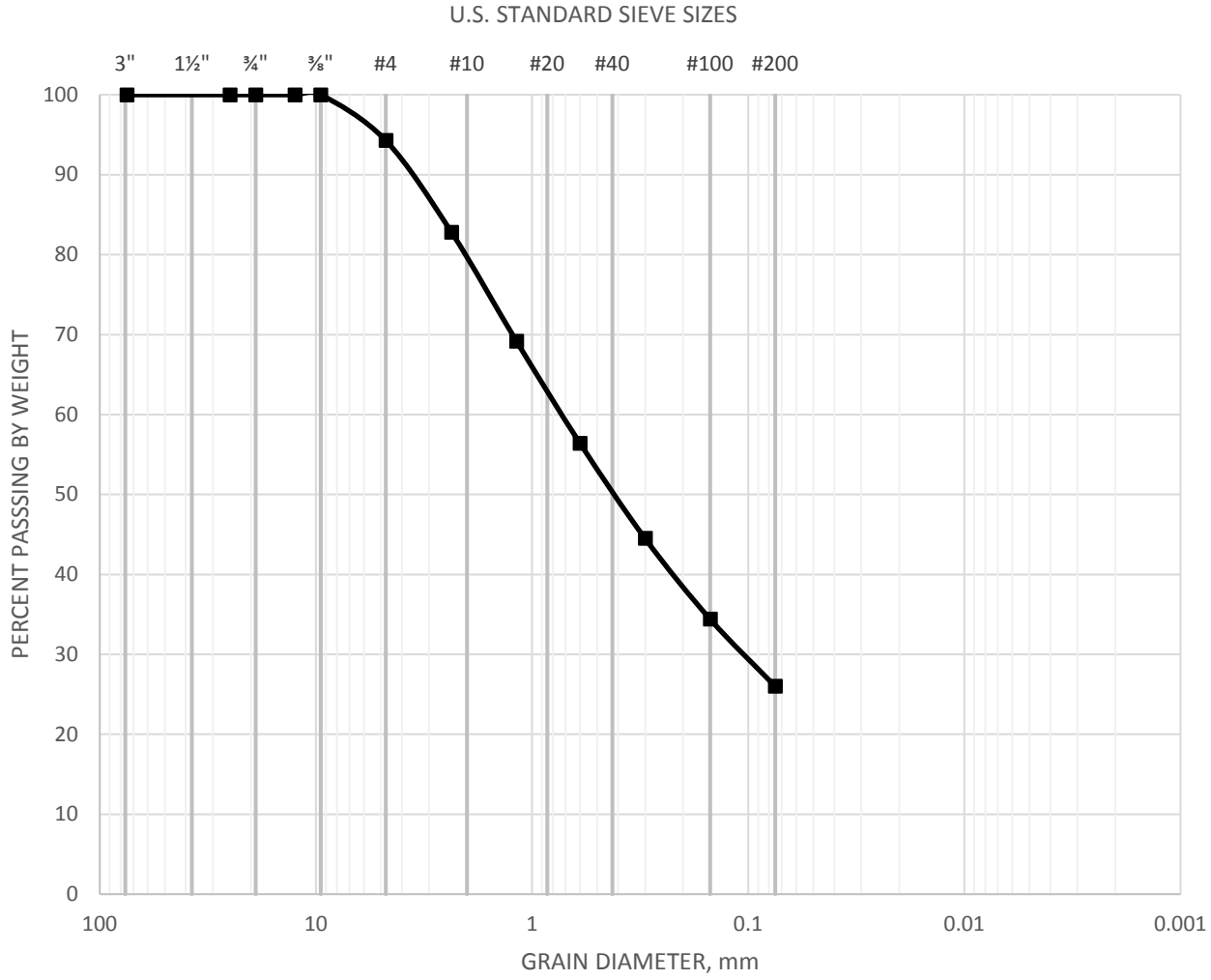
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 40

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-5	silty SAND with few gravel (SM), dark brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

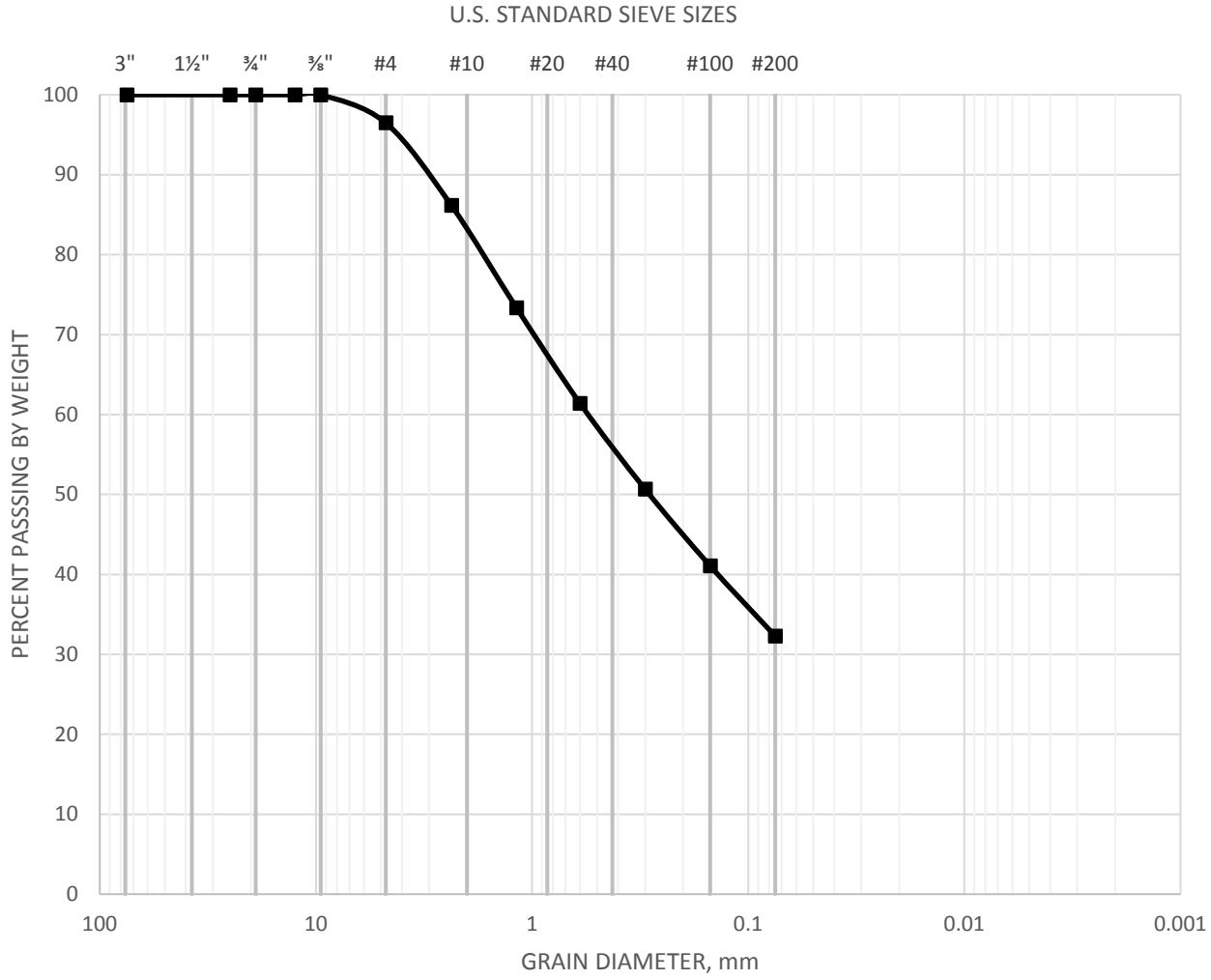
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 41

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-6	silty SAND with few gravel (SM), dark brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

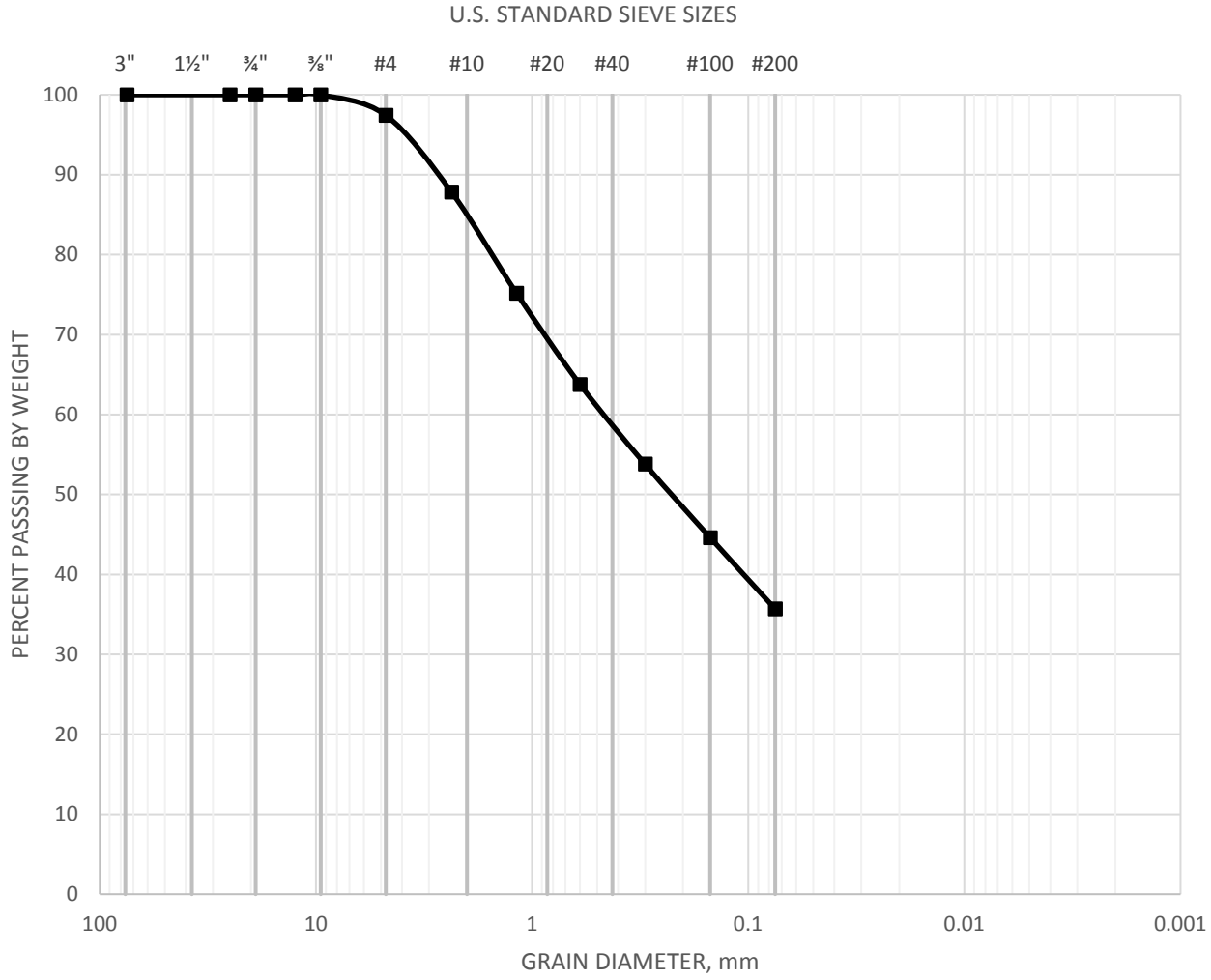
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 42

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-7	silty SAND with trace gravel (SM), dark reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

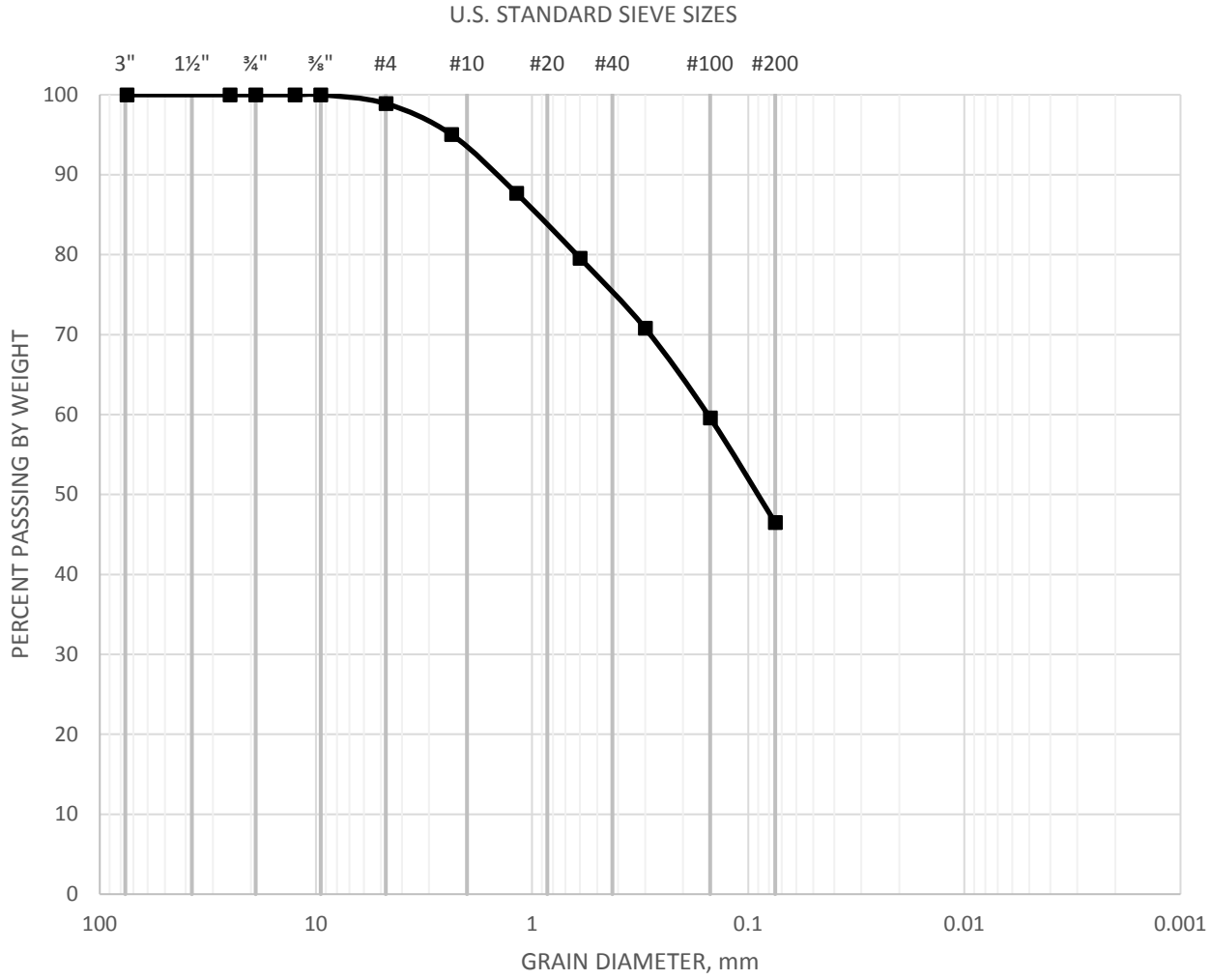
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 43

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-8	silty SAND with trace gravel (SM), dark yellowish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

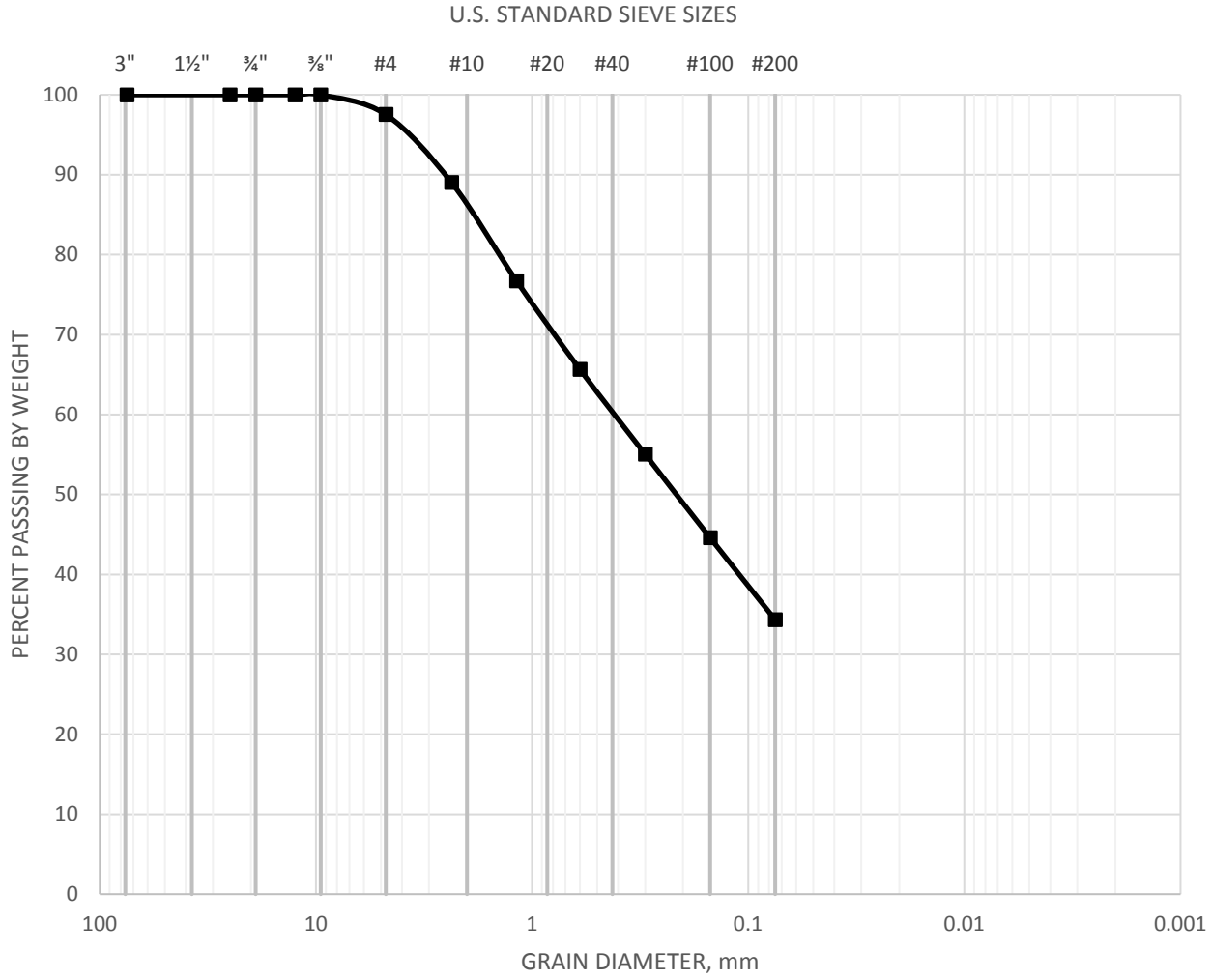
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 44

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-9	silty SAND with trace gravel (SM), light reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

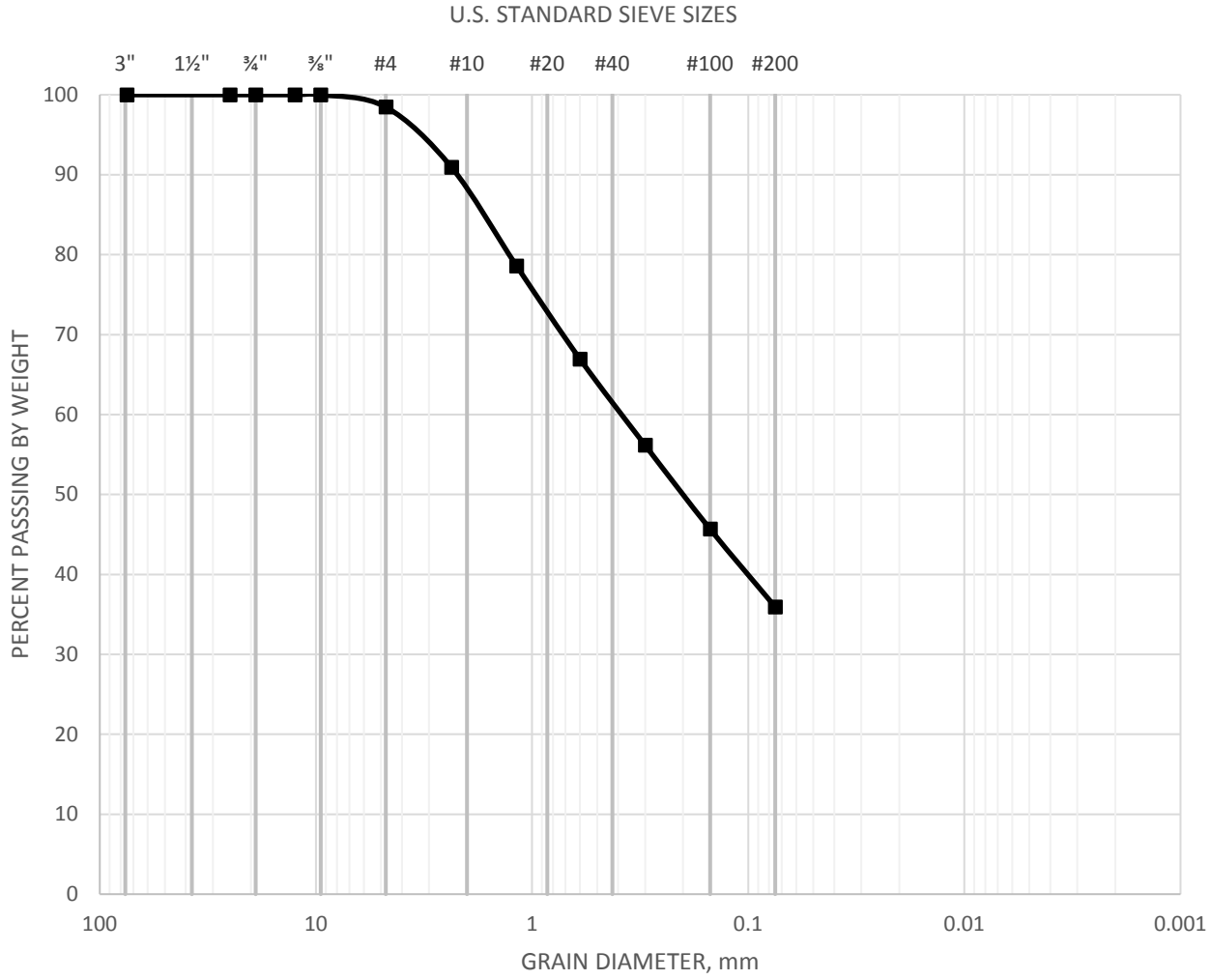
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 45

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-10	silty SAND with trace gravel (SM), light reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

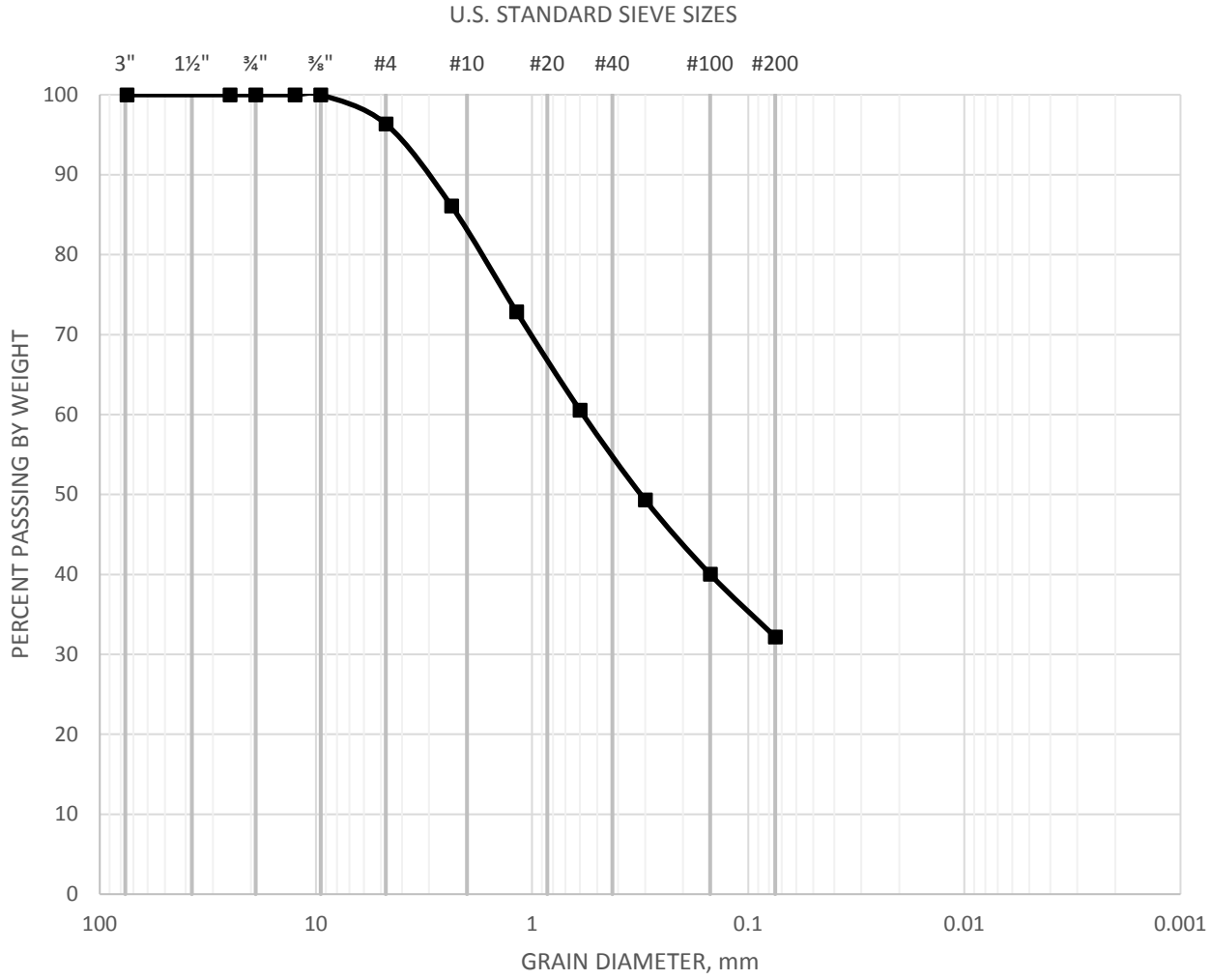
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 46

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-11	silty SAND with trace gravel (SM), reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

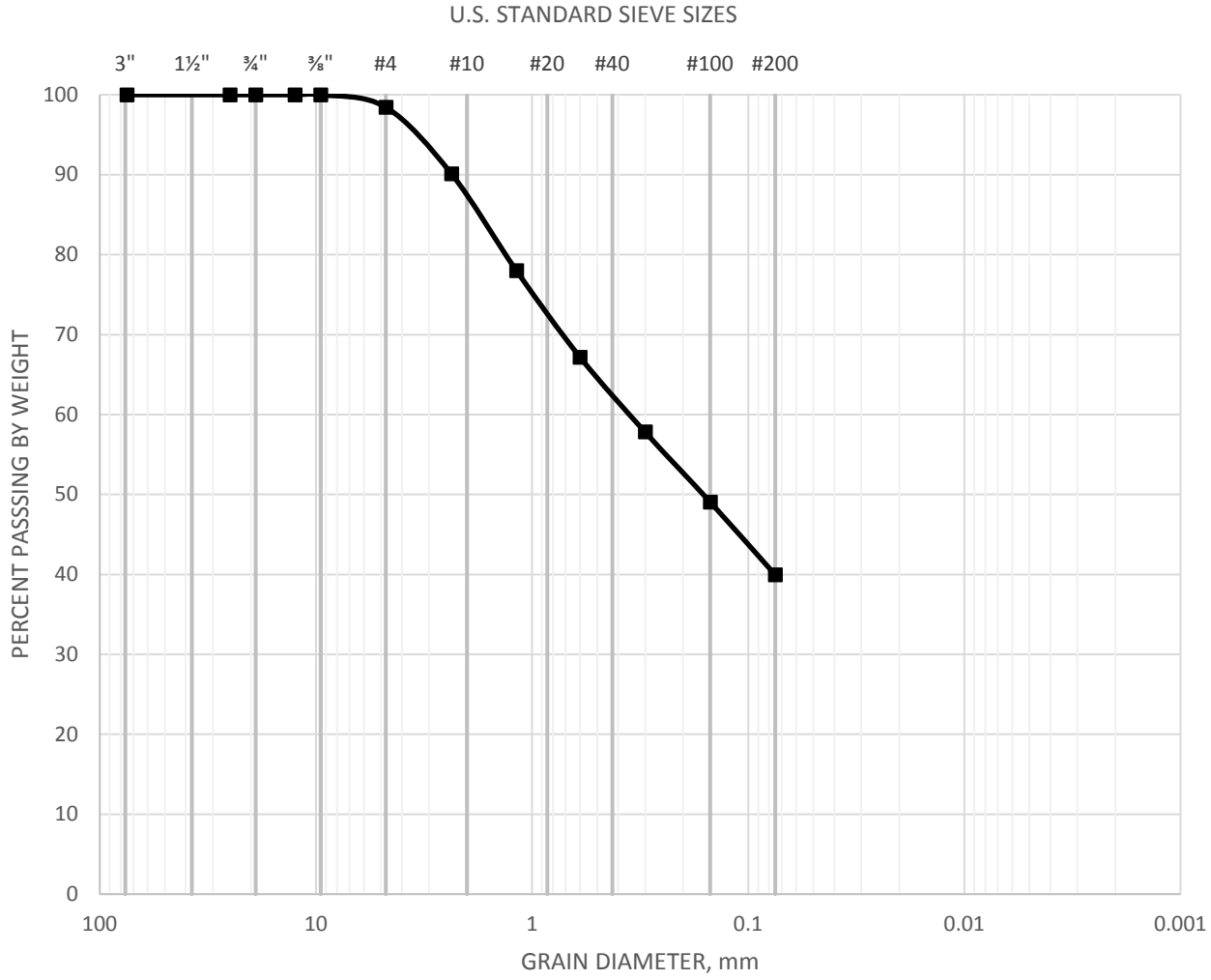
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 47

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-12	silty SAND with trace gravel (SM), light reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

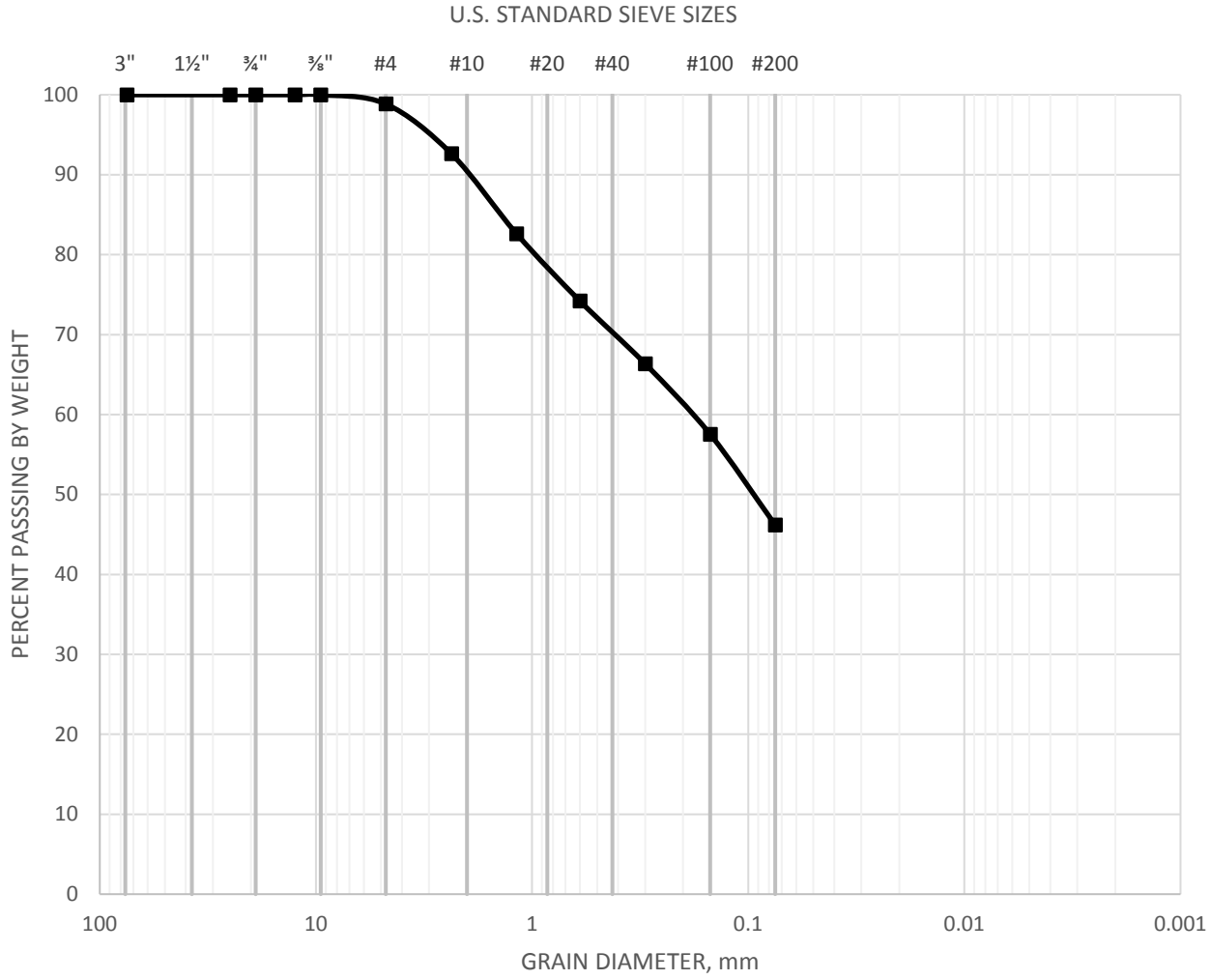
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 48

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-13	silty SAND with trace gravel (SM), reddish brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

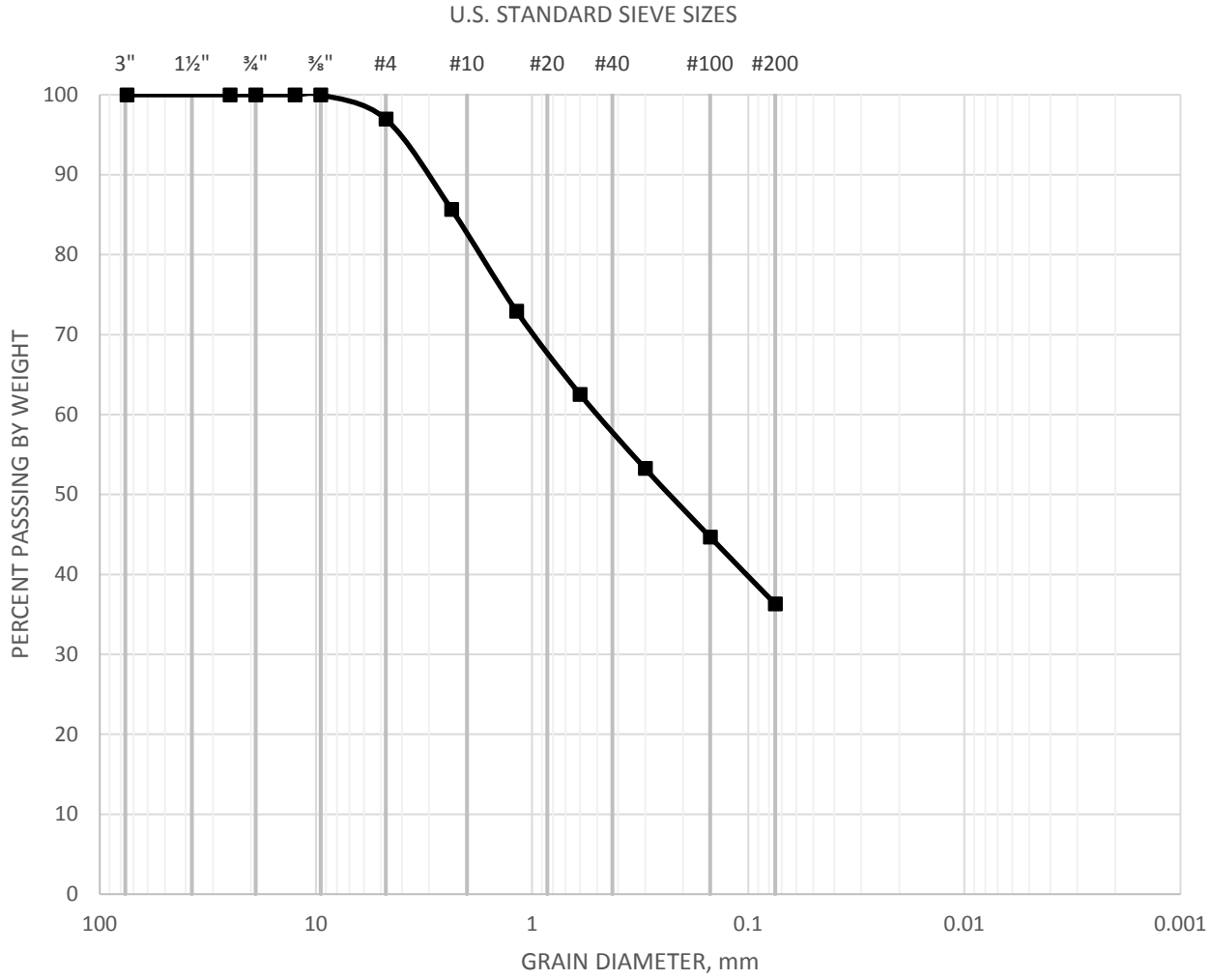
Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 49

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-14	silty SAND with trace gravel (SM), olive brown			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

Checked by:

Project No.: T2540-22-03

Strata Baxter Tract 34301
NWC Baxter Rd and I-15
Wildomar, California

Nov 19 Figure 50

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Examples of material to provide in Appendix 4 may include but are not limited to the following:

- Environmental Site Assessments conducted for the project,
- Other information on Past Site Use that impacts the feasibility of LID BMP implementation on the site.

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections D of this Template.

N/A

Appendix 5: LID Feasibility Supplemental Information

Information that supports or supplements the determination of LID technical feasibility documented in Section D

Examples of material to provide in Appendix 5 may include but are not limited to the following:

- Technical feasibility criteria for DMAs
- Site specific analysis of technical infeasibility of all LID BMPs (if Alternative Compliance is needed)
- Documentation of Approval criteria for Proprietary Biofiltration BMPs

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections D of this Template.

N/A

Appendix 6: LID BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation to supplement Section D

Examples of material to provide in Appendix 6 may include but are not limited to the following:

- DCV calculations,
- LID BMP sizing calculations from Exhibit C of the SMR WQMP
- Design details/drawings from manufacturers for proprietary BMPs

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 3.4 of the SMR WQMP and Sections D.4 of this Template.

Table D.4.1 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 1 BIORETENTION BASIN (BASIN 1)*		
	[A]		[B]	[C]	[A] x [C]			
1D.1	*387,119*	*Concrete or Asphalt*	*1.00*	*0.892*	*345,310*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
1D.2	*154,275*	*Roof*	*1.00*	*0.892*	*137,613*			
1D.3	*88,627*	*Landscape*	*0.10*	*0.110*	*9,789.5*			
	630,021				492,713	0.7	28,742	214,696

Table D.4.2 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 2 BIORETENTION BASIN (BASIN 2)*		
	[A]		[B]	[C]	[A] x [C]			
2D.1	*229,950*	*Concrete or Asphalt*	*1.00*	*0.892*	*205,115*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
2D.2	*82,648*	*Roof*	*1.00*	*0.892*	*73,722*			
2D.3	*195,683*	*Landscape*	*0.10*	*0.110*	*21,614.8*			
					-			
	508,281				300,452	0.7	17,526	194,132

Table D.4.2 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 3A BIORETENTION BASIN (BASIN 3A)*		
	[A]		[B]	[C]	[A] x [C]			
3AD.1	*14,580*	*Concrete or Asphalt*	*1.00*	*0.892*	*13,005*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
3AD.2	-	*Roof*	*1.00*	*0.892*	-			
3AD.3	*6,150*	*Landscape*	*0.10*	*0.110*	*679*			
	20,730				13,685	0.7	798	5,675

Table D.4.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 3B BIORETENTION BASIN (BASIN 3B)*		
	[A]		[B]	[C]	[A] x [C]			
3BD.1	*59,565*	*Concrete or Asphalt*	*1.00*	*0.892*	*53,132*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
3BD.2	*14,189*	*Roof*	*1.00*	*0.892*	*12,657*			
3BD.3	*23,315*	*Landscape*	*0.10*	*0.110*	*2,575.3*			
	97,069				68,364	0.7	3,988	23,940

Table D.4.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA 4 BIORETENTION BASIN (BASIN 4)*		
	[A]		[B]	[C]	[A] x [C]			
4D.1	*200,538*	*Concrete or Asphalt*	*1.00*	*0.892*	*178,880*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
4D.2	*28,458*	*Roof*	*1.00*	*0.892*	*25,384*			
4D.3	*106,723*	*Landscape*	*0.10*	*0.110*	*11,788.4*			
	335,719				216,053	0.7	12,603	136,028

Bioretention Facility - Design Procedure	BMP ID: BASIN 1	Legend:	Required Entries / Calculated Cells

Company Name: Michael Baker International — Date: 19-Dec-19

Designed by: Miguel Gonzalez — County/City Case No.:

Design Volume

Enter the area tributary to this feature	A_T =	14.5	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	28,742	ft^3
Enter the measured infiltration rate	I =	0.01	in/hr
Enter the Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" of this BMP Design Handbook)	FS =	3.00	
Enter factored infiltration rate (design)	$I_{factored}$ =	0.40	in/hr

Bioretention Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	6.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" allowed if vertically constr	d_s =	24.0	inches
Depth of Gravel Storage Layer (Optional Layer; up to 30")	d_g =	12.0	inches

Note: Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches (30 inch bulk depth) unless higher permeability media is used to allow faster filling of this layer.

Total Effective Depth, d_E

$$d_E(ft) = d_p(ft) + [(0.3) \times d_S(ft) + (0.4) \times d_g(ft)]$$

d_E = 1.50 feet

Required Effective Footprint Area, A_{BMP}

$$A_{BMP}\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_{BMP} = 19,161 ft^2

Proposed Surface Area (shall not be less than A_{BMP}) A= 26,169 ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water qualty ponding depth of the basin. The underlying gravel layer should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Message: Facility meets the Minimum Footprint

Drawdown Time (must be less than 72 hours) T_{Dd} = 45.0 hr

Message: Facility meets drawdown time limitations

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Longitudinal Slope of Site (3% maximum)			%
Check Dam Spacing			feet
Describe Vegetation:			

Notes: If underdrain is capped, provide a Capped Underdrain checklist and supporting calculations.

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries	
	BASIN 2		Calculated Cells	

Company Name:	Michael Baker International	Date:	19-Dec-19
Designed by:	Miguel Gonzalez	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	11.7	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	17,526	ft^3
Enter the measured infiltration rate	I=	0.01	in/hr
Enter the Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" of this BMP Design Handbook)	FS =	3.00	
Enter factored infiltration rate (design)	$I_{factored}$=	0.40	in/hr

Bioretention Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	6.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" allowed if vertically constr	d_s =	24.0	inches
Depth of Gravel Storage Layer (Optional Layer; up to 30")	d_g =	12.0	inches

Note: Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches (30 inch bulk depth) unless higher permeability media is used to allow faster filling of this layer.

Total Effective Depth, d_E

$$d_E(ft) = d_p(ft) + [(0.3) \times d_S(ft) + (0.4) \times d_g(ft)]$$

d_E = 1.50 feet

Required Effective Footprint Area, A_{BMP}

$$A_{BMP}\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_{BMP} = 11,684 ft^2

Proposed Surface Area (shall not be less than A_{BMP}) A= 25,271 ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water qualty ponding depth of the basin. The underlying gravel layer should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Message: Facility meets the Minimum Footprint

Drawdown Time (must be less than 72 hours) T_{Dd} = 45.0 hr

Message: Facility meets drawdown time limitations

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Longitudinal Slope of Site (3% maximum)			%
Check Dam Spacing			feet
Describe Vegetation:			

Notes: If underdrain is capped, provide a Capped Underdrain checklist and supporting calculations.

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries	
	BASIN 3A		Calculated Cells	

Company Name:	Michael Baker International	Date:	19-Dec-19
Designed by:	Miguel Gonzalez	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	0.5	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	798	ft^3
Enter the measured infiltration rate	I=	0.01	in/hr
Enter the Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" of this BMP Design Handbook)	FS =	3.00	
Enter factored infiltration rate (design)	$I_{factored}$=	0.40	in/hr

Bioretention Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	6.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" allowed if vertically constr	d_s =	24.0	inches
Depth of Gravel Storage Layer (Optional Layer; up to 30")	d_g =	6.0	inches

Note: Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches (30 inch bulk depth) unless higher permeability media is used to allow faster filling of this layer.

Total Effective Depth, d_E

$$d_E(ft) = d_p(ft) + [(0.3) \times d_S(ft) + (0.4) \times d_g(ft)]$$

d_E = 1.30 feet

Required Effective Footprint Area, A_{BMP}

$$A_{BMP}\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_{BMP} = 614 ft^2

Proposed Surface Area (shall not be less than A_{BMP}) A= 739 ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water qualty ponding depth of the basin. The underlying gravel layer should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Message: Facility meets the Minimum Footprint

Drawdown Time (must be less than 72 hours) T_{Dd} = 39.0 hr

Message: Facility meets drawdown time limitations

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Longitudinal Slope of Site (3% maximum)			%
Check Dam Spacing			feet
Describe Vegetation:			

Notes: If underdrain is capped, provide a Capped Underdrain checklist and supporting calculations.

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries	
	BASIN 3B		Calculated Cells	

Company Name:	Michael Baker International	Date:	19-Dec-19
Designed by:	Miguel Gonzalez	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	2.2	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	3,988	ft^3
Enter the measured infiltration rate	I=	0.03	in/hr
Enter the Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" of this BMP Design Handbook)	FS =	3.00	
Enter factored infiltration rate (design)	$I_{factored}$=	0.40	in/hr

Bioretention Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	6.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" allowed if vertically constr	d_s =	24.0	inches
Depth of Gravel Storage Layer (Optional Layer; up to 30")	d_g =	6.0	inches

Note: Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches (30 inch bulk depth) unless higher permeability media is used to allow faster filling of this layer.

Total Effective Depth, d_E

$$d_E(ft) = d_p(ft) + [(0.3) \times d_S(ft) + (0.4) \times d_g(ft)]$$

d_E = 1.30 feet

Required Effective Footprint Area, A_{BMP}

$$A_{BMP}\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_{BMP} = 3,068 ft^2

Proposed Surface Area (shall not be less than A_{BMP}) A= 4,465 ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water qualty ponding depth of the basin. The underlying gravel layer should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Message: Facility meets the Minimum Footprint

Drawdown Time (must be less than 72 hours) T_{Dd} = 39.0 hr

Message: Facility meets drawdown time limitations

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Longitudinal Slope of Site (3% maximum)			%
Check Dam Spacing			feet
Describe Vegetation:			

Notes: If underdrain is capped, provide a Capped Underdrain checklist and supporting calculations.

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries	
	BASIN 4		Calculated Cells	

Company Name:	Michael Baker International	Date:	19-Dec-19
Designed by:	Miguel Gonzalez	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	7.7	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	12,603	ft^3
Enter the measured infiltration rate	I=	0.01	in/hr
Enter the Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" of this BMP Design Handbook)	FS =	3.00	
Enter factored infiltration rate (design)	$I_{factored}$=	0.40	in/hr

Bioretention Facility Surface Area

Depth of Surface Ponding Layer (6" minimum, 12" maximum)	d_P =	6.0	inches
Depth of Engineered Soil Media (24" to 36"; 18" allowed if vertically constr	d_s =	24.0	inches
Depth of Gravel Storage Layer (Optional Layer; up to 30")	d_g =	6.0	inches

Note: Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches (30 inch bulk depth) unless higher permeability media is used to allow faster filling of this layer.

Total Effective Depth, d_E

$$d_E(ft) = d_p(ft) + [(0.3) \times d_S(ft) + (0.4) \times d_g(ft)]$$

d_E = 1.30 feet

Required Effective Footprint Area, A_{BMP}

$$A_{BMP}\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_{BMP} = 9,695 ft^2

Proposed Surface Area (shall not be less than A_{BMP}) A= 13,144 ft^2

Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water qualty ponding depth of the basin. The underlying gravel layer should extend to this contour. For systems with vertical walls, the effective area is the full footprint.

Message: Facility meets the Minimum Footprint

Drawdown Time (must be less than 72 hours) T_{Dd} = 39.0 hr

Message: Facility meets drawdown time limitations

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Longitudinal Slope of Site (3% maximum)			%
Check Dam Spacing			feet
Describe Vegetation:			

Notes: If underdrain is capped, provide a Capped Underdrain checklist and supporting calculations.

Appendix 7: Hydromodification

Supporting Detail Relating to compliance with the Hydromodification Performance Standards

Examples of material to provide in Appendix 7 may include but are not limited to the following:

- Hydromodification Exemption Exhibit,
- Potential Critical Coarse Sediment Yield Area Mapping
- Hydromodification BMP sizing calculations,
- SMRHM report files,
- Site-Specific Critical Coarse Sediment Analysis,
- Design details/drawings from manufacturers for proprietary BMPs

This information should support the hydromodification exemption (if applicable) and hydrologic control BMP and Sediment Supply BMP sections of this Template. Refer to Section 2.4 and 3.6 of the SMR WQMP and Sections E of this Template.

Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):		Rain Gauge	Wildomar/North Murrieta
Latitude (decimal format):		BMP Type (per WQMP):	
Longitude (decimal format):		BMP Number (Sequential):	

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	2.4	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3		0.6
LONGEST WATERCOURSE (FT) - 1,000' max[1]	431	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1		0.98
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1344	SLOPE OF THE INTENSITY DURATION - Plate D-4.6		0.45
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1327	LOW LOSS RATE (%) calc'd:	90.00	Over-ride:
EXISTING IMPERVIOUS PERCENTAGE (%)	0	CLOSEST IMPERVIOUS PERCENTAGE (%)		0% Undeveloped - Poor Cover
Use 10% of Q2 to avoid Field Screening requirements	Yes			

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
5	2.4 Ac.	Chaparral, Narrowleaf	Poor Cover	13		87		72	**86**	94
								0	**0**	0
								0	**0**	0
	2.40 Ac.						**Weighted Average RI Numbers =**	**72.0**	**86.0**	**94.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **1.915** cfs	Ex. 10% of the 2-year Flowrate[1] = **0.233** cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	2.4
LONGEST WATERCOURSE (FT)	311
DIFFERENCE IN ELEV (FT) - along watercourse	5
PROPOSED IMPERVIOUS PERCENTAGE (%)	86

Go to "BMP Design" tab to design your BMP, then check results below.
Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	2.4 Ac.	Urban Landscaping	Good Cover				100	80	**91**	97
								0	**0**	0
								0	**0**	0
	2.40 Ac.						**Weighted Average RI Numbers =**	**80.0**	**91.0**	**97.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
		Requirement		Proposed			
Hydromod Ponded depth	**0.40 feet**						
Hydromod Drain Time (unclogged)							
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: _____ Date: _____

Signature: _____

Spreadsheet Developed by: Benjie Cho, P.E.

BMP Design

Fill in **blue** shaded areas

BMP Geometry & Detention Calculations

0.1	feet, Stage Incremental Intervals

Larger intervals may incr. the Q at the bottom stg.

PROPOSED BASIN DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Bottom Stage h= 3.00', ss= 4:1

	Top Area		Bottom Area	
Width	86	Width	62	FT
Length	115.66	Length	91.66	FT
area =	9946.76	area =	5683	

Top Stage h= 0.00', ss= 4:1

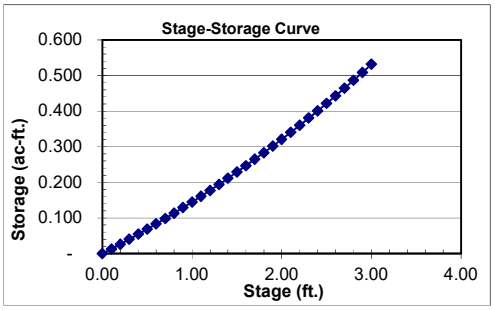
	Top Area		Bottom Area	
Width	0	Width		FT
Length	0	Length		FT
area =	0	area =	0	

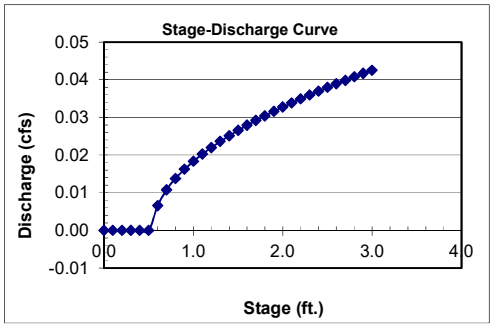
Bottom Stage Vol. =	23,148	FT3
Top Stage Vol. =	-	FT3
Total Volume[1] =	23,148	FT3
Max HydroMod Volume =	2,101	FT3
Total Acreage[2] =	9,947	Acres
BMP % of Site =	9.51%	
Max HydroMod Depth[3] =	0.40	FT

[1]Does not include forebay, or low flow trench

[2]Does not account for freeboard or access roads

[3]Does not consider Increased Runoff





STEP2: Input design for lowest orifice

Info for lowest orifice out of the basin	
0.005	Slope of orifice (feet/feet)
0.013	Manning's n for bottom orifice
0.2	Entrance Loss Coeff. (see Table C.2) =>

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the Existing Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of holes	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0.5	1.00	1			

MINIMUM DESIGN GEOMETRY

Set overflow weir at Hydromod Depth =	0.40 FT
Min. Basin depth with 1' Freeboard =	1.40 FT

Set emergency overflow spillway at or above this elev.

Top Surface Area

Based on HydroMod Depth +1' of Freeboard

Bottom Stage		
Width	86	FT
Length	115.66	FT

Top Stage		
Width	11.2	FT
Length	11.2:1	FT

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Stage-Storage-Discharge

Stage (ft)	Storage (ac-ft)	Storage (ft3)	Q (cfs)
0.00	-	-	0.00
0.10	0.013	574	0.00
0.20	0.027	1,161	0.00
0.30	0.040	1,761	0.00
0.40	0.054	2,373	0.00
0.50	0.069	2,998	0.00
0.60	0.083	3,636	0.01
0.70	0.098	4,287	0.01
0.80	0.114	4,951	0.01
0.90	0.129	5,628	0.02
1.00	0.145	6,319	0.02
1.10	0.161	7,023	0.02
1.20	0.178	7,741	0.02
1.30	0.195	8,473	0.02
1.40	0.212	9,219	0.03
1.50	0.229	9,979	0.03
1.60	0.247	10,754	0.03
1.70	0.265	11,542	0.03
1.80	0.283	12,345	0.03
1.90	0.302	13,163	0.03
2.00	0.321	13,995	0.03
2.10	0.341	14,842	0.03
2.20	0.361	15,704	0.03
2.30	0.381	16,582	0.04
2.40	0.401	17,474	0.04
2.50	0.422	18,382	0.04
2.60	0.443	19,306	0.04
2.70	0.465	20,245	0.04
2.80	0.487	21,199	0.04
2.90	0.509	22,170	0.04
3.00	0.532	23,157	0.04
#N/A	#N/A		#N/A
#N/A	#N/A		#N/A
#N/A	#N/A		#N/A
#N/A	#N/A		#N/A
#N/A	#N/A		#N/A
#N/A	#N/A		#N/A
#N/A	#N/A		#N/A
#N/A	#N/A		#N/A
#N/A	#N/A		#N/A

Add Infiltration

Enter information from actual infiltration tests	
No	Consider Infiltration (Yes or No)?
0.03	Infiltration rate (in/hr) [3]
3	Factor of Safety (3 or greater) [3]
360	mins, Max. Time represented by tests

0.0039	ft3/sec, Infiltration (over entire bottom)
-	ft3/sec, Infiltration / Factor of Safety

[3]Per the RC LID Manual, Appendix A.

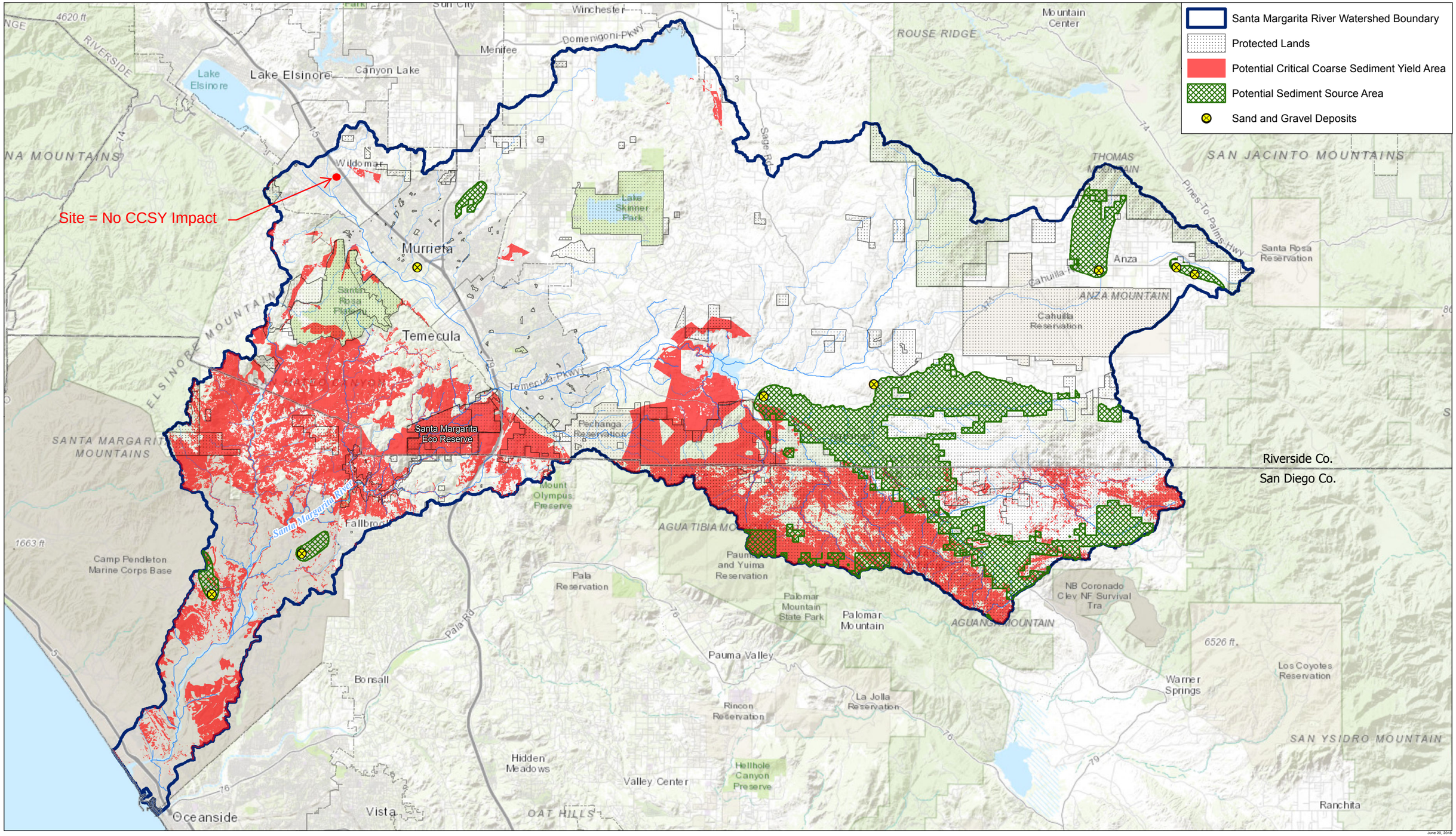


Exhibit G-1

SANTA MARGARITA RIVER WATERSHED

POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS AND POTENTIAL SEDIMENT SOURCE AREAS

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Include a copy of the completed Pollutant Sources/Source Control Checklist used to document Source Control BMPs in Section H of this Template.

Attachment 1

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section H of the 2018 SMR WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table H.1 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	**… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE**		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☒ **A.** On-site storm drain inlets	☒ Locations of inlets.	☒ Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	☒ Maintain and periodically repaint or replace inlet markings. ☒ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☒ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ☒ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
☐ **B.** Interior floor drains and elevator shaft sump pumps		☐ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.
☐ **C.** Interior parking garages		☐ State that parking garage floor drains will be plumbed to the sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☐ **D1.** Need for future indoor & structural pest control		☐ Note building design features that discourage entry of pests.	☐ Provide Integrated Pest Management information to owners, lessees, and operators.
☒ **D2.** Landscape/ Outdoor Pesticide Use	☒ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ☐ Show self-retaining landscape areas, if any. ☒ Show stormwater treatment and hydrograph modification management BMPs.	State that final landscape plans will accomplish all of the following. ☐ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☒ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ☒ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☒ Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☒ Maintain landscaping using minimum or no pesticides. ☒ See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at: http://www.rcwatershed.org/about/materials-library/#1450469138395-bb76dd39-d810 ☒ Provide IPM information to new owners, lessees and operators.

Attachment 1

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☒ **E.** Pools, spas, ponds, decorative fountains, and other water features.	☒ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)	If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	☒ See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at: http://www.rcwatershed.org/about/materials-library/#1450469201433-f5f358c9-6008
☐ **F.** Food service	☐ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ☐ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	☐ Describe the location and features of the designated cleaning area. ☐ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	☐ See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 Provide this brochure to new site owners, lessees, and operators.
☐ **G.** Refuse areas	☐ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ☐ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ☐ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☐ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☐ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☐ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **H.** Industrial processes.	❑ Show process area.	❑ If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank www.cchealth.org/groups/hazmat/	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 ❑ Car dealerships and similar may rinse cars with water only.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **K.** Vehicle/Equipment Repair and Maintenance	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations; "Outdoor Cleaning Activities;" and "Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants. Brochures can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **L.** Fuel Dispensing Areas	❑ Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.		❑ The property owner shall dry sweep the fueling area routinely. ❑ See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

[6] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **M.** Loading Docks	❑ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer. ❑ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ❑ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		❑ Move loaded and unloaded items indoors as soon as possible. ❑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **N.** Fire Sprinkler Test Water		❑ Provide a means to drain fire sprinkler test water to the sanitary sewer.	❑ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water or Other Sources ❑ Boiler drain lines ❑ Condensate drain lines ❑ Rooftop equipment ❑ Drainage sumps ❑ Roofing, gutters, and trim. ❑ Other sources		❑ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ❑ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ❑ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ❑ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ❑ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. ❑ Include controls for other sources as specified by local reviewer.	

Attachment 1
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ **P.** Plazas, sidewalks, and parking lots.			☒ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Include the completed Operation and Maintenance Plan in this Appendix along with additional documentation of Finance and Maintenance Recording Mechanisms for the site. Refer to Sections 3.10 and 5 of the SMR WQMP and Section J of this Template.

3.4 Bioretention Facility

Type of BMP	LID – Bioretention
Priority Level	Priority 1 – Full Retention
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation,
Infiltration Rate Range	> 0.8 in/hr factored design infiltration rate
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 5 acres. For facilities treating larger drainage basins, see Fact Sheet 3.7 for additional guidance on design of larger scale facilities.

Description

Bioretention Facilities are shallow, vegetated basins underlain by an engineered soil media designed to retain the design capture volume V_{BMP}. Bioretention Facilities function similarly to infiltration basins but have a shallower ponding depth and provide additional treatment through the inclusion of the soil media. Stormwater infiltrates through soil media and the bottom of the basin. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil media and maximize plant uptake of pollutants and runoff. This helps extend the lifespan before clogging occurs and allows more of the soil column to function as both a sponge (retaining water) and a biofilter. In all cases, the bottom of a Bioretention Facility is unlined as the primary treatment process is infiltration. Flows exceeding V_{BMP} must discharge to a downstream conveyance system. Biofiltration basins can be effective in removing targeted pollutants from stormwater runoff. Low-nutrient soil media (see Fact Sheet 3.8) is necessary to provide treatment and avoid leaching of nutrients.

Siting Considerations

These facilities generally work best when they are designed in a relatively level area. Unlike other BMPs, Bioretention Facilities can be used in smaller landscaped spaces on the site, such as, parking islands, medians, and site entrances. Identification of opportunities for siting bioretention facilities should begin with the initial layout of the site. Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Bioretention Facilities. This can be accomplished by:

- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention Facility.

For systems treating larger areas also consult Fact Sheet 3.7.

Bioretention Facilities should not be used downstream of areas where large amounts of sediment can clog the system. Placing a Bioretention Facility at the toe of a steep slope should also be avoided due to the potential for clogging the engineered soil media with erosion from the slope, as well as the potential for damaging the vegetation. Inclusion of additional design components such as pretreatment may be included to mitigate clogging potential at the discretion of the local jurisdiction.

The use of bioretention facilities may be restricted by risk of groundwater contamination, low soil permeability, and elevated potential for clogging at the site. Refer to Section 2.3.3 of the SMR WQMP for feasibility considerations for using bioretention BMPs. These BMPs may not be appropriate for the following site conditions:

- Industrial sites or locations where spills of toxic materials may occur, except where spill containment and/or hydrologic isolation is provided to mitigate the risk of groundwater contamination the satisfaction of the local jurisdiction
- Sites with very low soil infiltration rates or rates that cannot be reliably estimated prior to construction (e.g., deeper fills or deeper cuts)
- Sites with high groundwater tables where pollutants can affect groundwater quality
- Sites with unstabilized soil or construction activity upstream
- On steeply sloping terrain

Setbacks

Always consult your geotechnical engineer for site specific recommendations regarding setbacks for Bioretention Facilities. Recommended setbacks are needed to protect buildings, existing trees, walls, onsite or nearby wells, streams, and tanks. Setbacks should be considered early in the design process since they can affect where Biofiltration Facilities may be placed and how deep they are allowed to be.

Bioretention Facilities typically should be set back:

- 10 feet from the historic high groundwater (measured vertically from the bottom of the basin, as shown in Figure 1
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the basin, as shown in Figure 1.
- From all existing mature tree drip lines as indicated in Figure 1 (to protect their root structure)
- 100 feet horizontally from wells, tanks or springs

Setbacks to walls and foundations must be included as part of the Geotechnical Report. All other setbacks shall be in accordance with applicable standards of the District's *Basin Guidelines* (Appendix C).

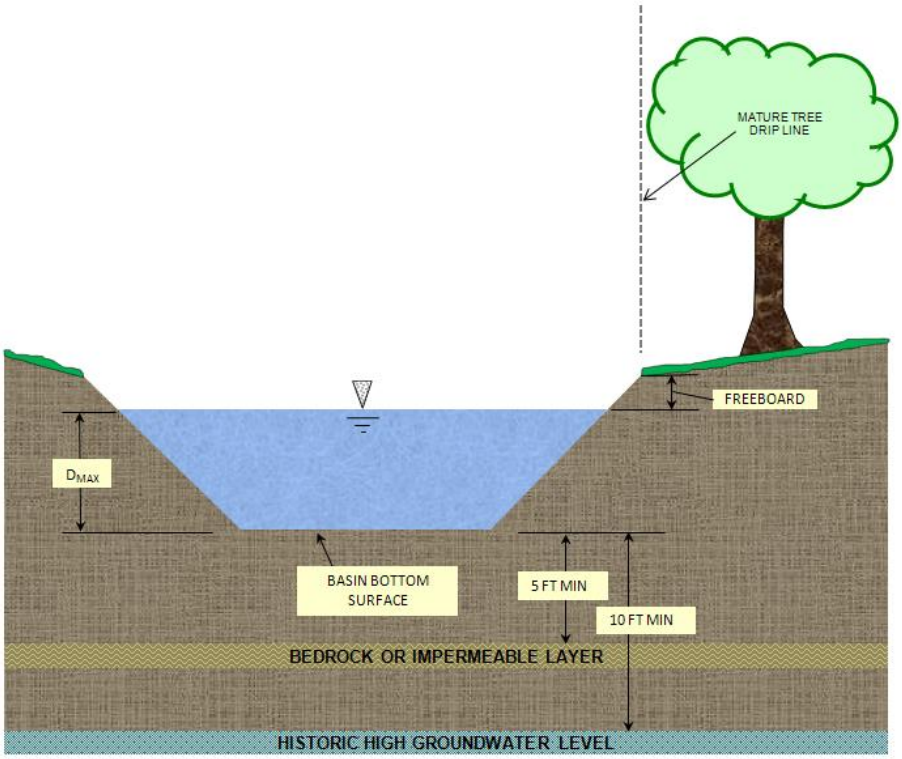


Figure 1 **: Setback Recommendations for a Bioretention Facility**

Pretreatment

Pretreatment should be considered to prevent premature clogging of bioretention BMPs. Pretreatment is strongly encouraged where the BMP will receive runoff from high traffic parking lots or roads, mixed land uses (with some erodible areas), or other land uses likely to generate elevated sediment.

For BMPs receiving overland flow, pretreatment may be provided using forebays with a volume equivalent to at least 10 percent (preferably 20 percent) of V_{BMP}. A forebay is effectively the first cell in the bioretention system, separated from the remaining area by a berm or cross plate. The forebay is designed to maximize sedimentation and will require more frequent, but more spatially-focused maintenance. This portion of the system can be concrete lined to facilitate simpler maintenance.

For BMPs with piped inlets, a forebay or sedimentation manhole may be applicable. In these systems, it is also necessary to consider energy dissipation near the inlet pipe, such as via a gravel/rock pad and berm system or concrete splash block, to avoid erosion of the bioretention media bed.

If the BMP will receive runoff primarily from roofs, low-traffic impervious surface, or similar low sediment generating surfaces, then pre-treatment is not necessary, but energy dissipation should still be considered, particularly if there is a piped inflow such as a downspout.

Design and Sizing Criteria

This section summarizes the recommended design parameters for Bioretention Facilities. Use of the recommended parameters will help provide the expected treatment and long term performance of the BMP. Deviations from the recommended parameters may be warranted and approved by the local jurisdiction based on site specific considerations. The recommended cross section for a Bioretention Facility includes:

- Vegetated area
- 6" minimum, 12" maximum, surface ponding, measured from the top of the mulch layer (for designs with deeper depths, consult Fact Sheet 3.7)
- Mulch layer (non-floating organic mulch or rock mulch)
- 24" recommended minimum depth of engineered soil media (36" preferred; 18" allowed in vertically-constrained conditions at the discretion of the local jurisdiction)
- Engineered soil media design filtration rate of 2.5 inches per hour (initial filtration rate should be higher).
- 6" optional filter course layer (required if aggregate storage layer is included)
- Optional gravel storage layer below media
- Optional capped underdrain pipe (see Resilient Design Features section below for specific criteria and conditions related to this option)

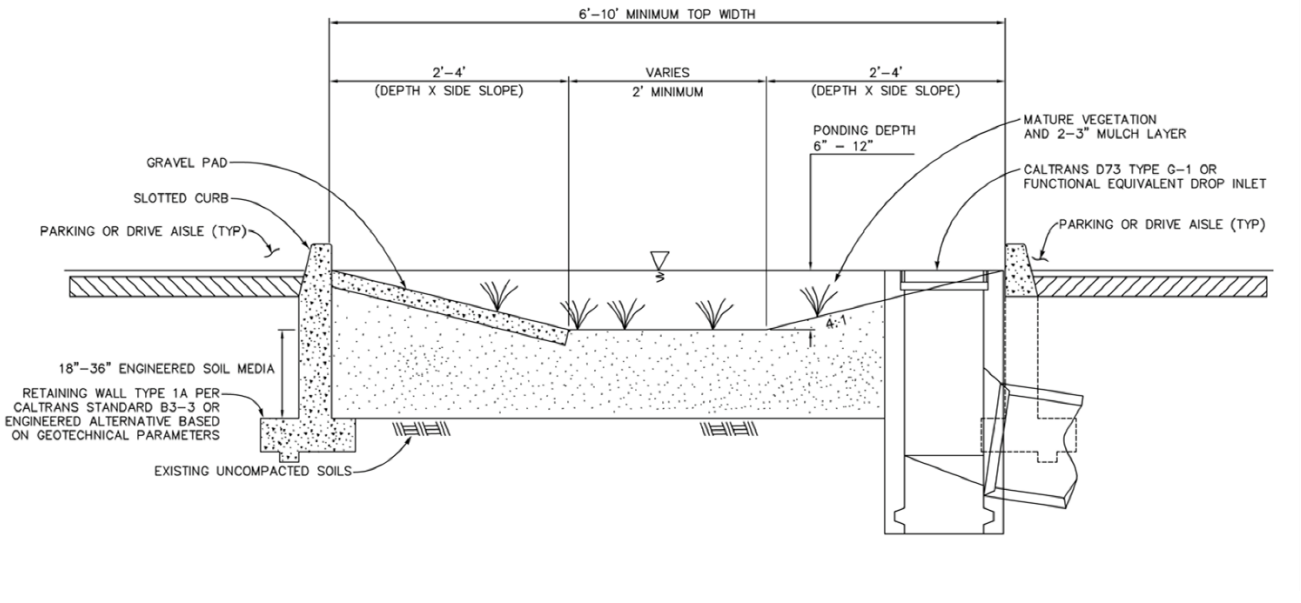


Figure 2: Standard Cross Section for a Bioretention Facility

Pore space in the soil and gravel layer can be credited as storage volume. However, several considerations must be noted:

- Ponding depth above the soil surface (6 to 12 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil infiltration rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be used for the gravel and filter course layers.
- Additional depth below the storage layer (via gravel) may be used to increase retention storage, under the following conditions:
    - The total system infiltrates the stored water in less than 72 hours
    - The depth below the media does not exceed the amount of water that can be filtered through the media during a typical DCV storm duration (5 hours, unless otherwise documented).

Adaptable/Resilient Design Option

At the discretion of the engineer and with the approval of the local jurisdiction, bioretention BMPs may be designed with a gravel drainage layer and a **capped** underdrain. This is effectively a biofiltration design (Fact Sheet 3.5), but there is no design discharge from the underdrains. The benefit of this configuration is that it allows simpler adaptation to a biofiltration BMP if this is warranted, documented, and approved.

This option **may only** be approved for use under the conditions described in Section 2.3.3.g of the WQMP, including:

1) The BMP must meet applicable infiltration BMP sizing standards without any discharge through the underdrain.

2) The Project-Specific WQMP must also meet all applicable sizing standards (biofiltration sizing, hydromodification, if applicable) standards if the underdrain is uncapped.

3) The underdrain must remain capped. Inspections conducted as part of the O&M Plan must corroborate that the underdrain remains capped.

4) If conditions are identified that require the underdrain to be uncapped to allow the BMP to be enlarged or otherwise modified to remedy the documented unacceptable performance, this must include: (a) documentation of the conditions that prompt and justify the require design revision, (b) revision of the Project-Specific WQMP to reflect the revised configuration, and (c) jurisdictional review, approval, and recordation of the revised Project Specific WQMP with commensurate updates to the O&M Plan.

See Section 5.3.6 for guidance on Project-Specific WQMP updates. Note that this is the same process that would be required to wholly redesign and reconstruct an underperforming BMP. However, if adaptable design features are included, the actual physical change could be limited to uncapping the underdrain.

Design Adaptations

Bioretention facilities can be designed to meet both pollutant control and hydromodification control performance standards. Combined facilities typically include increased storage (surface and or subsurface) and flow control devices (i.e. outlet orifices and/or weirs). Outlets elevations must be set above the V_{BMP} ponding level and the facilities must satisfy both the pollutant control and hydromodification control performance standards.

For systems exceeding 12 inches ponding depth and/or 5 acres tributary area, see additional design considerations in Fact Sheet 3.7.

Subsurface storage is not required but may be provided in the form of a gravel storage layer. Refer to the Subsurface Storage Requirements section for additional information and criteria.

Engineered Soil Media and Filter Course Aggregate Requirements

Refer to Fact Sheet 3.8 for specifications for engineered soil media and aggregate layers serving as filter course and drain rock in bioretention BMPs.

Subsurface Storage Requirements

Applicants may choose to provide a portion of the BMP storage volume as subsurface storage in a gravel storage layer. Use of subsurface storage instead of surface storage can be useful when the available surface ponding depth is limited or when a deeper profile is desired to reduce footprint requirements.

The gravel storage layer shall not provide a greater storage volume than can be routed through the soil media during the typical design storm duration (i.e. 2.5 inches/hour x 5 hours = 12 inches effective water depth). Alternatively, a separate routing calculation may be performed by the applicant to demonstrate that the provided volume does not result in surface overflow (bypass of the BMP) before the gravel storage layer is full.

When gravel storage layers are used, the filter course layer should be specifically designed to prevent migration of the engineered soil media into the storage layer. Refer to Fact Sheet 3.8 for filter course requirements. Inclusion of a filter course layer is mandatory unless filter fabric is allowed per manufacturer's recommendation and is acceptable to the local jurisdiction.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Bioretention Facility. The area should be designed for at least 70 percent mature coverage throughout the Bioretention Facility. To prevent the BMP from being used as walkways,

Bioretention Facilities shall be planted with densely planted shrubs and grasses. Grasses shall be shall be compatible with periodic inundation, preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Vegetation should be selected to withstand the anticipated drawdown time and ponding depths. Trees should only be used where they can be rooted into underlying native soil.

A 2 to 3-inch layer of standard shredded aged hardwood mulch shall be placed as the top layer inside the Bioretention Facility. Rounded stone mulch may be considered. A sacrificial layer of coarse sand could be considered between the bioretention soil and stone mulch to reduce surface compaction. The ponding depth shown in Figure 2 above shall be measured from the top surface of the 2 to 3-inch mulch layer.

Curb Cuts and Energy Dissipation

If the Bioretention Facility is sited to receive runoff from adjacent impervious areas, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 3 shows a curb cut in a Bioretention Facility. Curb cut flow lines must be at or above the V_{BMP} water surface ponding level. Additionally, vertical curb cuts may be a tripping hazard. Where feasible, curb cuts should be tapered from the bottom to top of curb as shown below. When tapered cuts are used, the minimum bottom cut width remains 1 foot.

Figure 3: Curb Cut located in a Bioretention Facility

To reduce erosion, a gravel or riprap pad shall be placed at each inlet point to the Bioretention Facility. The pad inside the Bioretention Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope. The size of gravel or riprap should be selected to withstand the expected peak flows into the basin.

In addition, an apron of stone or concrete, a foot square or larger should be placed inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 4.

When runoff is routed to the facility via a pipe, gutter, ditch or other conveyance structure, the conveyance should outlet to the forebay portion of the BMP and include appropriate energy dissipation devices to prevent erosion and scouring of the forebay (i.e. limit outlet velocities to less than 2 feet per second).

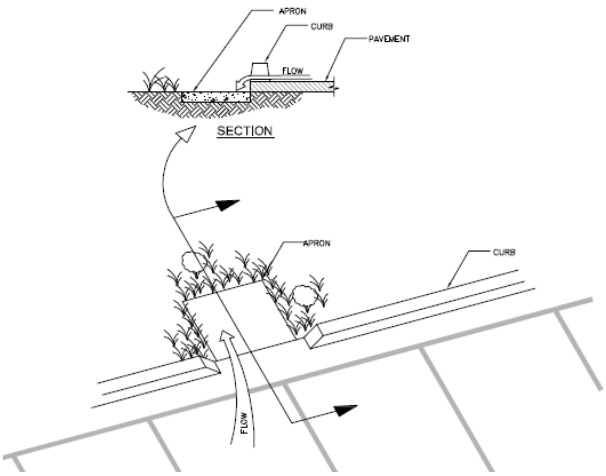


Figure 4: Apron located in a Bioretention Facility

Terracing the Facility

It is recommended that Bioretention Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Bioretention Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity.

The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 4:1. Table 1 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 1: Check Dam Spacing

6" Check Dam Spacing	
Slope	Spacing
1%	25'
2%	15'
3%	10'

Roof Runoff

Roof downspouts may be directed towards Bioretention Facilities. However, the downspouts must discharge onto a concrete splash block or other appropriate energy dissipation device to protect the Bioretention Facility from erosion.

Retaining Walls

When Bioretention facilities are located adjacent to structures, walkways, roadways, parking lots, etc., it is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Bioretention Facility. This practice will protect the sides of the Bioretention Facility from collapsing during construction and maintenance or

from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

Bioretention Facilities Requiring Side Slopes

The design should assure that the Bioretention Facility does not present a tripping hazard. Bioretention Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, should have a gentle slope to the bottom of the facility. Side slopes inside of a Bioretention Facility should generally be 4:1 unless steeper is approved by the local jurisdiction. A typical cross section for the Bioretention Facility is shown in Figure 2.

Bioretention Facilities Not Requiring Side Slopes

Where cars park perpendicular to the Bioretention Facility, side slopes are not required. A 12-inch maximum drop may be used for vertical walls, and the Bioretention Facility should be planted with shrubs to prevent pedestrian access. In this case, a curb is not placed around the Bioretention Facility, but wheel stops shall be used to prevent vehicles from entering the Bioretention Facility, as shown in Figure 5: Bioretention Facility Layout without Side Slopes

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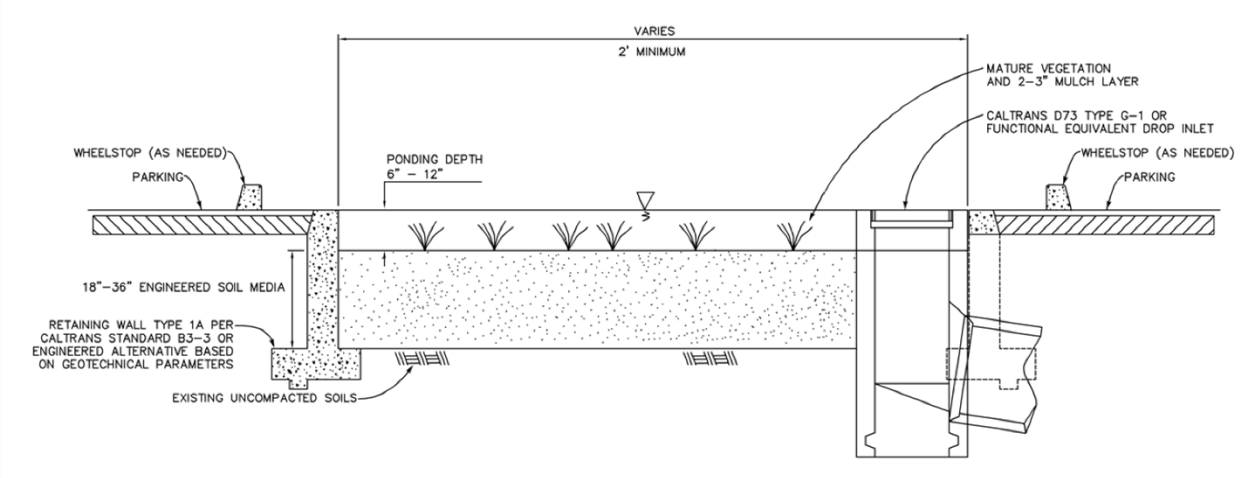


Figure 5: Bioretention Facility Layout without Side Slopes

Overflow

An overflow route is needed in the Bioretention Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 2 and Figure 6.. The inlet to the overflow structure shall be elevated inside the Bioretention Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 6. This will allow the design capture volume to be fully infiltrated by the Bioretention Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **not** be located in the entrance of a Bioretention Facility, as shown in Figure 6.

Figure 6: Incorrect Placement of an Overflow Inlet

Underdrain Gravel and Pipes

An underdrain gravel layer and capped perforated pipes may be provided in accordance with Appendix B – Underdrains. This is an optional configuration that is recommended when the design infiltration rate is between 0.8 and 2inches per hour. When the BMP is installed, the underdrain must be capped, such that no water is discharged. The underdrain serves only as a backup plan, which allows the facility to be converted to a biofiltration with partial infiltration facility if the post-construction infiltration rate is significantly less than measured during planning and design. Removal of the underdrain cap and conversion of the bioretention facility to a biofiltration with partial infiltration facility must be approved by the local jurisdiction with appropriate modifications to the Project-Specific WQMP and O&M Plan, as applicable.

Inspection and Maintenance Schedule

Inspection and maintenance of Bioretention Facilities is required to provide long term performance of these systems. Table 2 below provides a summary of the typical maintenance activities that may be applicable. Project specific activities and schedules may vary and are required to be included as part of the applicant's O&M Plan. At a minimum, the Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Bioretention Facility should be minimized.

Table 2: Maintenance Summary

Activity

• Maintain vegetation as needed. Use of fertilizers, pesticides and herbicides should be avoided as much as possible to ensure they do not contribute to water pollution. If appropriate native plant selections and other IPM methods are used, such products should not be needed. If such projects are used,
  ○ Products should be applied in accordance with their labeling, especially in relation to application to water, and in areas subjected to flooding.
  ○ Fertilizers should not be applied within 15 days before, after, or during the rainy season.
• Remove debris and litter from the entire basin to minimize clogging and improve aesthetics.
• Check for obvious problems and repair as needed. Address odor, insects, and overgrowth issues associated with stagnant or standing water in the basin bottom.
• Check for erosion and sediment laden areas in the basin. Repair as needed. Clean forebay if needed.
• Revegetate side slopes where needed.
• Inspect areas for ponding
• Inspect for erosion and clogging, repair as needed.
• Inspect of hydraulic and structural facilities: examine the inlet for blockage, the embankment and spillway for integrity, and damage to any structural element.
• Check for erosion, slumping and overgrowth. Repair as needed.
• Check basin depth for sediment build up and reduced total capacity. Scrape bottom as needed and remove sediment. Restore to original cross-section and infiltration rate. Replant basin vegetation.
• Verify the basin bottom is allowing acceptable infiltration. Scarify the surface using a rake, etc., to restore infiltration, working to avoid damage to plants if possible.
• No water should be present 72 hours after an event. No long term standing water should be present at all. No algae formation should be visible. Correct problem as needed.

Bioretention Facility Sizing and Design Procedure

1) Enter the area tributary, A_T, to the Bioretention Facility.

2) Enter the Design Capture Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3) Select the type of design used. There are two types of Bioretention Facility designs: the standard design used for most project sites that include side slopes, and the modified design used when the BMP does not use side slopes.

4) Enter the depth of the engineered soil media, d_S. The recommended minimum depth is 24". A depth of 36" is preferred to provide a enhanced root zone. Engineered soil media deeper than 36" will only get credit for the pore space in the first 36".

5) Enter the depth of the gravel storage layer, d_g (if included). This dimension includes the associated 6-inch filter course layer (do not double count this dimension).

6) Calculate the total effective depth, d_E, within the Bioretention Facility. The maximum allowable pore space of the soil media is 30% while the maximum allowable pore space for the gravel layer is 40%.

   This is calculated as:

$$d_E(ft) = d_P(ft) + [(0.3) \times d_S(ft) + (0.4) \times dg(ft)]$$

   Where:

   d_p = ponding depth
   d_s = soil depth
   d_g = gravel depth

7) Check that drawdown time is acceptable (72 hours, or shorter if needed to support selected vegetation):
   a. Drawdown Time = d_E / K_{design}

   Where:

   K_{design} = design infiltration rate (factored) determined per Section 2.3 of the WQMP and Appendix A of this LID-BMP Manual.

8) Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches unless higher permeability media is used to allow faster filling of this layer.

9) Calculate the required effective footprint area, this shall be measured at the mid-ponding depth of the BMP. For systems with side slopes, this should be the contour that is midway between the floor of the basin and the overflow elevation of the basin. The footprint of

the underlying gravel storage should extend to this contour. For systems with vertical walls, the effective footprint area is the full footprint.

This is calculated as:

$$\mathrm{A_{BMP}}(\text{sq ft}) = \mathrm{V_{BMP}}(cu\ ft)/d_E(ft)$$

10) Enter the proposed effective surface area. This area shall not be less than the minimum required effective surface area.

11) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design.

12) Provide the slope of the site around the Bioretention Facility, if used. The maximum slope is 3 percent for a standard design.

13) Provide the check dam spacing, if the site around the Bioretention Facility is sloped.

14) Describe the vegetation used within the Bioretention Facility.

References Used to Develop this Fact Sheet

Anderson, Dale V. "Landscaped Filter Basin Soil Requirements." Riverside, May 2010.

California Department of Transportation. CalTrans Standard Plans. 15 September 2005. May 2010 <http://www.dot.ca.gov/hq/esc/oe/project_plans/HTM/stdplns-met-new99.htm>.

Camp Dresser and McKee Inc.; Larry Walker Associates. California Stormwater Best Management Practice Handbook for New Development and Redevelopment. California Stormwater Quality Association (CASQA), 2004.

Contra Costa Clean Water Program. Stormwater Quality Requirements for Development Applications. 3rd Edition. Contra Costa, 2006.

County of Los Angeles Public Works. Stormwater Best Management Practice Design and Maintenance Manual. Los Angeles, 2009.

Kim, Hunho, Eric A. Seagren and Allen P. Davis. "Engineered Bioretention for Removal of Nitrate from Stormwater Runoff." Water Environment Research 75.4 (2003): 355-366.

LA Team Effort. LA Team Effort: FREE Planter Boxes for Businesses. 2 November 2009. May 2010 <http://lateameffort.blogspot.com/2009/11/free-planter-boxes-for-businesses-est.html>.

Montgomery County Maryland Department of Permitting Services Water Resources Section. Biofiltration (BF). Montgomery County, 2005.

Orange County Technical Guidance Document, September 2017.

San Diego Model BMP Design Manual, June 2015.

City of San Diego Stormwater Standards Manual. 2017.

Ventura Countywide Stormwater Quality Management. Technical Guidance Manual for Stormwater Quality Control Measures. Ventura, 2002.

United States Environmental Protection Agency. Storm Water Technology Fact Sheet Bioretention. Washington D.C, 1999.

Urban Drainage and Flood Control District. Urban Storm Drainage Criteria Manual Volume 3 - Best Management Practices. Vol. 3. Denver, 2008. 3 vols.

Urbonas, Ben R. Stormwater Sand Filter Sizing and Design: A Unit Operations Approach. Denver: Urban Drainage and Flood Control District, 2002.

3.7 Sand Filter Basin

Type of BMP	Treatment
Treatment Mechanisms	Filtration, Biofiltration
Maximum Tributary Area	25 acres
Other Names	Sand Filter, Media Filter, Pocket Filter

Description

The Sand Filter Basin (SFB) is a basin where the entire invert is constructed as a stormwater filter, using a sand bed above an underdrain system. Stormwater enters the SFB at its forebay where trash and sediment accumulate or through overland sheet flow. Overland sheet flow into the Sand Filter Basin is biofiltered through the vegetated side slopes or other pre-treatment. Flows pass into the sand filter surcharge zone and are gradually filtered through the underlying sand bed. The underdrain gradually dewaters the sand bed and discharges the filtered runoff to a nearby channel, swale, or storm drain.

The primary advantage of the SFB is its effectiveness in removing pollutants where infiltration into the underlying soil is not practical, and where site conditions preclude the use of a Bioretention Facility . The primary disadvantage is a potential for clogging if silts and clays are allowed to flow into the SFB. In addition, this BMP's performance relies heavily on its being regularly and properly maintained.

While this BMP is not currently considered an LID BMP, when designed in accordance with this manual, a Sand Filter Basin is considered to be a highly effective Treatment Control BMP.

Siting Considerations

SFBs should be avoided where onsite configurations include a base flow and/or where this BMP would be put into operation while construction, grading or major landscaping activities are taking place in the tributary catchment. **This BMP has a flat surface area**, so it may be challenging to incorporate into steeply sloping terrain. SFBs should be set away from areas that could discharge fine sediments into the basin such as at the bottom of a slope. **See Section 1 of Riverside County Flood Control and Water Conservation District's "Basin Guidelines" (Appendix C) for additional requirements** (i.e., fencing, maintenance access, etc.) or other guidelines issued by the Engineering Authority (EA)[1].

[1] The Engineering Authority (EA) may choose to alter these guidelines and may have different/additional requirements. These entities, along with the District, will be referred to as the EA.

Setbacks

The bottom of the sand filter should remain above the seasonal high groundwater level. Always consult your geotechnical engineer for additional site specific recommendations.

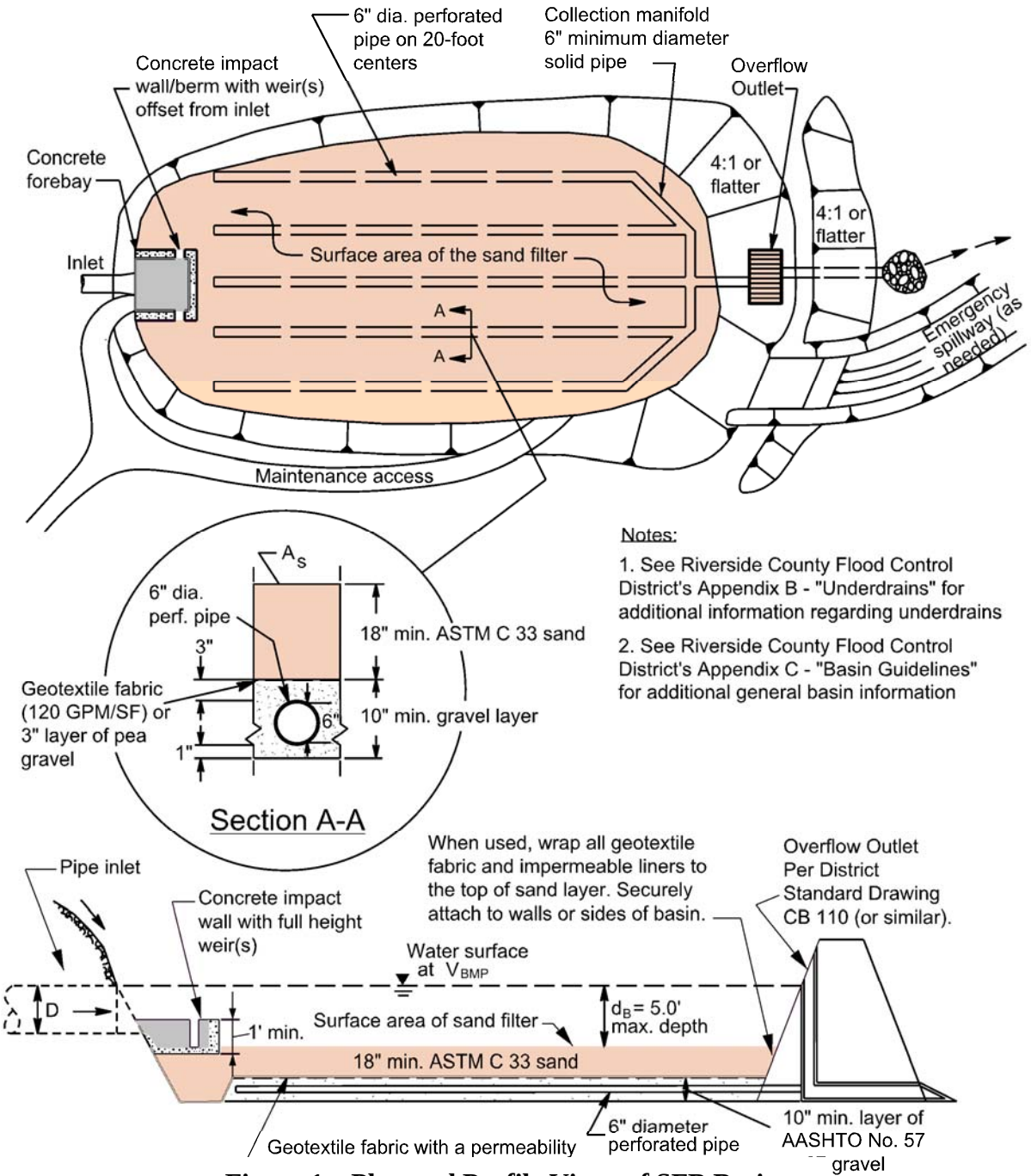


Figure 1 – Plan and Profile Views of SFB Basin

Forebay

A concrete forebay shall be provided to reduce sediment clogging and to reduce erosion. The forebay shall have a design volume of at least 0.5% V_{BMP} and a minimum 1 foot high concrete splashwall. Full height notch-type weir(s), offset from the line of flow from the basin inlet to prevent short circuiting shall be used to outlet the forebay. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 1).

Underdrains

Underdrain piping shall consist of a manifold (collector) pipe with perforated lateral branching. The lateral branching conveys the filtered water to the manifold where it is discharged into the outlet structure. See Appendix B for additional information.

Overflow Structure

An overflow must be provided to drain volume in excess of V_{BMP} or to help drain the system if clogging were to occur. Overflows shall flow to an acceptable discharge point such as a downstream conveyance system. Overflows must be placed above the water quality capture volume and near the outlet of the system. The overflow structure shall be similar to the District's Standard Drawing CB 110.

Recommended Maintenance

Table 1 - Recommended Inspection and Maintenance Activities for SFBs

Schedule	Inspection and Maintenance Activity
Semi-monthly including just before the annual storm season and following rainfall events.	• Routine maintenance and inspection. • Remove debris and litter from the entire basin to minimize filter clogging and to improve aesthetics. • Check for obvious problems especially filter clogging and signs of long term ponding. Repair as needed. Address odor, insects, and overgrowth issues associated with stagnant or standing water in the basin bottom. There should be no long-term ponding water. • Check for erosion and sediment laden areas in the basin. Repair as needed. Clean forebay if needed. • Revegetate side slopes where needed.
Annually. If possible, schedule these inspections within 72 hours after a significant rainfall.	• Inspection of hydraulic and structural facilities. Examine the overflow outlet for clogging, the embankment and spillway integrity, and damage to any structural element. • Check side slopes and embankments for erosion, slumping and overgrowth. • Inspect the sand media at the filter drain to verify it is allowing acceptable infiltration. **Scarify the top 3 inches by raking the filter drain's sand surface annually.** • Check the filter drain underdrains for damage or clogging. Repair as needed. • Repair basin inlets, outlets, forebays, and energy dissipaters whenever damage is discovered. • No water should be present 72 hours after an event. No long term standing water should be present at all. No algae formation should be visible. Correct problem as needed.
Every 5 years or sooner depending on the observed drain times (no more than 72 hours to empty the basin).	• Remove the top 3 inches of sand from the filter drain and backfill with 3 inches of new sand to return the sand layer to its original depth. When scarification or removal of the top 3 inches of sand is no longer effective, remove and replace sand filter layer.

Table 2 - Design and Sizing Criteria for SFBs

Design Parameter	Extended Detention Basin
Maximum tributary area	25 acres [2]
Basin design volume	100% of V_{BMP}
Maximum basin depth	5 feet
Forebay volume	0.5 % of V_{BMP}
Longitudinal Slope	0%
Transverse Slope (min.)	0%
Outlet erosion control	Energy dissipaters to reduce velocities[1]

1. **Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures**
2. **CA Stormwater BMP Handbook for New Development and Significant Redevelopment**

Note: The information contained in this BMP Factsheet is intended to be a summary of design considerations and requirements. Additional information which applies to all detention basins may be found in the District's "Basin Guidelines" (Appendix C). In addition, information herein may be superseded by other guidelines issued by the EA.

Design Procedure

1. Enter the Tributary Area, A_{TRIB}
2. Enter the Design Capture Volume, V_{BMP}, determined from Section 2.1 of this Handbook
3. SFB Geometry

   Determine the minimum sand filter area required. The filtration bed surface shall be flat with the maximum depth for the reservoir design volume no greater than 5 feet*. The reservoir design volume does not include the volume of the sand filter. No credit is given for voids in the sand layer toward the reservoir volume since the sand is part of the water quality filter and not a reservoir layer. The design storage volume shall equal 100 percent of V_{BMP}. The minimum sand filter area (As) of the basin's bottom shall be determined using the equation:

$$A_s = (V_{BMP}/ d_B)$$

   Where:

   V_{BMP} = Design Volume, ft^3
   d_B = proposed basin depth (5 feet maximum), ft

   Once the basin side slopes, proposed basin depth and depth of freeboard are entered, the spreadsheet will calculate the minimum total depth required to use this BMP. This is the depth from the top of the basin (including freeboard) down to the bottom of the underdrain gravel layer. This depth can be used to determine if enough vertical separation is available between the BMP and its outlet destination.

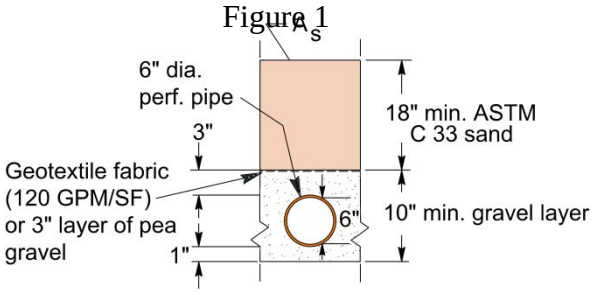
*Note: The 5 foot maximum depth equates to a minimum filter media infiltration rate of 0.83 inches per hour with a 72 hour drawdown time. Studies have shown that while initially most filter media will infiltrate at a much higher rate, it is not uncommon for that rate to decrease significantly over a very short period of time. (Urbonas, 1996)

4. Enter the proposed surface area of the basin.

5. Forebay

Provide a concrete forebay. Its volume shall be at least 0.5% V_{BMP} with a minimum 1 foot high concrete splashwall. Full-height notch-type weir(s) shall be used to outlet the forebay. The weir(s) must be offset from the line of flow from the basin inlet. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 1). Notches shall not be less than 1.5 inches in width.

Figure 1



6. Filter Media

Provide, as a minimum, an 18-inch layer of filter media (ASTM C-33 sand). Other filter media may be considered with sufficient supporting documentation. Where a medium level of removal efficiency is desired for nutrients, the depth of the sand layer must be increased to 36 inches.

5. Underdrains

Underdrains shall be provided per the guidelines outlined in Appendix B.

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

Examples of material to provide in Appendix 10 may include but are not limited to the following:

- BMP Fact Sheets for proposed BMPs form Exhibit C: LID BMP Design Handbook of the SMR WQMP,
- Source control information and training material for site owners and operators,
- O&M training material,
- Other educational/training material related to site drainage and BMPs.

After the Storm

A Citizen's Guide to Understanding Stormwater

EPA 833-B-03-002

January 2003

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

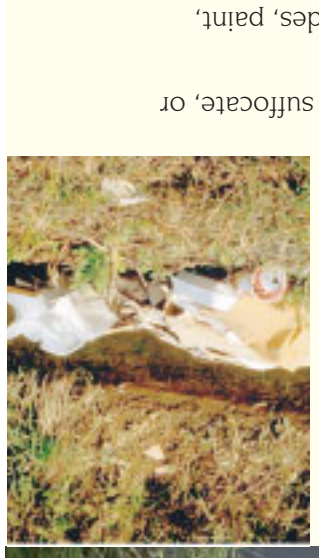
Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

Why is stormwater runoff a problem?

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.



Stormwater Pollution Solutions

Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Auto care

Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Commercial

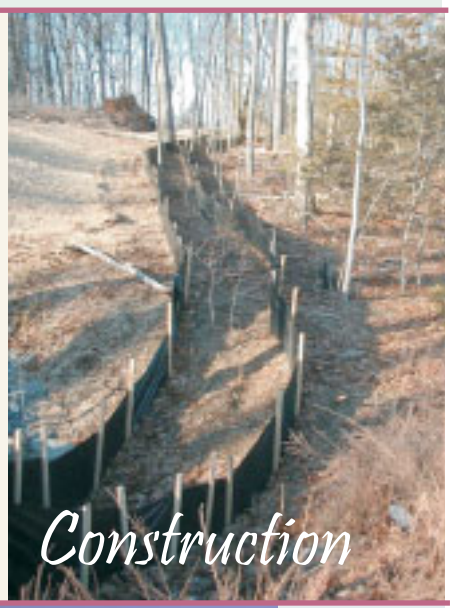
Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Agriculture

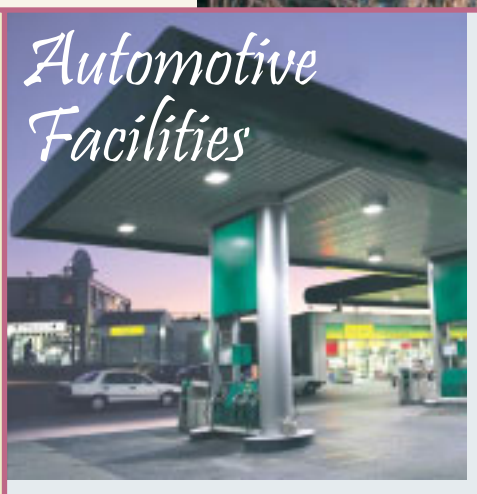
Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

For Information:

For more information on the General Industrial Storm Water Permit contact:

State Water Resources Control Board (SWRCB)
(916) 657-1146 or www.swrcb.ca.gov/ or, at your Regional Water Quality Control Board (RWQCB).

Santa Ana Region (8)
California Tower
3737 Main Street, Ste. 500
Riverside, CA 92501-3339
(909) 782-4130

San Diego Region (9)
9771 Clairemont Mesa Blvd., Ste. A
San Diego, CA 92124
(619) 467-2952

Colorado River Basin Region (7)
73-720 Fred Waring Dr., Ste. 100
Palm Desert, CA 92260
(760) 346-7491

SPILL RESPONSE AGENCY:
HAZ-MAT: (909) 358-5055
HAZARDOUS WASTE DISPOSAL: (909) 358-5055
RECYCLING INFORMATION: 1-800-366-SAVE
TO REPORT ILLEGAL DUMPING OR A CLOGGED STORM DRAIN: 1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, call:
(909) 955-1111.

StormWater
CleanWater
PROTECTION PROGRAM

Riverside County gratefully acknowledges the State Water Quality Control Board and the American Public Works Association, Storm Water Quality Task Force for the information provided in this brochure.

DID YOU KNOW . . .

YOUR FACILITY MAY NEED A STORM WATER PERMIT?

Many industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit

FIND OUT IF YOUR FACILITY MUST OBTAIN A PERMIT

StormWater Pollution . . . What you should know

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to help prevent flooding by carrying excess rainwater away from streets. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our waterways.

Unlike sanitary sewers, storm drains are not connected to a treatment plant - they flow directly to our local streams, rivers and lakes.

In recent years, awareness of the need to protect water quality has increased. As a result, federal, state, and local programs have been established to reduce polluted stormwater discharges to our waterways. The emphasis of these programs is to prevent stormwater pollution since it's much easier, and less costly, than cleaning up "after the fact."

National Pollutant Discharge Elimination System (NPDES)

In 1987, the Federal Clean Water Act was amended to establish a framework for regulating industrial stormwater discharges under the NPDES permit program. In California, NPDES permits are issued by the State Water Resources Control Board (SWRCB) and the nine (9) Regional Water Quality Control Boards (RWQCB). In general, certain industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit if the type of facilities or operations falls into one of the several categories described in this brochure.

How Do I Know If I Need A Permit?

Following are ***general descriptions*** of the industry categories types that are regulated by the Industrial Activities Storm Water General Permit. Contact your local Region Water Quality Control Board to determine if your facility/operation requires coverage under the Permit.

➜ Facilities such as cement manufacturing; feedlots; fertilizer manufacturing; petroleum refining; phosphate manufacturing; steam electric power generation; coal mining; mineral mining and processing; ore mining and dressing; and asphalt emulsion;

➜ Facilities classified as lumber and wood products (except wood kitchen cabinets); pulp, paper, and paperboard mills; chemical producers (except some pharmaceutical and biological products); petroleum and coal products; leather production and products; stone, clay and glass products; primary metal industries; fabricated structural metal; ship and boat building and repairing;

➜ Active or inactive mining operations and oil and gas exploration, production, processing, or treatment operations;

➜ Hazardous waste treatment, storage, or disposal facilities;

➜ Landfills, land application sites and open dumps that receive or have received any industrial waste; unless there is a new overlying land use such as a golf course, park, etc., and there is no discharge associated with the landfill;

➜ Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards;

➜ Steam electric power generating facilities, facilities that generate steam for electric power by combustion;

➜ Transportation facilities that have vehicle maintenance shops, fueling facilities, equipment cleaning operations, or airport deicing operations. This includes school bus maintenance facilities operated by a school district;

➜ Sewage treatment facilities;

➜ Facilities that have areas where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water.

How do I obtain coverage under the Industrial Activities Storm Water General Permit?

Obtain a permit application package from your local Regional Water Quality Control Board listed on the back of this brochure or the State Water Resources Control Board (SWRCB). Submit a completed Notice of Intent (NOI) form, site map and the appropriate fee ($250 or $500) to the SWRCB. Facilities must submit an NOI thirty (30) days prior to beginning operation. Once you submit the NOI, the State Board will send you a letter acknowledging receipt of your NOI and will assign your facility a waste discharge identification number (WDID No.). You will also receive an annual fee billing. These billings should roughly coincide with the date the State Board processed your original NOI submittal.

What are the requirements of the Industrial Activities Storm Water General Permit?

The basic requirements of the Permit are:

1. The facility must eliminate any non-stormwater discharges or obtain a separate permit for such discharges.

2. The facility must develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must identify sources of pollutants that may be exposed to stormwater. Once the sources of pollutants have been identified, the facility operator must develop and implement Best Management Practices (BMPs) to minimize or prevent polluted runoff.

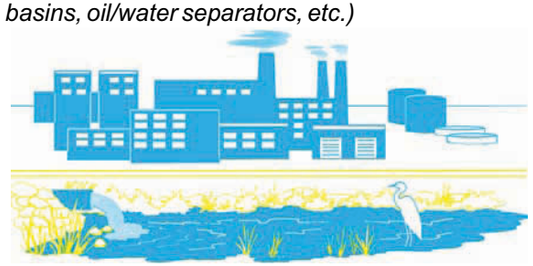
   Guidance in preparing a SWPPP is available from a document prepared by the California Storm Water Quality Task Force called the California Storm Water Best Management Practice Handbook.

3. The facility must develop and implement a Monitoring Program that includes conducting visual observations and collecting samples of the facility's storm water discharges associated with industrial activity. The General Permit requires that the analysis be conducted by a laboratory that is certified by the State of California.

4. The facility must submit to the Regional Board, every July 1, an annual report that includes the results of its monitoring program.

A Non-Storm Water Discharge is... *any discharge to a storm drain system that is not composed entirely of storm water. The following non-storm water discharges are authorized by the General Permit: fire hydrant flushing; potable water sources, including potable water related to the operation, maintenance, or testing of potable water systems; drinking fountain water; atmospheric condensates including refrigeration, air conditioning, and compressor condensate; irrigation drainage; landscape watering; springs; non-contaminated ground water; foundation or footing drainage; and sea water infiltration where the sea waters are discharged back into the sea water source.*

A BMP is . . . *a technique, process, activity, or structure used to reduce the pollutant content of a storm water discharge. BMPs may include simple, non-structural methods such as good housekeeping, staff training and preventive maintenance. Additionally, BMPs may include structural modifications such as the installation of berms, canopies or treatment control (e.g. setting basins, oil/water separators, etc.)*



WARNING*: There are significant penalties for non-compliance: a minimum fine of $5,000 for failing to obtain permit coverage, and, up to $10,000 per day, per violation plus $10 per gallon of discharge in excess of 1,000 gallons.*

For Information:

Local Sewering Agencies in Riverside County:

City of Beaumont	(909) 769-8520
Belair Homeowners Association	(909) 277-1414
City of Banning	(909) 922-3130
City of Blythe	(760) 922-6161
City of Coachella	(760) 391-5008
Coachella Valley Water District	(760) 398-2651
City of Corona	(909) 736-2259
Desert Center, CSA #51	(760) 227-3203
Eastern Municipal Water District	(909) 928-3777
Elsinore Valley MWD	(909) 674-3146
Farm Mutual Water Company	(909) 244-4198
Idyllwild Water District	(909) 659-2143
Jurupa Community Services Dist.	(909) 685-7434
Lake Hemet MWD	(909) 658-3241
Lee Lake Water District	(909) 277-1414
March Air Force Base	(909) 656-7000
Mission Springs Water District	(760) 329-6448
City of Palm Springs	(760) 323-8242
Rancho Caballero	(909) 780-9272
Rancho California Water Dist.	(909) 676-4101
Ripley, CSA #62	(760) 922-4909
Rubidoux Community Services Dist.	(909) 684-7580
City of Riverside	(909) 782-5341
Silent Valley Club, Inc	(909) 849-4501
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(909) 780-4170

Spill Response Agency:
Haz-Mat: (909) 358-5055
Hazardous Waste Disposal: (909) 358-5055
To Report Illegal Dumping or a Clogged Storm Drain: 1-800-506-2555

StormWater CleanWater
PROTECTION PROGRAM

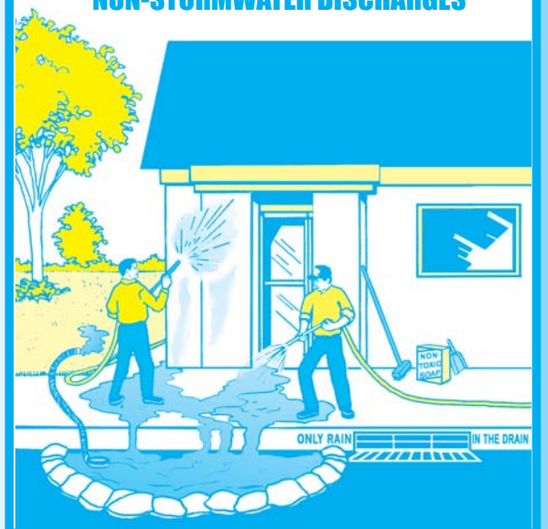
Riverside County gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

StormWater Pollution

What you should know for...

OUTDOOR CLEANING ACTIVITIES

NON-STORMWATER DISCHARGES



GUIDELINES for disposal of washwater from:

- Sidewalk, plaza or parking lot cleaning
- Vehicle washing or detailing
- Building exterior cleaning
- Waterproofing
- Equipment cleaning or degreasing

Do you know . . . where the water should go?

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to prevent flooding by carrying excess rainwater away from streets. . . it's not designed to be a waste disposal system. Since the storm drain system does not provide for water treatment, it often serves the unintended function of transporting pollutants directly to our waterways.

Unlike sanitary sewers, storm drains are not connected to a treatment plant - they flow directly to our local streams, rivers and lakes.

Non-stormwater discharges such as washwater generated from outdoor cleaning projects often transport harmful pollutants into storm drains and our local waterways. Polluted runoff contaminates local waterways and poses a threat to groundwater resources.

Soaps, degreasers, automotive fluids, litter, and a host of other materials washed off buildings, sidewalks, plazas, parking areas, vehicles, and equipment can all pollute our waterways.

The Cities and County of Riverside StormWater/CleanWater Protection Program

Since preventing pollution is much easier, and less costly than cleaning up "after the fact," the Cities and County of Riverside StormWater/CleanWater Protection Program informs residents and businesses of pollution prevention activities such as those described in this pamphlet.

The Cities and County of Riverside have adopted ordinances for stormwater management and discharge control. In accordance with state and federal law, these local stormwater ordinances **prohibit** the discharge of wastes into the storm drain system or local surface waters. This includes non-stormwater discharges containing oil, grease, detergents, degreasers, trash, or other waste materials.

PLEASE NOTE: The discharge of pollutants into the street, gutters, storm drain system, or waterways - without a Regional Water Quality Control Board permit or waiver - is ***strictly prohibited*** by local ordinances and state and federal law.

Help Protect Our Waterways!

Use These Guidelines For Outdoor Cleaning Activities and Washwater Disposal

DO . . . Dispose of **small amounts** of **washwater from cleaning building exteriors, sidewalks, or plazas** onto landscaped or unpaved surfaces provided you have the owner's permission and the discharge will not cause flooding or nuisance problems, or flow into a storm drain.

DO NOT . . . Discharge **large amounts** of these types of washwater onto landscaped areas or soil where water may run to a street or storm drain. Wastewater from exterior cleaning may be pumped to a sewer line with specific permission from the local sewering agency.

DO . . . Check with your local sewering agency's policies and requirements concerning waste water disposal. **Water from many outdoor cleaning activities** may be acceptable for disposal to the sewer system. See the list on the back of this flyer for phone numbers of the sewering agencies in your area.

DO NOT . . . Pour **hazardous wastes** or toxic materials into the storm drain or sewer system . . . properly dispose of it instead. When in doubt, contact the local sewering agency! The agency will tell you what types of liquid wastes can be accepted.

DO . . . Understand that **water (without soap) used to remove dust from clean vehicles** may be discharged to a street or storm drain. **Washwater from sidewalk, plaza, and building surface cleaning** may go into a street or storm drain if ALL of the following conditions are met:

1) The surface being washed is free of residual oil stains, debris and similar pollutants by using dry cleanup methods (sweeping, and cleaning any oil or chemical spills with rags or other absorbent materials before using water).
2) Washing is done with water only - no soap or other cleaning materials.
3) You have not used the water to remove paint from surfaces during cleaning.

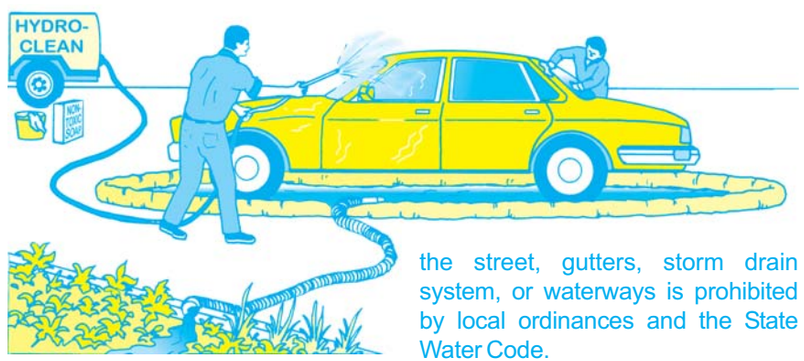
DO NOT . . . Dispose of water containing **soap or any other type of cleaning agent** into a storm drain or water body. This is a direct violation of state and/or local regulations. Because **wastewater from cleaning parking areas or roadways** normally contains metallic brake pad dust, oil and other automotive fluids, it should never be discharged to a street, gutter, or storm drain.

DO . . . Understand that **mobile auto detailers** should divert washwater to landscaped or dirt areas. Note: Be aware that soapy washwater may adversely affect landscaping; consult with the property owner. Residual washwater may remain on paved surfaces to evaporate; sweep up any remaining residue. If there is sufficient water volume to reach the storm drain, collect the runoff and obtain permission to pump it into the sanitary sewer. Follow local sewering agency's requirements for disposal.

DO NOT . . . Dispose of left over cleaning agents into the gutter, storm drain or sanitary sewer.

Regarding Cleaning Agents:

If you must use soap, use biodegradable/phosphate free cleaners. Avoid use of petroleum based cleaning products. Although the use of nontoxic cleaning products is strongly encouraged, ***do*** understand that these products can still degrade water quality and, therefore, the discharge of these products into



the street, gutters, storm drain system, or waterways is prohibited by local ordinances and the State Water Code.

Note: When cleaning surfaces with a high pressure washer or steam cleaning methods, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning, as compared to the use of a low pressure hose, can remove additional materials that can contaminate local waterways.

Other Tips to Help Protect Our Water . . .

Screening Wash Water

A thorough dry cleanup before washing (without soap) surfaces such as building exteriors and decks without loose paint, sidewalks, or plaza areas, *should be sufficient to protect storm drains.* **However**, if any debris (solids) could enter storm drains or remain in the gutter or street after cleaning, washwater should first pass through a "20 mesh" or finer screen to catch the solid material, which should then be disposed of in the trash.

Drain Inlet Protection/ Containing & Collecting Wash Water

- Sand bags can be used to create a barrier around storm drain inlets.
- Plugs or rubber mats can be used to temporarily seal storm drain openings.
- You can also use vacuum booms, containment pads, or temporary berms to keep wash water away from the street, gutter, or storm drain.

Equipment and Supplies

Special materials such as absorbents, storm drain plugs and seals, small sump pumps, and vacuum booms are available from many vendors. For more information check catalogs such as New Pig (800-468-4647), Lab Safety Supply (800-356-0783), C&H (800-558-9966), and W.W. Grainger (800-994-9174); or call the Cleaning Equipment Trade Association (800-441-0111) or the Power Washers of North America (800-393-PWNA).

Helpful telephone numbers and links:

Riverside County Water Agencies

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

REPORT ILLEGAL STORM DRAIN DISPOSAL

1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers

Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

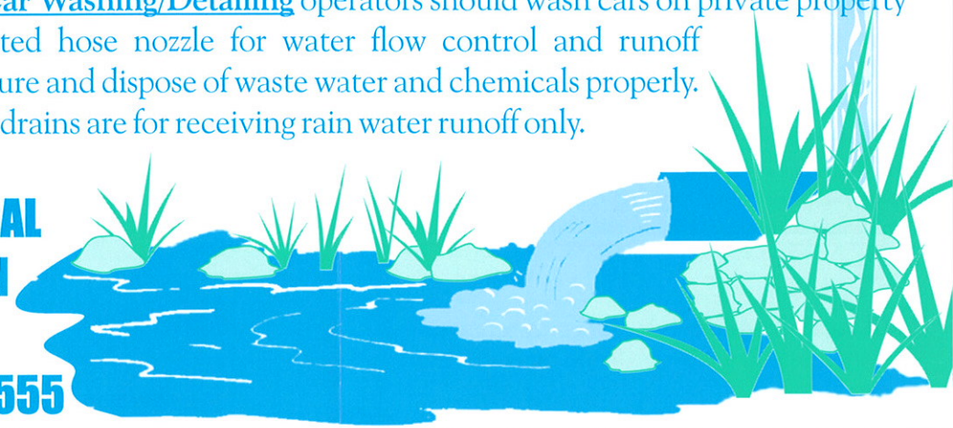
Do you know where street flows actually go?

Storm drains are NOT connected to sanitary sewer systems and treatment plants!

The primary purpose of storm drains is to carry rain water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep storm water clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing wash water to the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.

Report illegal storm drain disposal,
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them for being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.

When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlet by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators

Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.

- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.

IRRIGATION RUNOFF

STORMWATER FACT SHEET

Report Irrigation Runoff or Stormwater Pollution:
800.506.2555

RIVERSIDE COUNTY
WATERSHED PROTECTION

OVERWATERING

Overwatering causes irrigation runoff that may contain pollutants such as pesticides, herbicides, fertilizers, pet waste, yard waste, and sediments which can be hazardous to residents and harmful to our environment. Runoff can also serve as a transport mechanism for other pollutants already on the ground or in the curb gutter. Irrigation runoff entering the storm drain system is an illicit discharge.

BEST PRACTICES

Urban runoff begins when yards and landscaped areas are over-irrigated. Irrigation systems require regular maintenance and visual inspection of the system should be performed to prevent over-spray, leaks, and other problems that result in runoff to storm drains, curbs and gutters.

You can **prevent pollution** by conserving water on your property. Water during cooler times of the day (before 10am and after 6pm).

- Adjust sprinklers to stop overspray and runoff.
- Make needed repairs immediately.
- Use drip irrigation, soaker hoses, or micro-spray systems.
- Use an irrigation timer to pre-set watering times.
- Use a control nozzle or similar mechanism when watering by hand.
- Switch to a water-wise landscape - native plants need less fertilizers, herbicides, pesticides and water.

PROTECT OUR WATERSHED

Many people think that when water flows into a storm drain it is treated, but the storm drain system and the sanitary sewer system are not connected. Everything that enters storm drains flows untreated directly into our creeks, rivers, lakes, beaches and ultimately the ocean. Storm water often contains pollutants, including chemicals, trash, and automobile fluids, all of which pollute our watershed and harm fish and wildlife.

Whether at home or work, you can help reduce pollution and improve water quality by using the above Best Management Practices (BMP's) as part of your daily clean up and maintenance routine.

HOME & GARDEN

Yard waste and household toxics such as paints, solvents, and pesticides often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water and make our waters unhealthy and unsafe for people and wildlife.

Follow these practices to help prevent stormwater pollution...

In Your Home...

Household products such as paints, paint thinners, drain openers, motor oil, wood polishes, insecticides & herbicides, oven cleaners, and many other general cleaners frequently get dumped on the ground, or into a gutter, street or storm drain. Instead of polluting our stormwaters, take these items to a household hazardous waste collection facility. Call 1-800-OILY-CAT for a facility in your area.

Fertilizers and Pesticides...

Fertilizers and pesticides are often carried into our storm drains by sprinkler runoff. To minimize stormwater pollution, use organic or non-toxic pesticides and fertilizers as directed, and keep them away from ditches, gutters and storm drains. Store them in a covered area, off the ground, to prevent contact with water. For additional gardening questions, call the San Bernardino Master Gardeners at 387-2182.

Trimmin' the Garden...

Decaying organic materials that enter our storm drains, such as grass, leaves, yard clippings, and pet waste, will use up oxygen in nearby streams, stressing aquatic life. Prevent stormwater pollution by not blowing, sweeping, raking or hosing yard waste into the street, gutter, or storm drain. Alternatively, leave grass clippings on your lawn after mowing, or compost your clippings and yard waste. Pet waste should not be composted, but rather disposed of in the trash to prevent the potential spread of diseases.

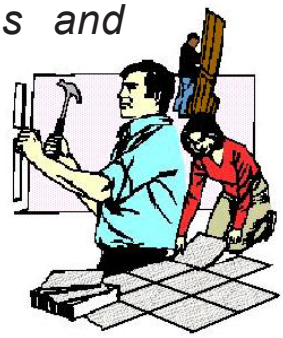
Planting In The Yard

Produce less yard waste and save water by planting low maintenance trees and shrubs. Also, conserve water and minimize unwanted runoff by using drip irrigation, soaker hoses, or micro-spray systems to water vegetation.

For more information, call your city's stormwater representative

HOME REPAIR & REMODELING

Paints, solvents, adhesives, dusts, sediments, pesticides and household toxics commonly associated with home repair and remodeling activities often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.



Follow these practices to help prevent stormwater pollution...

Household Hazardous Wastes...

Common household cleaners, paint products, and wallpaper & tile adhesives contain toxic substances. Dispose of these products properly. REMEMBER: Toxic wastes should never enter the storm drain system. For disposal information, call 1-800-OILY-CAT.

Construction...

Keep all construction debris away from the street, gutter and storm drain, and if possible, schedule grading and excavation projects for dry weather. Cover excavated material and stockpiles of asphalt, sand, etc. with plastic tarps, and prevent erosion by planting fast-growing annual and perennial grasses, which will shield and bind the soil.

Landscape & Gardening...

Use fertilizers and pesticides as directed. Keep them away from ditches, gutters and storm drains, and store them in a covered area to prevent contact with rain water. Also, minimize runoff and conserve water by using drip irrigation, soaker hoses, or micro-spray systems. REMEMBER: Do not deposit leaves into the street, gutter, or storm drain.

Painting...

CLEANUP... Avoid cleaning brushes or rinsing paint containers into a street, gutter, or storm drain. For water-based paints, “brush out” as much paint as possible, and rinse in the sink. For oil-based paints, “brush out” as much paint as possible, clean with thinner, and then filter and reuse thinner or solvent.

REMOVAL... Paint stripping residue, chips & dust from marine paints, and paints containing lead or tributyl tin are hazardous wastes. Sweep them up and call 1-800-OILY-CAT for disposal information.

RECYCLING... Recycle or reuse leftover paint by using it for touch-ups, or by giving it to someone who can us it, such as a theatre group, school, city or other community organization. If you’re unable to give it away, contact 1-800-OILY-CAT for disposal information.

Concrete & Masonry...

Store bags of cement and plaster away from gutters and storm drains, and under cover, protected from rainfall, runoff and wind. REMEMBER: Never dispose of cement washout or concrete dust onto driveways, streets, gutters or storm drains.

For more information, call your city’s stormwater representative

PAINTING

Paints, solvents, adhesives, and toxic chemicals from painting operations often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.

Follow these practices to help prevent stormwater pollution...

General Business Practices...

Keep all paint products and wastes away from the street, gutter, and storm drains. Reuse paint thinner by setting used thinner aside in a closed, labeled jar to settle out paint particles, and then pouring off the clear liquid for future use. Wrap dried paint residue in newspaper and dispose of it in the trash.

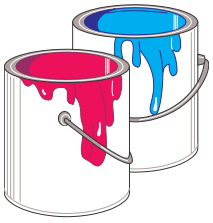
Water-Based Paints...

Purchase water-based paints whenever possible. Look for products labeled “latex” or “clean up with water.”

Recycle or Reuse Paints...

Recycle/reuse leftover paint by using it for touch-ups, or by giving it to someone who can use it, such as a theatre group, school, city or other community organization. If you’re unable to give it away, contact 386-8401 for information on hazardous waste pick-up.

Paint Cleanup...



Avoid cleaning brushes and rinsing paint containers in a street, gutter, or storm drain. For water-based paints, “brush out” as much paint as possible and and rinse in the sink. For oil-based paints, “brush out” as much paint as possible, clean with thinner, and then filter and reuse thinner or solvent.

Paint Removal...

Chemical paint stripping residue, chips & dust from marine paints, and paints containing lead or tributyl tin are hazardous wastes. For disposal information, call 386-8401. Also, when stripping or cleaning building exteriors with high-pressure water, block storm drains and divert the washwater onto a designated dirt area. Check with your local wastewater treatment authority to find out if you can collect building cleaning water and discharge it to the sewer.

For more information, call your city’s stormwater representative

Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.

- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - is strictly prohibited by local ordinances, state and federal law. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
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Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
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Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:

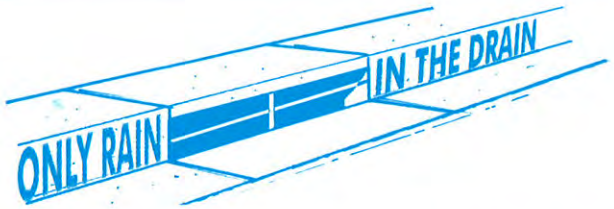
- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...

Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.

A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

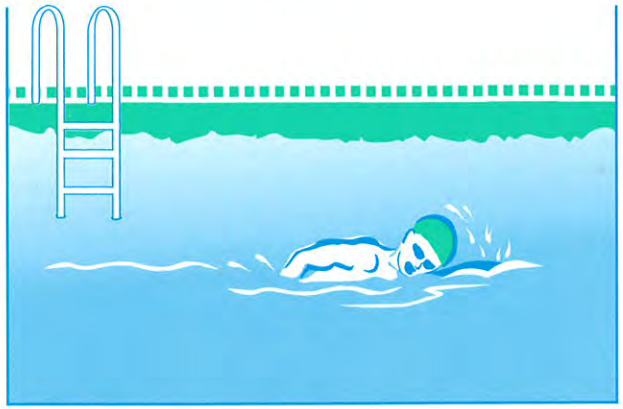
Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.

Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.



If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping by following these guidelines:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and allow the chemicals in the pool water to dissipate before draining the pool (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals

Cleaning Filters

Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.

Adopt a pet from your local animal shelter or adoption centers at pet stores. A variety of animals, from purebred tomixe d breed are waiting for loving arms and good homes. Consider volunteering at your local animal shelters. Volunteers, donations, food, newspapers, old towels and linens are needed to help the animals.

RIVERSIDE COUNTY
ANIMAL SHELTER LOCATIONS:

BLYTHE
16450 West Hobson Way
Blythe, CA 92225
760-921-7857

HEMET
800 South Sanderson
Hemet, CA 92545
909 925-8025

INDIO
45-355 Van Buren
Indio, CA 92201
760-347-2319

RIVERSIDE
5950 Wilderness Avenue
Riverside, CA 92504
909-358-7387

FOR ALL OTHER AREAS
CALL 1-888-636-7387

Riverside County gratefully acknowledges the City of Los Angeles Stormwater Program for the design concept of this brochure.

What's the Scoop?

TIPS FOR A HEALTHY PET AND A HEALTHIER ENVIRONMENT

CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surroundings.

HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets, and grassy areas is immediately flushed into the nearest waterway when it rains. Even if you can't see water near you, the rain or waste water WASHES all that PET WASTE and BACTERIA INTO THE STORMDRAIN, where it travels to your neighborhood creek or lake untreated. These animal droppings also contain nutrients that can promote the growth of algae, if they enter our streams and lakes. The risk of STORMWATER CONTAMINATION INCREASES, if pet wastes is allowed to accumulate in animal pen areas or left on sidewalks, streets, or driveways where runoff can carry them to storm sewers.

Some of the DISEASES THAT CAN SPREAD from pet waste are:
Campylobacteriosis — a bacterial infection that causes diarrhea in humans.
Salmonellosis — the most common bacterial infection transmitted to humans from animals.
Toxocarisis — roundworms transmitted from animals to humans.

Flies and other pest insects can also increase when pet waste is disposed of improperly, becoming a nuisance and adding yet another vector for disease transmission.

WHAT CAN YOU DO?

- SCOOP up pet waste and flush it down the toilet.
- NEVER DUMP pet waste into a storm drain or catch basin.
- USE the complimentary BAGS or mutt mitts offered in dispensers at local parks.
- CARRY EXTRA BAGS when walking your dog and make them available to other pet owners who are without.
- TEACH CHILDREN how to properly clean up after a pet.
- TELL FRIENDS AND NEIGHBORS about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Did You Know . . .
that Californians illegally dump about 80 million gallons of motor oil each year?

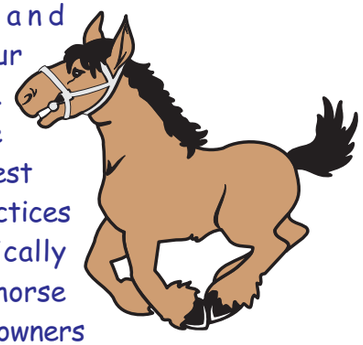
Many communities have "Scoop the Poop" laws that govern pet waste cleanup. Some of these laws specifically require anyone who walks an animal off of their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. CALL YOUR LOCAL CODE ENFORCEMENT OFFICER to find out more about pet waste regulations.

Pets are only one of the many fixtures of suburban America that add to water pollution. Lawn fertilizers, rinse water from driveways and motor oil commonly end up in streams and lakes. **CALL 1-800-506-2555 FOR HOUSEHOLD HAZARDOUS WASTE COLLECTION LOCATION AND DATES.** Maintain your automobile to avoid leaks. Dispose of used vehicle fluids properly. Your pets can be poisoned if they ingest gas, oil or antifreeze that drips onto the pavement or is stored in open containers.

NEVER HOSE VEHICLE FLUIDS into the street or gutter. USE ABSORBENT MATERIALS such as cat litter to clean-up spills. SWEEP UP used absorbent materials and place in the trash.

HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horse owners and landowners with horses.



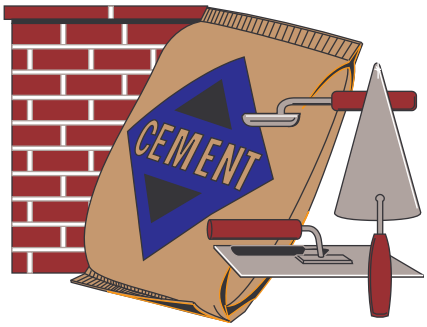
- STORE your manure properly. Do not store unprotected piles of manure in places where runoff may enter streams, or flood waters may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.
- CHECK with your local conservation district to design manure storage facilities to protect water quality. These structures usually consist of a concrete pad to protect ground water and a short wall on one or two sides to make manure handling easier.
- TRY composting – A vegetative cover placed around buildings or on steeper slopes can help minimize erosion and absorb nutrients while improving the appearance of your property. In addition, avoid costlier erosion controls, vegetative covers will provide animals with better traction during wet or icy conditions.

- KEEP animals out of steams – Designed stream crossings provide a safe, easy way for horses and livestock to ford streams. Fencing encourages the use of the crossing instead of the streambed to navigate streams. This will allow vegetation to stabilize stream banks and reduce sediment pollution.
- MOW pastures to proper height, six inches is typically recommended.
- Material STORAGE SAFETY TIPS – Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:
  - Buy only what you need.
  - Treat spills of hoof oils like fuel spill. Use kitty litter to soak up the oil and dispose in a tightly sealed plastic bag.
  - Store pesticides in a locked, dry, well-ventilated area.
  - Protect stored fertilizer and pesticides from rain and surface water.

Call 1-800-506-2555 to locate your local conservation district to find out what to do with your current backyard manure pile, how to re-establish a healthy pasture, what to do about weeds, and what grasses grow best in your soils.

Thank you for doing your part to protect your watershed, the environment, and the equestrian way of life in your community!

FRESH CONCRETE & MORTAR APPLICATION



Cement, cement wash, gravel, asphalt, solvents, and motor oil from fresh concrete and mortar activities often make their way into the San Bernardino County storm drain system and DO NOT GET TREATED before reaching the Santa Ana River. These wastes pollute our drinking water, and make our waters unhealthy and unsafe for people and wildlife.

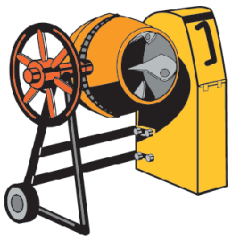
Follow these practices to help prevent stormwater pollution...

General Business Practices...

Schedule excavation and grading work during dry weather, and in case it rains, prevent materials from contacting stormwater by storing them under cover. Also, secure open bags of cement to keep wind-blown cement powder away from streets, gutters and storm drains.

During Construction...

Prevent mortar and cement from entering the storm drains by placing erosion controls (i.e., berms or temporary vegetation) down-slope to capture runoff. When breaking up paving, be sure to pick up all pieces and recycle them at a crushing company; small amounts of excess dry concrete, grout and mortar can be disposed of in the trash. Setup small mixers on tarps or heavy drop cloths to allow for easy cleanup of debris. REMEMBER: Never bury waste material -- recycle or dispose of it as hazardous waste. Call 386-8401 for recycling and disposal information.

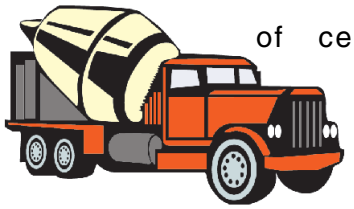


Handling Materials & Wastes...

Minimize wastes when ordering materials by ordering only the amounts needed to complete the job. Whenever possible, use recycled or recyclable materials. Recycle broken asphalt, concrete, wood, and cleared vegetation. Unrecyclable materials must be taken to an appropriate landfill or disposed of as hazardous waste. For recycling and disposal information, call 386-8401.

Cleaning up...

When cleaning up after driveway or sidewalk construction, wash concrete dust onto designated dirt areas, not down the driveway or into the street or storm drain. Also, wash out concrete mixers and equipment only in specified wash-out areas, where the water flows into containment ponds. Cement washwater can be recycled by pumping it back into cement mixers for reuse. REMEMBER: Never dispose of cement washout into driveways, streets, gutters, storm drains or drainage ditches.



For more information, call your city's stormwater representative