Project Specific
Preliminary Water Quality Management Plan

For: **Alberhill Villages**

Westerly side of Lake Street between Temescal Canyon Road & Alberhill Ranch Road

DEVELOPMENT NO. **TTM NO. 35000**
DESIGN REVIEW NO. **N/A**

Prepared for:

Pacific Clay Products, Inc.
6455 Alberhill Ranch Road
Lake Elsinore, CA 92530
Telephone: 951-245-0476

Prepared by:
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PWQMP Preparation/Revision Date: 9/6/12
04/07/15

OWNER'S CERTIFICATION

This project-specific Preliminary Water Quality Management Plan (PWQMP) has been prepared for:

Pacific Clay Products, Inc.

by KWC Engineers for the project known as **Alberhill Villages** at **Westerly side of Lake Street, between Temescal Canyon Road and Alberhill Ranch Road**.

This Preliminary WQMP is intended to comply with the requirements of **City of Lake Elsinore** for **TTM 35000 ALBERHILL VILLAGES**, which includes the requirement for the preparation and implementation of a project-specific PWQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. 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 PWQMP. The undersigned is aware that implementation of this PWQMP is enforceable under City of Lake Elsinore Water Quality Ordinance (Municipal Code Section 7.D.1).

If the undersigned transfers its interest in the subject property/project, its successor in interest the undersigned shall notify the successor in interest of its responsibility to implement this PWQMP.

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

Owner's Signature	Date
M.J. "Tom" Tomlinson	V.P. Land Development
Owner's Printed Name	Owner's Title/Position

6455 Alberhill Ranch Road
Lake Elsinore, CA 92530
951-245-0476

Contents

I. Project Description

PROJECT DESCRIPTION

The Alberhill Villages project, a current mining site owned by Pacific Clay Products, Inc., will be reclaimed for development by Castle & Cooke as the existing onsite clay, sand, and aggregate mining operations are gradually phased out. The Alberhill Villages project site is comprised of approximately 1,371 acres of undeveloped land. The site will also include an additional 9.1 acres and 16.7 acres for development which was originally part of the Alberhill Ranch Specific Plan. The site is bounded by undeveloped vacant land to the south, the I-15 Freeway to the north, the existing Horsethief Canyon development to the west, and Lake Street to the east. Figure 1 in Appendix B shows a vicinity map of the area.

As proposed by the Alberhill Villages Specific Plan, the site is planned for a large mixed-use community consisting of a university campus, recreational lakes and park areas, mixed-use commercial/office/retail, neighborhood commercial, public institutions/schools, and a large residential component ranging from very low density estate lots to very high density multi-family lots. Lake Street and Temescal Canyon Road/Lincoln Street are the main north-south thoroughfares into the community connecting the project to Downtown Lake Elsinore and the Interstate 15 Freeway. The development of Alberhill Villages and other neighboring communities will enhance the northerly area of Lake Elsinore producing a profound entry statement into the City off of the Interstate 15 freeway at Lake Street.

Refer to the PWQMP Conceptual Site Plan and the Alberhill Villages PWQMP Land Use Plan in Appendix B for maps showing the location of the proposed community. Commercial sites are located along Lake Street and I-15 while the residential sites are located generally to the west and south of the commercial sites. Public parks are located in the middle of the site and around the proposed recreational lakes. Very low density residential sites are located on the south-westerly side of the project in the existing hillsides.

The project is located on a hilly site, with elevations across the site ranging from 1,830 feet at the most southwesterly corner to 1,208 feet at the downstream end of the site. Mining operations will export approximately 40 million cubic yards before the site reaches the final proposed elevations. Five existing major streamlines flow through the site from the southwest to the northerly end of the site, all ultimately discharging into Temescal Creek. Refer to Figure 2A for the location of these five existing watersheds.

Castle & Cooke proposes to construct Alberhill Villages in phases over the next 20-30 years. Refer to Appendix B, Figure 4 for phase delineations. Additional Preliminary WQMP reports will be prepared for each Tentative Map as the phases are designed. **This Conceptual WQMP is a Specific Plan level document which will be submitted to the City for review and will be included in the Specific Plan as an appendix**. Therefore, details including BMP: basin sizing for design capture volume and HCOC volume, pipe sizing, inlet/outlet structures, maintenance access and fencing will be provided in the additional WQMP reports as phased out. The current level of design includes public backbone streets, master drainage facilities and mass-graded pads for future development. Around each mass-graded pad are landscaped areas, generally at 2:1 slopes with typical terrace drains and benches. Existing natural springs are located on the site which will be designed to provide perennial flows to the proposed lakes. Treated urban runoff will also be a source of water for the lakes. Trails for pedestrians, wildlife corridors and low-flow streams will also provide connections between the existing hillsides to the south and the proposed lakes.

As shown on the PWQMP Conceptual Site Plan, Figure 2, the offsite area to the southwest of the site will drain into detention/debris basins prior to entering the storm drain system. Drainage will be conveyed through a combination of storm drain pipes, low-flow channels, open engineered channels, two lakes and reinforced concrete box in lake street, all discharging ultimately into Temescal Creek. Urban runoff will be treated for pollutants and HCOC volume via WQMP Basins prior to entering the storm drain system.

Project Owner: **Pacific Clay Products, Inc.**
c/o Castle & Cooke Alberhill Ranch, LLC
6455 Alberhill Ranch Road
Lake Elsinore, CA 92530
Telephone: 951-245-0476

PWQMP Preparer: Victor Elia, Project Engineer
KWC Engineers
1880 Compton Ave., Suite 100
Corona, CA 92881
Telephone: 951-734-2130

Project Site Address: Lake Street & Temescal Canyon Road, Lake Elsinore, CA 92530

Planning Area/ Community Name/ Development Name: Alberhill Villages Specific Plan

APN Number(s):

391-800-011	391-230-009	391-240-001	389-020-063	390-130-021
390-160-012	390-190-019	391-200-012	391-230-005	390-170-001
390-160-001	390-160-002	390-190-011	391-230-002	391-200-007
391-230-003	391-200-004	391-230-004	390-130-020	390-130-006
391-170-005	391-170-007	391-200-010	391-200-003	390-230-010

Thomas Bros. Map: 2007 page 835 grids E5-6, F4-7, and G5-7

Project Watershed: Santa Ana

Sub-watershed: Temescal Creek – Reach 2

Project Site Size: 1371.1 acres

Standard Industrial Classification (SIC) Codes: 5810, 5900, 6029, 6324…

Formation of Home Owners' Association (HOA) or Property Owners Association (POA):

Y ☒ N ☐

Additional Permits/Approvals required for the Project

AGENCY	Permit required
State Department of Fish and Game, 1601 Streambed Alteration Agreement	Y ☒ N☐
State Water Resources Control Board, Clean Water Act (CWA) section 401 Water Quality Certification	Y ☒ N☐
US Army Corps of Engineers, CWA section 404 permit	Y ☒ N☐
US Fish and Wildlife, Endangered Species Act section 7 biological opinion	Y ☒ N☐
Other *(please list in the space below as required)* RCFC&WCD Storm Drain Permit and City of Lake Elsinore Grading, Street and Building Permits.	

Appendix A of the final project-specific WQMP will include a complete copy of the final Conditions of Approval. Appendix B of the final project-specific WQMP shall include:

1. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail to allow the project site to be plotted on Co-Permittee base mapping; and
2. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:
   - Location and identification of all structural BMPs, including Treatment Control BMPs.
   - Landscaped areas.
   - Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.).
   - Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.).
   - Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation.
   - Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated.
   - Location(s) of Receiving Waters to which the project directly or indirectly discharges.
   - Location of points where onsite (or tributary offsite) flows exit the property/project site.
   - Proposed drainage areas boundaries, including tributary offsite areas, for each location where flows exits the property/project site. Each tributary area should be clearly denoted.
   - Pre- and post-project topography.

Appendix G of the final project-specific WQMP shall include copies of CC&Rs, Covenant and Agreements, and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific WQMP requirements.

II. Site Characterization

Land Use Designation or Zoning: Current Zoning: Alberhill District Land Use Plan, City of Lake Elsinore General Plan approved 12/13/2011.
Proposed Zoning: same

Current Property Use: Undeveloped – Non-reclaimed Mining Site

Proposed Property Use: Community: University, Schools, Mixed-Use, Office, Commercial, Retail, Medical, Parks, Recreation, and Residential (Very Low Density Single-Family to High Density Multi-family)

Availability of Soils Report: Y ☐ N ☒ **A soils report is not available.** *Note: A soils report is required if infiltration BMPs are utilized. Attach report in Appendix E.*

Phase 1 Site Assessment: Y ☐ N ☒ **A Phase 1 Site Assessment is not available.** *Note: If prepared, attached remediation summary and use restrictions in Appendix H.*

Receiving Waters for Urban Runoff from Site

Receiving Waters	303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Temescal Creek Reach 2	---	AGR, GWR, REC 1 & 2, WARM, WILD, RARE	---
Temescal Creek Reach 1	pH	REC 1, REC 2, WARM, WILD	2.3 miles
Santa Ana River Reach 1-3	Pathogens, lead and copper (wet season only)	AGR, GWR, REC 1 & 2, WARM, WILD, RARE	20 miles

III. Pollutants of Concern

Potential pollutants associated with Urban Runoff from the proposed project must be identified. Exhibit B of the PWQMP provides brief descriptions of typical pollutants associated with Urban Runoff and a table that associates typical potential pollutants with types of development (land use). It should be noted that at the Co-Permittees discretion, the Co-Permittees may also accept updated studies from the California Association of Stormwater Quality Agencies (CASQA), USEPA, SWRCB and/or other commonly accepted agencies/associations acceptable to the Co-Permittee for determination of Pollutants of Concern associated with given land use. Additionally, in identifying Pollutants of Concern, the presence of legacy pesticides, nutrients, or hazardous substances in the site's soils as a result of past uses and their potential for exposure to Urban Runoff must be addressed in project-specific WQMPs. The Co-Permittee may also require specific pollutants commonly associated with urban runoff to be addressed based on known problems in the watershed. The list of potential Urban Runoff pollutants identified for the project must be compared with the pollutants identified as causing an impairment of Receiving Waters, if any. To identify pollutants impairing proximate Receiving Waters, each project proponent preparing a project-specific WQMP shall, at a minimum, do the following:

3. For each of the proposed project discharge points, identify the proximate Receiving Water for each discharge point, using hydrologic unit basin numbers as identified in the most recent version of the Water Quality Control Plan for the Santa Ana River Basin or the San Diego Region.
4. Identify each proximate identified above that is listed on the most recent list of Clean Water Act Section 303(d) list of impaired water bodies, which can be found at website www.swrcb.ca.gov/tmdl/303d_lists.html. List all pollutants for which the proximate Receiving Waters are impaired.
5. Compare the list of pollutants for which the proximate Receiving Waters are impaired with the pollutants expected to be generated by the project.

Urban Runoff Pollutants:

- Sediment / Turbidity
- Nutrients
- Organic Compounds
- Trash & Debris
- Oxygen Demanding Substances
- Bacteria & Viruses
- Oil & Grease
- Pesticides
- Metals

The following are definitions of the pollutants of concern:

Sediments are soils or other surficial materials that are eroded and then transported or deposited by the action of wind, water, ice, or gravity. Excessive discharge of sediments to waterbodies and streams can potentially increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organism survival rates, smother bottom dwelling organisms, and/or suppress aquatic vegetation growth.

Nutrients are inorganic substances, such as nitrogen and phosphorus. They commonly exist in the form of mineral salts that are either dissolved or suspended in water. Primary potential sources of nutrients in urban runoff are fertilizers and eroded soils. Excessive discharge of nutrients to waterbodies and streams may cause excessive aquatic algae and plant growth. Such excessive production, referred to as cultural eutrophication, may lead to excessive decay of organic matter in the waterbody, loss of oxygen in the water, release of toxins in bed sediment, and/or the eventual death of aquatic organisms and fish kills.

Metals are raw material components in both metal products, as well as non-metal products. Primary potential sources of metal pollution in stormwater are typically commercially-available metals and non-metal products such as fuels, adhesives, paints, and other coatings. Metal pollutants may include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. Metals that naturally occur in soil are typically not toxic at low concentrations. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental concerns, regarding the potential for release of metals to the environment, have already led to restricted metal usage in certain applications.

Toxic Organic Compounds are natural or synthetic carbon-based molecules that may be found in pesticides, solvents, and hydrocarbons. Organic compounds can, at certain concentrations, indirectly or directly constitute a hazard to life or health. When rinsing off objects, toxic levels of solvents and cleaning compounds can inadvertently be discharged to storm drains. Dirt, grease, and grime retained in the cleaning fluid or rinse water may also adsorb levels of organic compounds that are harmful or hazardous to aquatic life.

Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) may impact the recreational value or other Beneficial Uses of a waterbody and/or aquatic habitat. Excess organic matter that may have been introduced as trash can create a high biochemical oxygen demand in a stream and thereby lower its water quality.

Oxygen-Demanding Substances includes biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. Proteins, carbohydrates, and fats are examples of biodegradable organic compounds; compounds such as ammonia and hydrogen sulfide are examples of oxygen-demanding compounds. The oxygen demand of a substance can lead to depletion of dissolved oxygen in a waterbody and the possible development of septic conditions.

Primary sources of **oil and grease** are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. Introduction of these pollutants to the waterbodies can occur due to the wide uses and applications of some of these products in municipal, residential, commercial, industrial, and construction areas. Elevated oil and grease content can decrease the aesthetic value of the waterbody, as well as the water quality.

Bacteria and Viruses are environmentally-ubiquitous microorganisms that thrive under certain ecological conditions. Their proliferation is often from natural or uncontrollable sources but can also be caused by the transport of animal or human fecal wastes from a watershed. Water containing excessive bacteria and viruses, can alter the aquatic habitat and create a harmful environment for humans and aquatic life. Bacterial Indicators are used as a surrogate to indicate the potential presence of these organisms.

Pesticides (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms. Excessive or inappropriate application of a pesticide may result in runoff that may be toxic to aquatic life.

IV. Hydrologic Conditions of Concern

Impacts to the hydrologic regime resulting from the Project may include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration, and peaks; faster time to reach peak flow; and water quality degradation. Under certain circumstances, changes could also result in the reduction in the amount of available sediment for transport; storm flows could fill this sediment-carrying capacity by eroding the downstream channel. These changes have the potential to permanently impact downstream channels and habitat integrity. A change to the hydrologic regime of a Project's site would be considered a hydrologic condition of concern if the change would have a significant impact on downstream erosion compared to the pre-development condition or have significant impacts on stream habitat, alone or as part of a cumulative impact from development in the watershed.

The final project-specific WQMP must address the issue of Hydrologic Conditions of Concern unless one of the following conditions are met:

- **Condition A:** Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4; the discharge is in full compliance with Co-Permittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements); the discharge would not significantly impact stream habitat in proximate Receiving Waters; and the discharge is authorized by the Co-Permittee.
- **Condition B:** The project disturbs less than 1 acre. The disturbed area calculation should include all disturbances associated with larger plans of development.
- **Condition C:** The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by minimizing impervious area on a site and incorporating other site-design concepts that mimic pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the Co-Permittee.

  This Project meets the following condition: **The Tentative Map P-WQMP shall address HCOC**

  Supporting engineering studies, calculations, and reports are included in Appendix C.

This Preliminary WQMP is a Specific Plan level document which will be submitted to the City for review and will be included in the Specific Plan as an appendix. Additional Preliminary WQMP reports will be prepared for each Tentative Map as the phases are designed. At that time the Hydrologic Modeling will be performed based on the Tentative Map Site Plan and Lotting Studies. The Proposed WQMP Basins for each land planning area will mitigate the difference between the Pre- and Post-Condition Volumes. Preliminary basin sizing based on the design capture volume has been determined based on assumed impervious ratio as attached in Appendix F. A Factor of Safety of 1.5 has been applied to the basin sizing to account for the possibility of the HCOC volume being larger than the design capture volume.

Runoff reduction of the WQMP basins will depend on the infiltration rate below the basins after rough grading has been completed. However, regionally based detention basins will also provide opportunity for runoff reduction on a regional level. These detention basins include: two (2) lakes, five (5) proposed detention basins on the southwest end of the site and the existing lake street detention basin. In addition, the park, mixed-use and commercial sites will have the opportunity in the tentative map phase to design BMPs with runoff reduction including: pervious pavement, infiltration trenches and bio-treatment areas**.**

V. Best Management Practices

V.1 SITE DESIGN BMPS

Project proponents shall implement Site Design concepts that achieve each of the following:

1) Minimize Urban Runoff
2) Minimize Impervious Footprint
3) Conserve Natural Areas
4) Minimize Directly Connected Impervious Areas (DCIAs)

The project proponent should identify the specific BMPs implemented to achieve each Site Design concept and provide a brief explanation for those Site Design concepts considered not applicable.

The Alberhill Villages project was designed to mimic the existing drainage patterns of the site by respecting the existing drainage boundaries as shown on the PWQMP Site Plan. This was accomplished by proposing to restore existing drainage washes through the site and discharging the same flow and volume to the existing runoff locations. Proposed public onsite streets will drain into a typical storm drain system. However, the BMP volume will be bypassed into WQMP basins prior to flowing offsite. By proposing a WQMP basin at the downstream end of each planning area (defined by tributary areas) the objectives of low impact development were met by using local treatment facilities instead of regional facilities.

Table 1. Site Design BMPs

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A
Site Design Concept 1	*Minimize Urban Runoff*	Maximize the permeable area (See Section 4.5.1 of the WQMP). ***Streets and driveways are proposed at the City of Lake Elsinore standard width and smaller as allowed by the Alberhill Villages Specific Plan. Two-story house footprints proposed throughout the site minimize impervious area on each lot. Landscape design throughout the site, including the park sites, recreational lakes, and open space area will minimize impermeable surfaces.***	☒	☐	☐
		Incorporate landscaped buffer areas between sidewalks and streets. ***The street sections as proposed in the Alberhill Villages Specific Plan call for depressed landscape buffer areas between sidewalks and streets.***	☒	☐	☐
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs. ***Existing native trees and shrubs are minimal due to the fact that the project site is a mining site. However, native and drought tolerant trees and large shrubs will be planted per the Landscape Plans as the project is designed.***	☒	☐	☐
		Use natural drainage systems. ***The existing Un-named Wash which is proposed to be restored at a wider width will be used as a natural drainage system for the site to the extent practical. Low-flow channels along Temescal Canyon Road and through the park site toward the proposed lake will be natural bottom to minimize urban runoff as well.***	☒	☐	☐
		Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration. ***Perforated pipe or gravel pits may be used in landscaped areas where feasible for low flow infiltration.***	☒	☐	☐
		Construct onsite ponding areas or retention facilities to increase opportunities for infiltration consistent with vector control objectives. ***A number of onsite extended detention basins are proposed to increase opportunities for infiltration as soils allow.***	☒	☐	☐
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required to describe BMP and how it addresses Site Design concept).	☐	☐	☒

Table 1. Site Design BMPs (Cont.)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A
Site Design Concept 2	*Minimize Impervious Footprint*	Maximize the permeable area (See Section 4.5.1 of the WQMP). ***The Alberhill Villages project proposes three park sites, two lakes, detention basins, natural channels and open space maximizing the permeable area. Due to the steepness of the site, numerous LLMD/CFD maintained landscaped slopes are proposed throughout the site contributing to the permeable area.***	☒	☐	☐
		Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets and other low -traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials. ***Walkways, trails, and parking stalls throughout the site will be constructed using permeable surfaces as feasible.***	☒	☐	☐
		Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walk able environment for pedestrians are not compromised. ***Streets and sidewalks are at minimum widths and smaller as described in the Alberhill Villages Specific Plan. When commercial sites are designed, minimum widths for parking lot aisles and stalls shall be used to minimize impervious footprints.***	☒	☐	☐
		Reduce widths of street where off-street parking is available. ***The Alberhill Villages Specific Plan calls for narrower street widths in some instances while still providing for adequate traffic lanes and bicycle lanes. The collector streets and larger will have depressed landscape medians as well.***	☒	☐	☐
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design. ***The use of impervious surfaces will be minimized when the landscape is designed.***	☒	☐	☐
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).	☐	☒	☐

Table 1. Site Design BMPs (Cont.)

			Included		
Design Concept	**Technique**	**Specific BMP**	**Yes**	**No**	**N/A**
Site Design Concept 3	*Conserve Natural Areas*	Conserve natural areas (See WQMP Section 4.5.1). ***The majority of natural area has not been conserved and cannot be conserved due to ongoing mining operations at the site. However, the hillsides in the southwesterly corner of the site will be preserved.***	☒	☐	☐
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs. ***Additional native and drought tolerant trees and large shrubs will be planted throughout the site, within street medians and parkways, landscaped slopes, and non-residential site parking lots to maximize canopy interception.***	☒	☐	☐
		Use natural drainage systems. ***Due to the site being actively mined, existing drainage flowlines cannot be conserved except for the Un-named Wash. However, new natural drainage systems will be designed throughout the site. Individual lots will be designed with natural swales instead of area drains. Natural channels will be proposed instead of more storm drain pipes where feasible. Commercial sites will be designed to utilize natural drainage systems within the parking lots where feasible.***	☒	☐	☐
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).	☐	☒	☐

Table 1. Site Design BMPs (Cont.)

			Included		
Design Concept	**Technique**	**Specific BMP**	**Yes**	**No**	**N/A**
Site Design Concept 4	*Minimize Directly Connected Impervious Areas (DCIAs)*	Residential and commercial sites must be designed to contain and infiltrate roof runoff, or direct roof runoff to vegetative swales or buffer areas, where feasible. ***The residential areas of this site will maximize soil infiltration in neighborhood basins which is the most efficient and feasible method for this site. The commercial sites will, where feasible, direct roof runoff to landscape areas as a pretreatment measure prior to entering into the WQMP basins.***	☒	☐	☐
		Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping. ***When each planning area is designed impervious sidewalks and walkways shall drain into adjacent landscaping where practical.***	☒	☐	☐
		Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales. ***When each planning area is designed, the use of vegetated drainage swales shall be used where feasible. The use of imperviously lined swales will be minimized except for landscaped slopes higher than 30' which will require concrete terrace drains per the Uniform Building Code.***	☒	☐	☐
		Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings. ***This system is not feasible for this site.***	☐	☒	☐
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter. ***This system is feasible in some locations of the site, and will be used where practical.***	☒	☐	☐
		Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to MS4s. ***A dual drainage system will be considered if feasible in the design of local streets.***	☒	☐	☐
		Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping prior to discharging to the MS4. ***Commercial driveways will be designed with shared access where feasible. Driveways will drain into a treatment facility prior to discharging to the MS4.***	☒	☐	☐
		Uncovered temporary or guest parking on private residential lots may be paved with a permeable surface, or designed to drain into landscaping prior to discharging to the MS4. ***Uncovered temporary or guest parking on the private residential lots will drain into landscaping prior to discharging to the street where feasible.***	☒	☐	☐

Table 1. Site Design BMPs (Cont.)

Site Design Concept 4	*Minimize Directly Connected Impervious Areas (DCIAs)*	Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design. ***The proposed commercial sites and park sites will incorporate landscape areas into the drainage design where feasible.***	☒	☐	☐
		Overflow parking (parking stalls provided in excess of the Co-Permittee's minimum parking requirements) may be constructed with permeable paving. ***The proposed commercial sites and park sites may incorporate permeable paving in overflow parking stalls where feasible.***	☒	☐	☐
		Other comparable and equally effective design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).	☐	☒	☐

Project Site Design BMPs:

This Preliminary WQMP is a part of the Alberhill Village Specific Plan package which will go to City Council for approval. Therefore the site design BMPs including: constructing reduced street widths and sidewalk widths, utilizing 2-story footprints to minimize impervious surfaces, designing natural drainage facilities, and draining to basins for infiltration will be designated as facilities to be constructed per the Specific Plan ensuring that the BMPs are implemented. The remaining site design BMPs such as: using perforated pipe in landscaped area drain systems, providing natural trails, planting native or drought tolerant trees and designing landscaping areas as Bio-retention facilities will be included in the Grading Plans prepared during Final Engineering. Finally, this Preliminary WQMP will provide guidelines for the planning areas when they are designed to address WQMP requirements including: using minimum driveway aisle and parking stall widths, providing the minimum required number of parking stalls, using permeable pavement if practical, draining impermeable surfaces to landscaped areas prior to entering a storm drain system, and planting native or drought tolerant trees.

V.2 SOURCE CONTROL BMPS

The following are source control BMPs that will be implemented at the Alberhill Villages site.

Table 2. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	☒	☐	
Activity Restrictions	☒	☐	
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☒	☐	
Drainage Facility Inspection and Maintenance	☒	☐	
Structural Source Control BMPs			
MS4 Stenciling and Signage	☒	☐	
Landscape and Irrigation System Design	☒	☐	
Protect Slopes and Channels	☒	☐	
Provide Community Car Wash Racks	☒	☐	
Properly Design:	☒	☐	
Fueling Areas	☒	☐	
Air/Water Supply Area Drainage	☒	☐	
Trash Storage Areas	☒	☐	
Loading Docks	☒	☐	
Maintenance Bays	☒	☐	
Vehicle and Equipment Wash Areas	☒	☐	
Outdoor Material Storage Areas	☒	☐	
Outdoor Work Areas or Processing Areas	☒	☐	
Provide Wash Water Controls for Food Preparation Areas	☒	☐	

Education for Property Owners, Operators, Tenants, Occupants, or Employees

Informational materials to promote the prevention of Urban Runoff pollution will be provided in Appendix D in the Final WQMP. These educational materials will help in implementing this project-specific WQMP.

These materials include general housekeeping practices that contribute to the protection of Urban Runoff quality and Best Management Practices that eliminate or reduce pollution during subsequent property improvements. The Owner shall be responsible for educational material distribution to all new homeowners. The educational materials should be updated on an annual basis to include the latest available BMPs (check with the Riverside County Flood Control and Water Conservation District and the CASQA handbooks for the latest information.)

The following is a list of educational materials that are made a part of this WQMP and will be included in Appendix D:

- SD-10 Site Design and Landscape Planning
- SD-11 Roof Runoff Controls
- SD-12 Efficient Irrigation
- SD-13 Storm Drain Signage
- SD-32 Trash Storage Areas

- SC-10 Non-Stormwater Discharges
- SC-20 Vehicle Fueling
- SC-21 Vehicle Cleaning
- SC-30 Outdoor Loading/Unloading
- SC-34 Waste Handling and Disposal
- SC-43 Parking/Storage Area Maintenance
- SC-35 Safer Alternative Products
- SC-41 Building & Grounds Maintenance
- SC-43 Parking/Storage Area Maintenance
- SC-44 Drainage System Maintenance
- TC-10 Infiltration Trench
- TC-11 Infiltration Basin
- TC-22 Extended Detention Basin
- TC-32 Bio-retention
- After the Storm
- Guidelines for Maintaining your Swimming Pool, Jacuzzi and Garden Fountain
- What's the Scoop?
- Outdoor Cleaning Activities and Professional Mobile Service Providers
- Landscape and Gardening
- 10 Ways to Save Water Outdoors
- Living on the Edge

Activity Restrictions

The following activities are prohibited:

- Blowing, sweeping, or hosing of debris (leaf litter, grass clippings, litter, etc.) into storm drain inlets, or other conveyances.
- Onsite fueling except in designated areas
- Dumping of any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use of pesticides if rain is expected.
- Mixing or preparation of pesticides for application near storm drain inlets.
- Allowing wash water to enter storm drains

Irrigation System and Landscape Maintenance

Irrigation system inspection and repair and landscape maintenance shall be performed every week and conform to the guidelines included in the educational materials until the homeowner takes title. Fertilizer and pesticide usage shall be consistent with the instructions contained on product labels and with regulations administered by California's Department of Pesticide Regulation. All wastes generated shall be disposed of in a safe legal manner. Castle & Cooke shall be responsible for the irrigation system and landscape maintenance and the funding required to perform the task until the title is transferred to the homeowner or City.

Common Area Litter Control

The litter control and parking lot sweeping as needed of the park sites will be performed by the City Parks Department once turned over. The park sites will have trash receptacles where appropriate throughout the sites maintained by the City Parks Department. Patrols of the perimeter fences and walls to collect litter shall be made as needed. Litter control within the public streets will also be provided by the City.

The litter control of the sloped landscaped lots, wildlife corridor and low-flow channels will be performed by the City maintenance crews once turned over.

Street Sweeping Private Streets and Parking Lots

The property owner/association will maintain private parking lots within the commercial, mixed-use, university and multi-family sites as shown on the PWQMP Site Plan and Land Plan, on a monthly basis or as needed. Funding shall be secured in the property owners budget for street and parking lot sweeping.

Drainage Facility Inspection and Maintenance

The private drainage facilities shall be inspected and maintained by the property owner as needed and shall follow the guidelines in the educational material (SC-44). The City shall be responsible for the inspection and maintenance of public drainage facilities within the landscaped lots and the funding required to perform the task.

MS4 Stenciling and Signage (Catch Basin Marker)

Catch Basin Markers shall be installed at catch basins within the project site per the City of Lake Elsinore MS4 standards to alert the public not to dump anything down the storm drain system.

Landscape and Irrigation System Design

The following design features shall be included in the landscaping and irrigation plans:

1. Landscape/irrigation design incorporated rain shutoff devices to prevent irrigation during and after precipitation events when event is sufficient to replace watering needs.
2. Irrigation system is designed to each landscape area's specific requirements.
3. Irrigation system is designed to shut off when fluctuations or pressure drops are detected, to control water loss.
4. System is designed to minimize runoff of excess water.
5. Use of spray head, water nozzles, and spray bubblers aid in reduction of water runoff.
6. System incorporates programmable irrigation controller.
7. Plans incorporate native and drought tolerant plants.
8. Plant with similar water requirements are grouped together.
9. Mulch is used in all planter areas.
10. Planting layout and irrigation is designed for the appropriate exposure to sunlight.
11. Perimeter landscaping includes use of shrubs, trees and ground cover of varying size to act as screening as well as pollutant filters.

Protect Slopes and Channels

Slopes shall be design per Uniform Building Codes and City of Lake Elsinore standards including a maximum of a 2:1 steepness, terrace drains and landscaping to protect from erosion into the MS4. Channels shall be designed per RCFC&WCD standards to protect erosion of the side slopes and bottom. Velocities shall be slowed down via rip-rap dikes, energy dissipaters, and vegetation. Low-flow channels within public areas shall have signs notifying the public not to pollutant and have trash receptacles around the vicinity to promote litter control.

Provide Community Car Wash Racks

If multifamily sites provide community car wash racks than the drainage design shall meet the City of Lake Elsinore standards to protect MS4 facilities from pollutants due to car washing. The design shall be included in the WQMP for the multifamily site.

Properly Design:

Fueling areas, air/water supply area drainage, trash storage areas, loading docks, maintenance bays, vehicle and equipment wash areas, outdoor material storage, outdoor work areas and processing areas if included in a site plan for a planning area, shall be properly designed per local standards including but not limited to: health department, city, water district and flood control district standards. The design shall be included in the WQMP for the planning area.

Provide Wash Water Controls for Food Preparation Areas

If food preparation areas are included in a site plan for a planning area, than wash water controls shall be designed per local standards including but not limited to: health department, city, and water district standards.

V.3 TREATMENT CONTROL BMPS

Extended Detention Basins

Extended Detention Basins were chosen for this site due to the size of the tributary area being treated, type of project and topographic constraints of the site. Since the site has historically been used as a mining site, the proposed rough grading of the site that will be required eliminates the possibility of testing the infiltration rate of the soils at this time. However, upon rough grading of the WQMP areas, infiltration tests can be performed to determine the possibility of designing the extended detention basins as infiltration basins instead. The media section at the bottom of the basin can be revised to reduce or eliminate the sand and gravel layers if the soils can infiltrate the required volume.

Extended Detention Basins are basins whose outlets have been designed to detain the volume of stormwater runoff from a water quality design storm for a minimum of 48 hours to allow particles and associated pollutants to settle. Additional pollutant removal is provided by maximizing the opportunity for the volume to infiltrate, evaporate, and surface wet. Unlike wet ponds, these facilities do not have a large permanent pool. Stormwater enters the basin through a forebay where any trash, debris, and sediment accumulate for easy removal. Flows from the forebay enter the basin which will be vegetated with native grasses which is interspersed with gravel-filled trenches that help further enhance infiltration. Low flows or incidental dry weather flows will be conveyed to the basin bottom to be treated through a sand filter and collected in a subdrain structure. Any additional flows will be detained in the basin for an extended period by incorporating an outlet structure that is more restrictive to extend the drawdown time which further allows particles to settle out.

The basin locations for this project were determined by dividing the project into tributary areas (including the public streets) based on the phasing, planning areas and major hydrologic boundaries. At the downstream end of each tributary area, preliminary basin locations have been proposed (refer to the PWQMP Site Plan in Appendix B). Urban runoff will be treated in the basins prior to discharging into the storm drain which will protect the receiving waters from urban pollutants. The water quality design storm will enter the basins via a bypass weir constructed in the storm drain manhole. The bypass weir will be designed to convey the WQMP flows into the basin while allowing higher storm flows to bypass the weir and continue down the storm drain line for flood protection. Treated runoff shall not comingle with untreated runoff. Therefore, separate storm drain lines are proposed in some locations.

Refer to Appendix F for detailed calculations for each basin. A table entitled "WQMP BMP Sizing" summarizes the calculations for each basin.

Park, Mixed-Use and Commercial Site BMPs

At this time, the site plans have not been designed. Therefore, the BMPs cannot be designed as well. However, we have identified the preliminary volume of runoff required to be treated. We are proposing multiple BMP combinations that could be utilized when the final design of the park sites is performed. Below are a few options:

1) Extended Detention Basin only
2) Pervious pavement in the parking stalls and walkways and the remainder of the volume allocated to the Extended Detention Basin
3) Pervious pavement in the parking stalls and walkways, Bio-retention in the planter areas and the remainder of the volume allocated to the Extended Detention Basin
4) Bio-retention in the planter areas and the remainder of the volume allocated to the Extended Detention Basin

Table 3: Treatment Control BMP Selection Matrix [1]

Pollutant of Concern	Treatment Control BMP Categories[2]							
	Veg. Swale & Veg. Filter Strips[3]	Detention Basins[4]	Infiltration Basins, Infiltration Trenches, & Porous Pavement[5]	Wet Ponds or Wetlands[6]	Sand Filter or Media Filters	Water Quality Inlets	Hydrodynamic Separator Systems [7]	Manufactured / Proprietary Devices[8]
Sediment/Turbidity	H/M	M	H/M	H/M	H/M	L	H/M (L for turbidity)	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Nutrients	L	M	H/M	H/M	L/M	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Organic Compounds	U	U	U	U	H/M	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Trash & Debris	L	M	U	U	H/M	M	H/M	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Oxygen Demanding Substances	L	M	H/M	H/M	H/M	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Bacteria & Viruses	U	U	H/M	U	H/M	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Oils & Grease	H/M	M	U	U	H/M	M	L/M	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Pesticides (non-soil bound)	U	U	U	U	U	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Metals	H/M	M	H	H	H	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐

Abbreviations:

L: Low removal efficiency H/M: High or medium removal efficiency U: Unknown removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.

(2) Project applicants should base BMP designs on the Riverside County Stormwater Quality Best Management Practice Design Handbook. However, project applicants may also wish to reference the California Stormwater BMP Handbook – New Development and Redevelopment (www.cabmphandbooks.com). The Handbook contains additional information on BMP operation and maintenance.

(3) Includes grass swales, grass strips, wetland vegetation swales, and bioretention.

(4) Includes extended/dry detention basins with grass lining and extended/dry detention basins with impervious lining. Effectiveness based upon minimum 36-48-hour drawdown time.

(5) Projects that will utilize infiltration-based Treatment Control BMPs (e.g., Infiltration Basins, Infiltration Trenches, Porous Pavement, etc.) must include a copy of the property/project soils report as Appendix E to the project-specific WQMP. The selection of a Treatment Control BMP (or BMPs) for the project must specifically consider the effectiveness of the Treatment Control BMP for pollutants identified as causing an impairment of Receiving Waters to which the project will discharge Urban Runoff.

(6) Includes permanent pool wet ponds and constructed wetlands.

(7) Also known as hydrodynamic devices, baffle boxes, swirl concentrators, or cyclone separators.

(8) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP, or newly developed/emerging stormwater treatment technologies.

V.4 EQUIVALENT TREATMENT CONTROL ALTERNATIVES

Not applicable

V.5 REGIONALLY-BASED TREATMENT CONTROL BMPS

Not applicable

VI. Operation and Maintenance Responsibility for Treatment Control BMPs

Operation and maintenance (O&M) requirements for all structural Source Control and Treatment Control BMPs shall be identified in the project-specific WQMP. The project-specific WQMP shall address the following:

- Identification of each BMP that requires O&M.
- Thorough description of O&M activities, the O&M process, and the handling and placement of any wastes.
- BMP start-up dates.
- Schedule of the frequency of O&M for each BMP.
- Identification of the parties (name, address, and telephone number) responsible for O&M, including a written agreement with the entities responsible for O&M. This agreement can take the form of a Covenant and Agreement recorded by the Project Proponent with the County Recorder, HOA or POA CC&Rs, formation of a maintenance district or assessment district or other instrument sufficient to guarantee perpetual O&M. The preparer of this project-specific WQMP should carefully review Section 4.6 of the WQMP prior to completing this section of the project-specific WQMP.
- Self-inspections and record-keeping requirements for BMPs (review local specific requirements regarding self-inspections and/or annual reporting), including identification of responsible parties for inspection and record- keeping.
- Thorough descriptions of water quality monitoring, if required by the Co-Permittee.

This section will be completed in the Final WQMP. Castle & Cooke will provide operation and maintenance for the WQMP facilities, lakes/detention basins and detention/debris basins until 1-year after construction then the City of Lake Elsinore or new property owner for mixed-use and commercial sites will provide operation and maintenance.

VII. Funding

A funding source or sources for the O&M of each Treatment Control BMP identified in the project-specific WQMP must be identified. By certifying the project-specific WQMP, the Project applicant is certifying that the funding responsibilities have been addressed and will be transferred to future owners. One example of how to adhere to the requirement to transfer O&M responsibilities is to record the project-specific WQMP against the title to the property.

This section will be completed in the Final WQMP. Castle & Cooke or future owners will provide funding for the construction of the WQMP facilities. The City of Lake Elsinore or future owners will then provide funding for the operation and maintenance of the WQMP facilities.

Appendix A

Conditions of Approval

(To be provided in Final WQMP)

Planning Commission Resolution _____

Dated _____

Appendix B

Vicinity Map, PWQMP Site Plan,
PWQMP Land Use Plan, Phasing Map and Receiving Waters Map

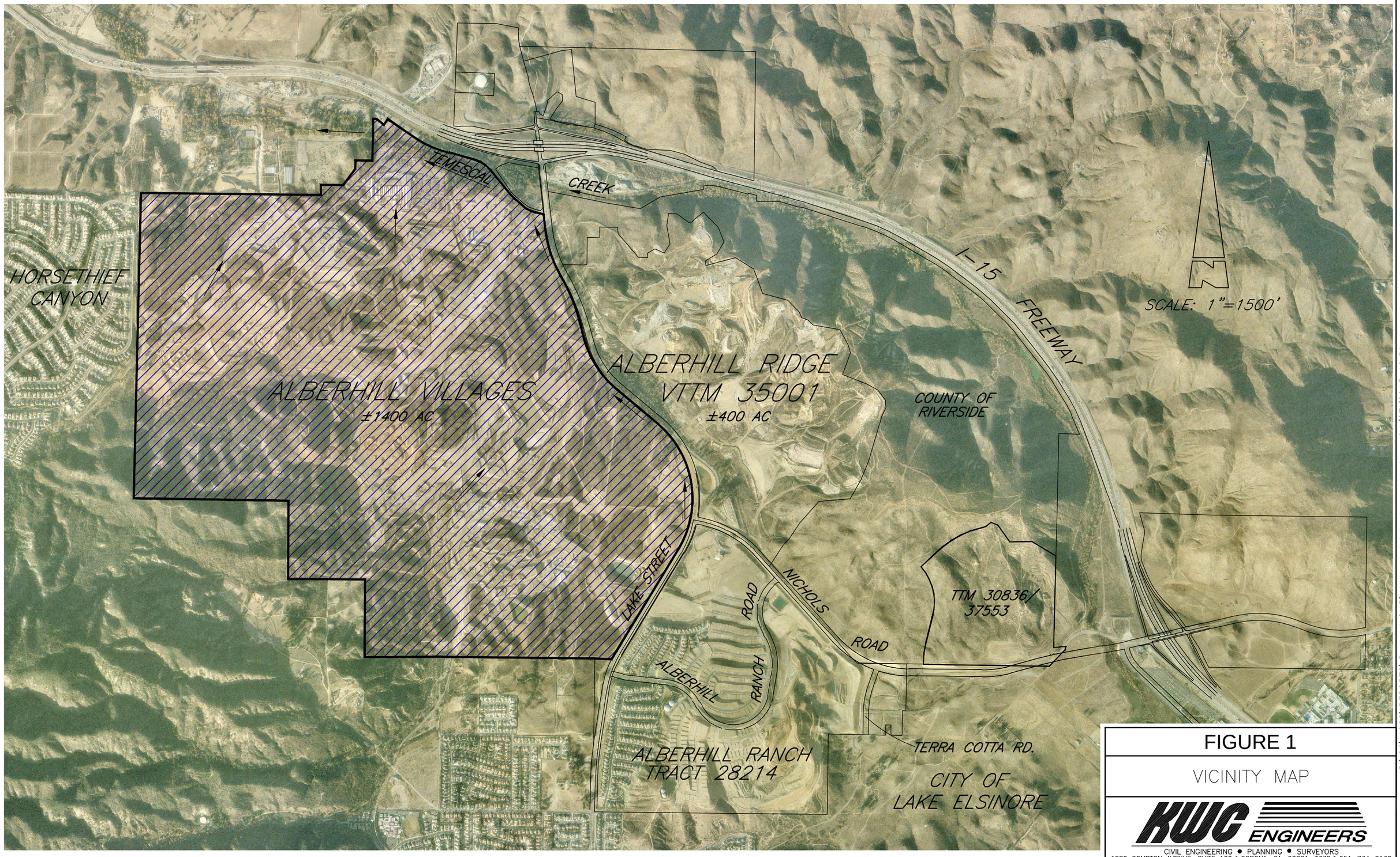


FIGURE 1

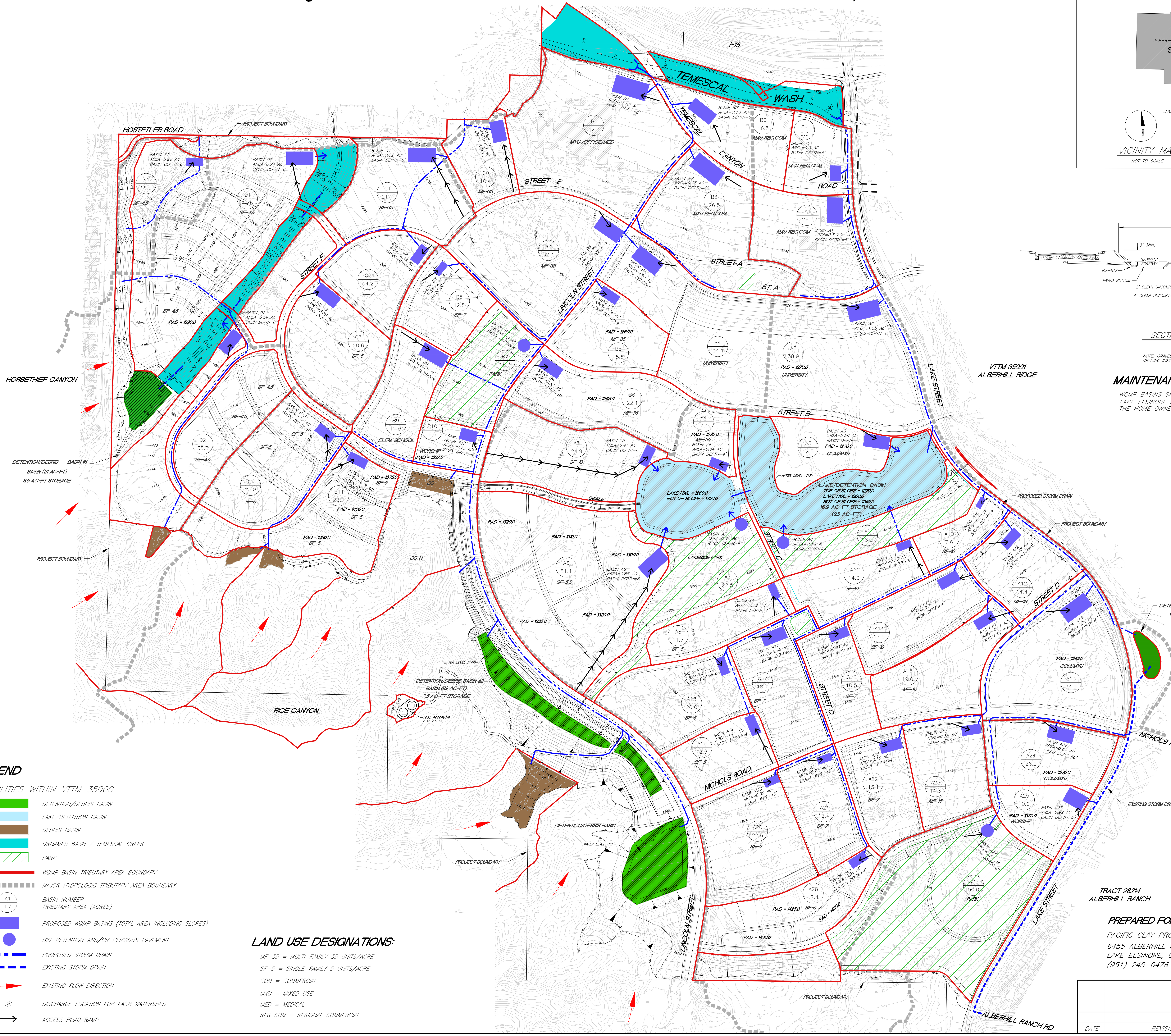
VICINITY MAP

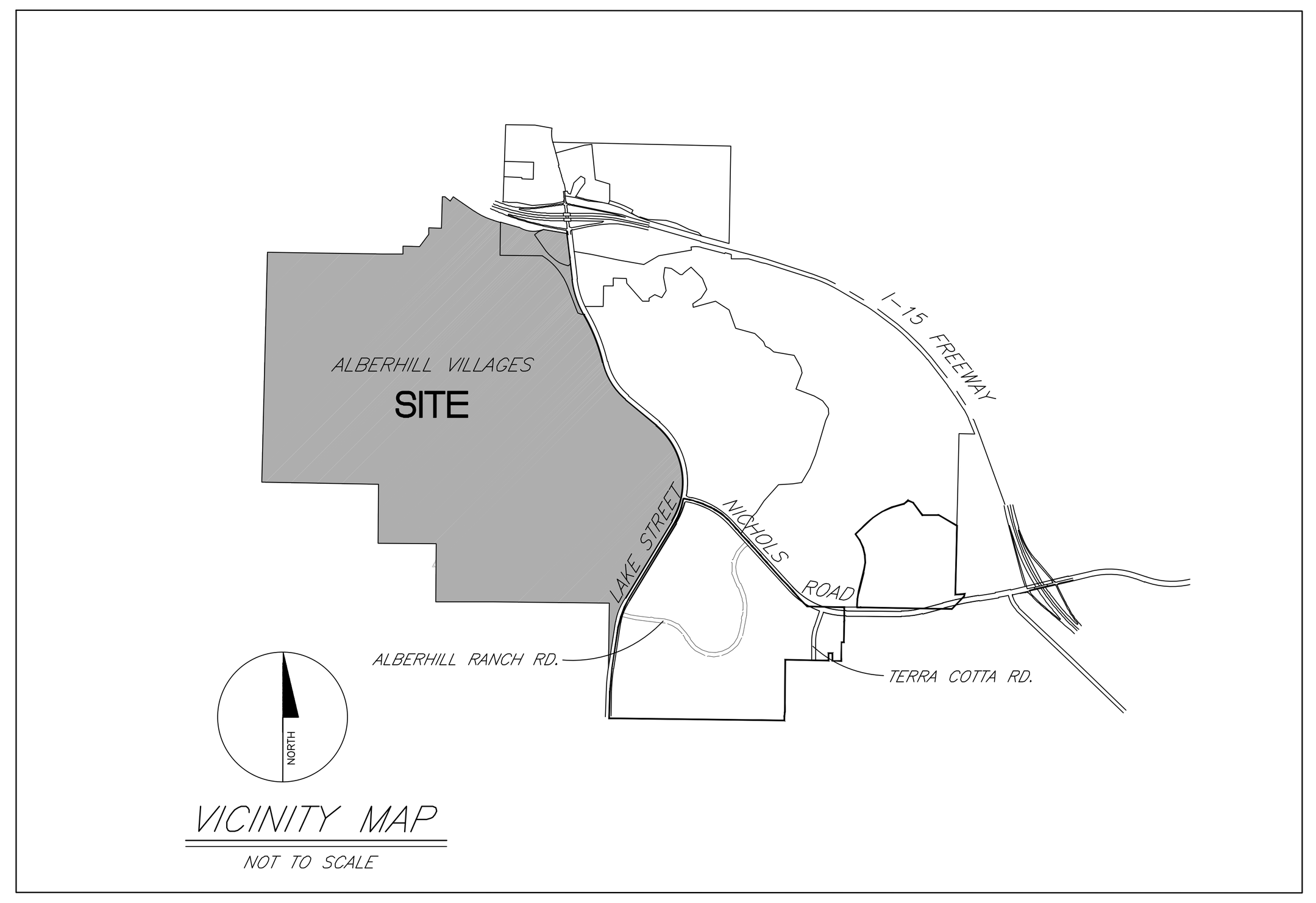
KWC ENGINEERS

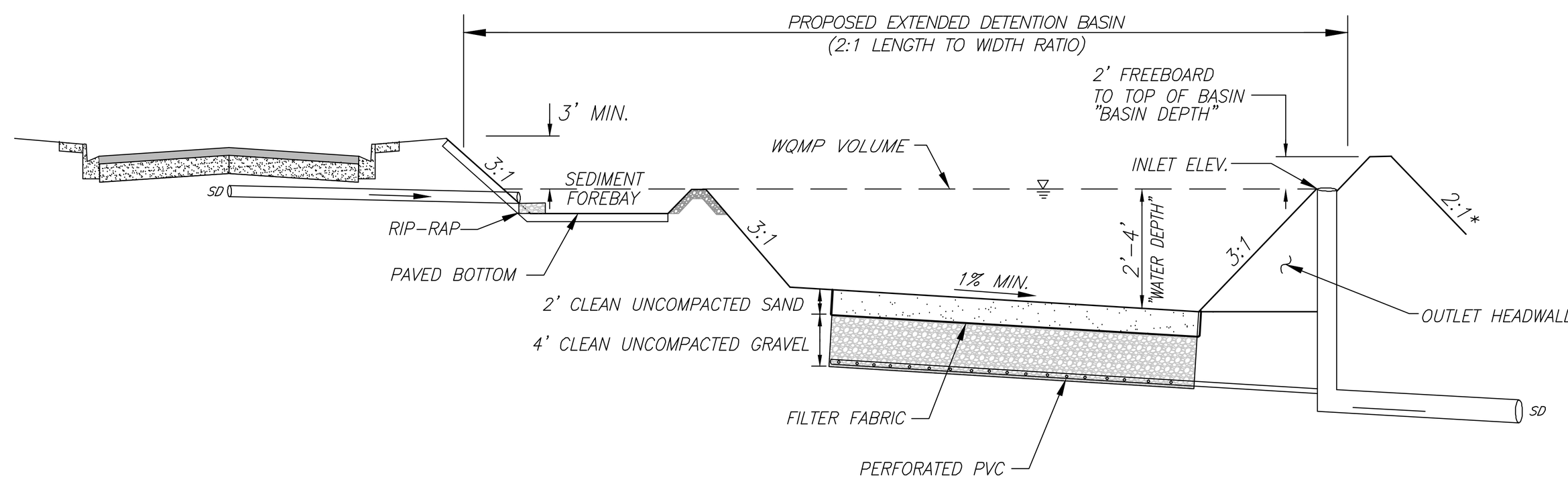
CIVIL ENGINEERING • PLANNING • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

JN. 07.1100.4.42 R:\06\1000\REPORTS\Prelim WQMP\Villages Vicinity Map exhb.dwg 04/07/2015 10:59

ALBERHILL VILLAGES SPECIFIC PLAN & TTM 35000
PWQMP CONCEPTUAL SITE PLAN - CITY OF LAKE ELSINORE, CA







SECTION EXTENDED DETENTION BASIN
(NOT TO SCALE)

NOTE: GRAVEL AND SAND MAY BE REDUCED UPON THE COMPLETION OF A POST GRADING INFILTRATION TEST AND BASIN REDESIGN.

MAINTENANCE

WQMP BASINS SHALL BE OWNED AND MAINTAINED BY THE CITY OF LAKE ELSINORE LLMD/CFD (IF APPROVED BY TE CITY) OTHERWISE BY THE HOME OWNER ASSOCIATION.

WATERSHED DESIGNATIONS:

AREA A – LAKE STREET
AREA B – RICE CANYON
AREA C – UN-NAMED WASH
AREA D – HORSETHIEF CANYON
AREA E – UN-NAMED WASH

LEGEND

FACILITIES WITHIN VTTM 35000

- DETENTION/DEBRIS BASIN
- LAKE/DETENTION BASIN
- DEBRIS BASIN
- UNNAMED WASH / TEMESCAL CREEK
- PARK
- WQMP BASIN TRIBUTARY AREA BOUNDARY
- MAJOR HYDROLOGIC TRIBUTARY AREA BOUNDARY
- A1 / 4.7 — BASIN NUMBER, TRIBUTARY AREA (ACRES)
- PROPOSED WQMP BASINS (TOTAL AREA INCLUDING SLOPES)
- BIO-RETENTION AND/OR PERVIOUS PAVEMENT
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING FLOW DIRECTION
- DISCHARGE LOCATION FOR EACH WATERSHED
- ACCESS ROAD/RAMP

LAND USE DESIGNATIONS:

MF-35 = MULTI-FAMILY 35 UNITS/ACRE
SF-5 = SINGLE-FAMILY 5 UNITS/ACRE
COM = COMMERCIAL
MXU = MIXED USE
MED = MEDICAL
REG COM = REGIONAL COMMERCIAL

300 0 300 600 900
SCALE IN FEET

STUDY DATE IDENTIFIER	
DATE OF LATEST CHANGE TO THIS MAP	
09/22/15	BY:TGF
DATE OF THIS PLOT	
09/22/15	

PREPARED FOR:

PACIFIC CLAY PRODUCTS INC.
6455 ALBERHILL RANCH ROAD
LAKE ELSINORE, CA 92530
(951) 245-0476

PREPARED BY:

FIGURE 2

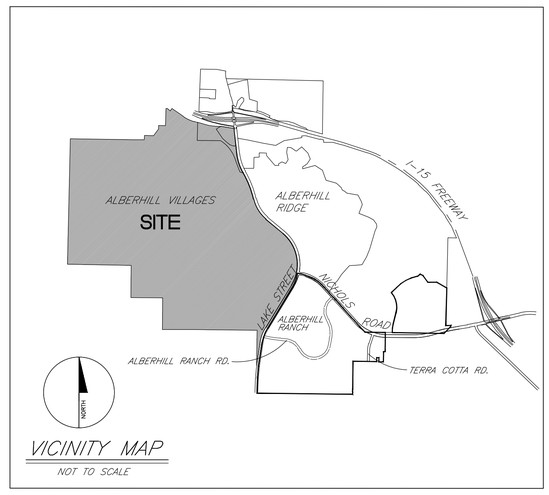
DATE	REVISION

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

J.N. -06.1000.5.16 R:\06\1000\REPORTS\Prelim WQMP\WQMP Conceptual Plan.dwg 09/22/2015 14:03

ALBERHILL VILLAGES SPECIFIC PLAN
PRELIMINARY LAND USE EXHIBIT

VICINITY MAP



VICINITY MAP
NOT TO SCALE

LEGEND:

- HILLSIDE RESIDENTIAL
- SINGLE FAMILY RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- MIXED USE
- SCHOOL
- WORSHIP
- LAKE
- PUBLIC WATER FACILITY
- PARKS
- OPEN SPACE-NATURAL
- OPEN SPACE-RESTORED (DETENTION/DEBRIS BASIN/ SLOPE/ LOW FLOW CHANNEL)

VTTM 35001
ALBERHILL RIDGE

I-15 FREEWAY
TEMESCAL CANYON ROAD
LINCOLN STREET
LAKE STREET
STREET A
STREET B
STREET C
STREET D
STREET E
NICHOLS ROAD
ALBERHILL RANCH ROAD
EXISTING HOSTETLER ROAD
EXISTING DETENTION BASIN
TO BE VACATED
TRACT 28214
ALBERHILL RANCH

OS-N 0.5AC
OS-N 2.3AC
OS TEMESCAL WASH 7.4AC
OS 10.1AC
1C MXU /OFFICE/MED 40.2AC
MF-35 10.0AC
MXU REG.COM. 19.3AC
1B MXU REG.COM. 35.9AC
2A SF-4.5 54.6AC
SF-7 21.7AC
OS 4.5AC
SF-4.5 9.1AC
2B MF-35 29.3AC
STREET A 1.7AC
STREET A 0.7AC
STREET A 1.7AC
SF-7 13.2AC
SF-7 10.6AC
2C SF-6 20.2AC
ELM. SCHOOL 12.0AC
PARK 14.3AC
WORSHIP 5.2AC
MF-35 12.9AC
1A UNIVERSITY 63.6AC
OS 30.7AC
SF-4.5 17.1AC
SF-4.5 20.8AC
SF-4.5 15.0AC
SF-4.5 23.2AC
MF-35 25.4AC
OS 0.5AC
OS 0.1AC
OS 0.1AC
STREET B
COM/MXU 12.7AC
4C LAKE 26.0AC
LAKE 13.6AC
SF-10 23.1AC
OS 3.2AC
PARK 15.5AC
OS 0.8AC
OS 1.5AC
OS-N 19.7AC
SF-5 51.0AC
4A
PARK 21.3AC
PARK 0.7AC
SF-10 18.7AC
MF-16 11.9AC
SF-5 10.2AC
SF-10 16.0AC
4B
SF-7 10.5AC
MF-16 17.2AC
6A COM/MXU 25.7AC
3A HILLSIDE 164.5AC
SF-7 15.2AC
SF-5 30.4AC
OS 67.7AC
5B
SF-7 13.1AC
MF-16 14.8AC
6B COM/MXU 13.1AC
WORSHIP 10.0AC
5A SF-7 12.4AC
SF-5 22.6AC
3B
SF-5 17.4AC
PARK 45.9AC
OS 8.6AC
OS 6.0AC
PW 1.2AC

LAND USE SUMMARY TABLE

PHASE	PLANNING AREA	LAND USE	ACRES	DWELLING UNITS (MAX)	F.A.R.	NON-RESIDENTIAL BLDG. (SQ. FT.)	SCHOOL CAPACITY (STUDENTS)
	1A	UNIVERSITY	63.6		0.54	1,500,000	6,000
	1A	MF-35	12.9	450			
	1B	MU/REG COM	1.7	15	0.35	26,000	
	1B	PARK (TG)	0.7				
	1B	MU/REG COM	1.7	15	0.35	26,000	
	1B	MU/REG COM	35.9	206	0.46	717,500	
	1B	MU/REG COM	19.3	110	0.31	260,000	
	1B	OS (TEM CREEK)	10.1				
	1B	OS (LAKE ST)	0.7				
	4C	COMMERCIAL/MU	12.7	60	0.69	382,000	
	4C	LAKE	26.0				
	4C	PARK (TG)	0.7				
	4C	PARK	15.5				
	4C	SF-10	18.7	190			
	4B	MF-16	11.9	192			
	6A	COMMERCIAL/MU	25.7	100	0.35	392,500	
	6B	COMMERCIAL/MU	13.1	50	0.35	200,000	
	6B	WORSHIP	10.0				600
1		**SUBTOTAL**	**280.9**	**1,388**		**3,504,000**	**6,600**
	4B	SF-10	16.0	160			
	4B	SF-7	10.5	74			
	4B	MF-16	17.2	275			
	5B	SF-7	13.1	92			
	5B	MF-16	14.8	237			
	5B	PARK	45.9				
	5B	OS	6.0				
2		**SUBTOTAL**	**123.5**	**838**		**0**	**0**
	4A	MF-35	25.4	889			
	4A	SF-10	23.1	231			
	4A	OS	3.2				
	4A	SF-5	51.0	255			
	4A	SF-5	10.2	51			
	4A	SF-5	30.4	152			
	4A	SF-7	15.2	106			
	4A	PARK	21.3				
	4A	LAKE	13.6				
	5A	SF-5	22.6	113			
	5A	SF-7	12.4	87			
	5A	SF-5	17.4	87			
	5A	OS	8.6				
	3B	OS	67.7				
	3B	OS-N	19.7				
3		**SUBTOTAL**	**341.8**	**1,971**		**0**	**0**
	2A	SF-4.5	54.6	246			
	2A	SF-4.5	9.1	41			
	2A	SF-4.5	15.0	68			
	2A	SF-4.5	17.1	77			
	2A	SF-4.5	20.8	94			
	2A	SF-4.5	23.2	104			
	2A	SF-7	21.7	152			
	2A	MF-35	10.0	350			
	2A	OS-N	0.5				
	2A	OS	35.2				
	2C	SF-6	20.2	121			
	2C	SF-7	13.2	92			
	2C	SF-7	10.6	74			
	2C	ELM SCHOOL	12.0				850
	2C	PARK	14.3				
	2C	WORSHIP	5.2				600
4		**SUBTOTAL**	**282.7**	**1,419**		**0**	**1,450**
	3A	HILLSIDE	164.5	8			
	3A	PW	1.2				
	3A	OS	0.8				
	3A	OS	1.5				
5		**SUBTOTAL**	**168.0**	**8**		**0**	**0**
	1C	MU/OFFICE/MED	40.2	1,594	0.29	503,000	
	1C	OS (TEM CREEK)	7.4				
	1C	OS	2.3				
	2B	MF-35	29.3	1026			
6		**SUBTOTAL**	**79.2**	**2,620**		**503,000**	**0**
		STREETS	**123.9**				
		TOTAL	**1,400.0**	**8,244**		**4,007,000**	**8,050**

LAND USE TYPE SUMMARY

Land Use	Total Acres	Units
SF-4.5	139.8	630
SF-5	131.6	658
SF-6	20.2	121
SF-7	96.7	677
SF-10	57.8	581
MF-16	43.9	704
MF-35	77.6	2715
UNIVERSITY	63.1	
WORSHIP	15.2	
COMMERCIAL/MU	51.5	210
MU/REG COM	57.7	346
OS/PARK/LAKE	301.7	
ELM SCHOOL	12.0	
MU/OFFICE/MED	40.2	1594
HILLSIDE	164.5	8
STREETS	123.9	
PW	1.2	
TOTAL	**1398.6**	**8,244**

RESIDENTIAL TYPE SUMMARY

Land Use	Total Acres	Units
SFD	388.3	2086
SFA	57.8	581
MF	121.5	3419
MXU	149.4	2150
HILLSIDE	164.5	8
TOTAL	**881.5**	**8,244**

N

300' 0 300' 600' 900'
SCALE IN FEET

STUDY DATE IDENTIFIER
DATE OF LATEST CHANGE TO THIS MAP
BY: YH
DATE OF THIS PLOT
07/17/15

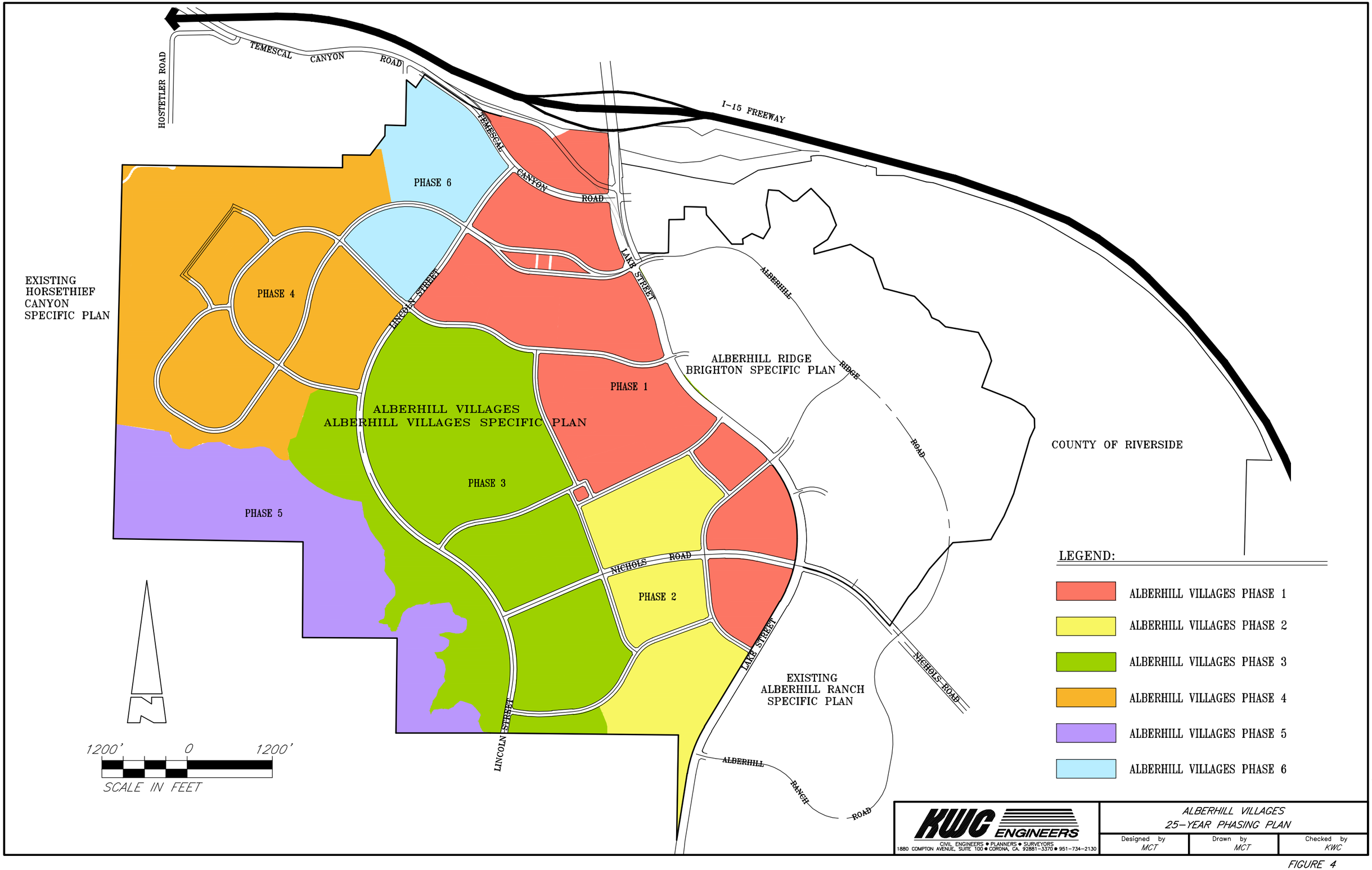
PREPARED FOR:

PACIFIC CLAY PRODUCTS INC.
6455 ALBERHILL RANCH ROAD
LAKE ELSINORE, CA 92530
(951) 245-0476

PREPARED BY:

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

JN 96.1000.6 R:\96.1000\EXHIBITS\ASP_LAND USE EXHIBITS\ASP_LAND USE.dwg 07/17/2015 11:14



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ALBERHILL VILLAGES
25-YEAR PHASING PLAN

Designed by	Drawn by	Checked by
MCT	MCT	KWC

J.N. 06.1000.6.05/ R:\06\1000\REPORTS\Prelim WQMP\PHASING.dwg 04/02/2015 08:29

FIGURE 4

LEGEND

- EXISTING MAJOR BOUNDARY
- EXISTING MINOR BOUNDARY
- EXISTING FLOWLINE
- DISCHARGE POINTS

- AREA A – LAKE STREET
- AREA B – RICE CANYON
- AREA C – UN–NAMED WASH
- AREA D – HORSETHIEF CANYON
- AREA E – UN–NAMED WASH

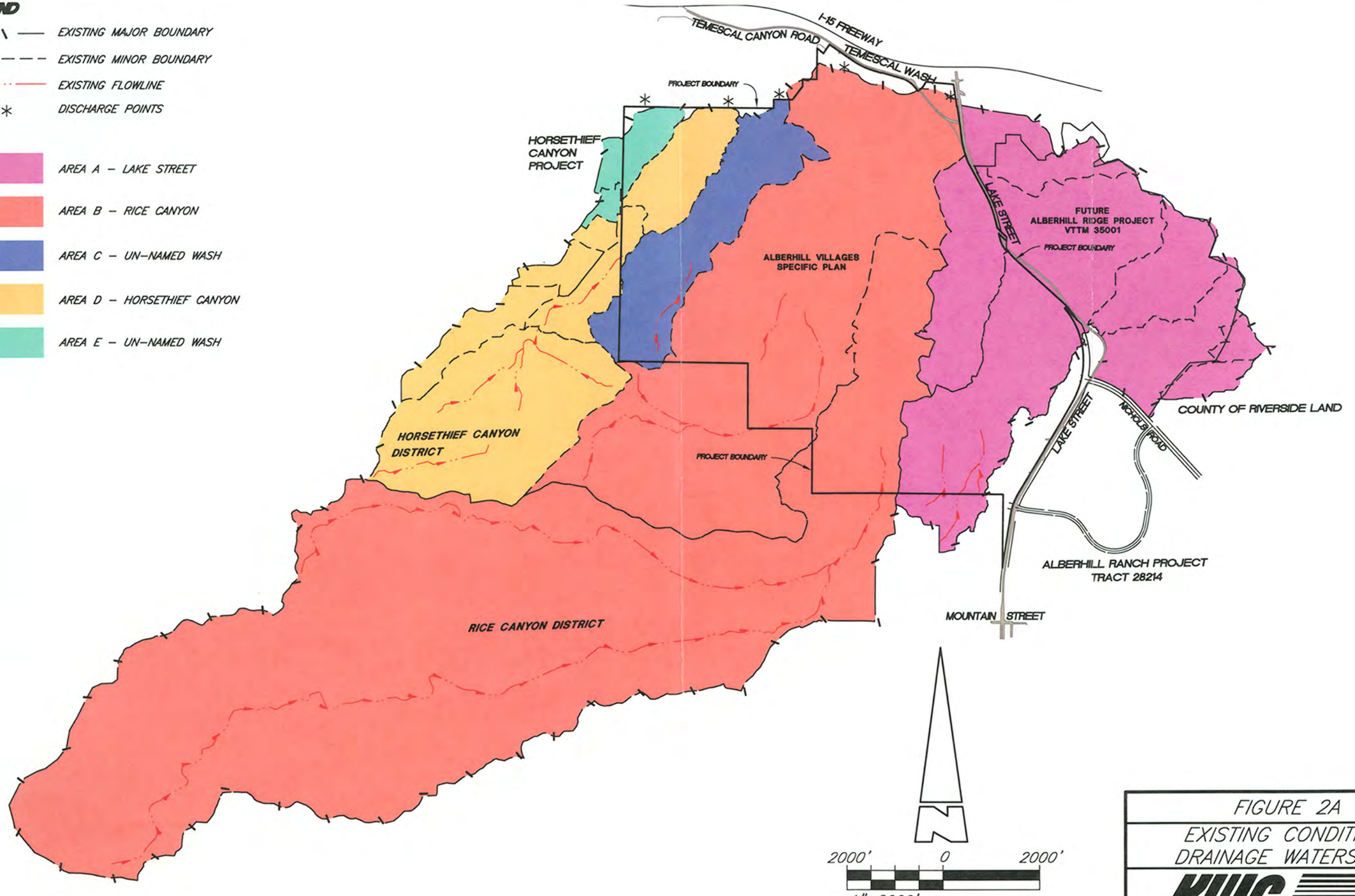

FIGURE 2A
EXISTING CONDITION
DRAINAGE WATERSHED

KWC ENGINEERS
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JN. 06.1000.2.06 R:\06\1000\REPORTS\Prelim WQMP\EXISTING DRAINAGE WATERSHED.dwg 12/26/2012 10:36

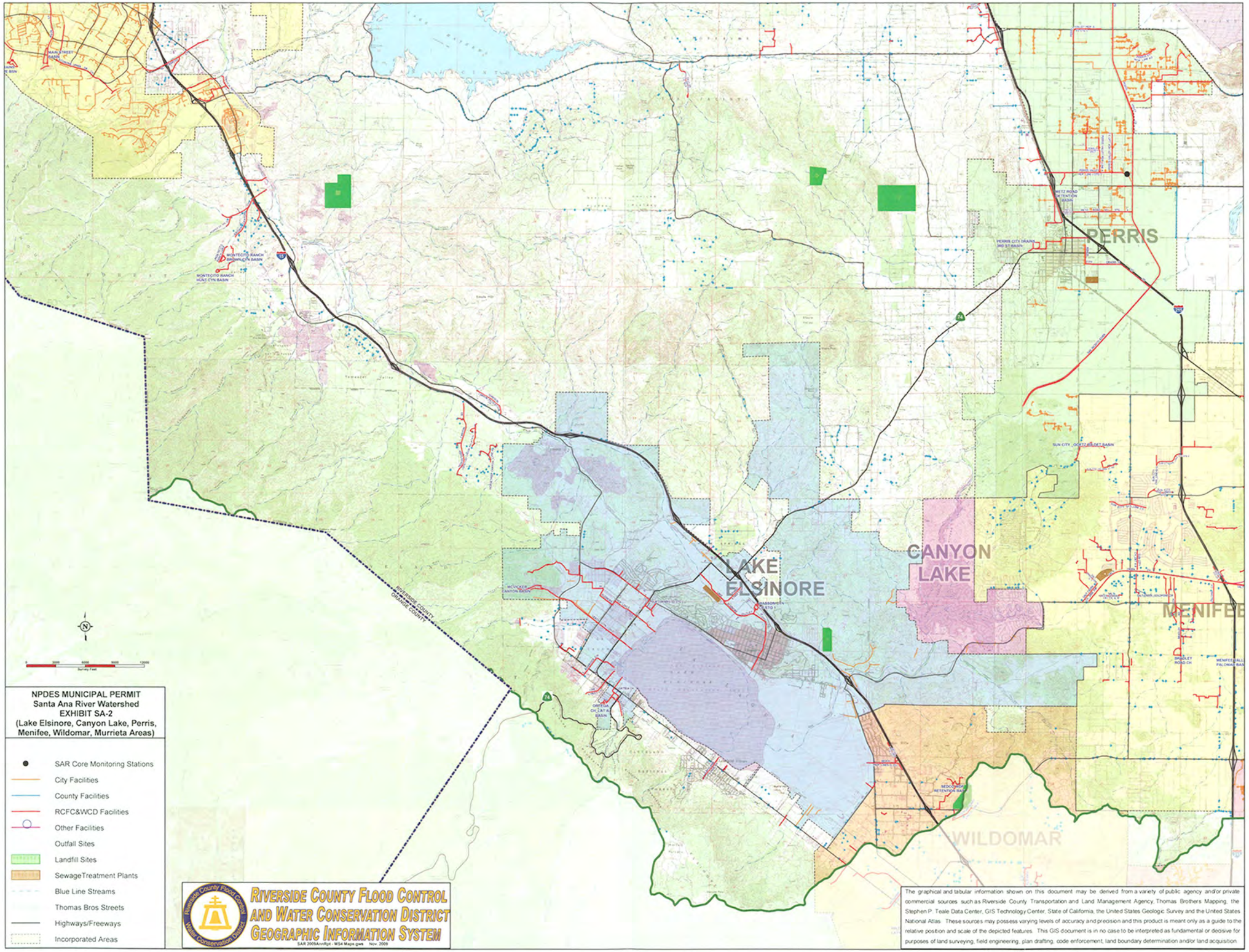

PERRIS
LAKE ELSINORE
CANYON LAKE
MENIFEE
WILDOMAR
MONTECITO RANCH DETENTION BASIN
MONTECITO RANCH HUNT CYN BASIN
PERRIS CITY DRAINS 3RD ST BASIN
SUN CITY - QUAIL SET BASIN
MEDOCINO DETENTION BASIN
RIVERSIDE COUNTY
ORANGE COUNTY
NPDES MUNICIPAL PERMIT
Santa Ana River Watershed
EXHIBIT SA-2
(Lake Elsinore, Canyon Lake, Perris, Menifee, Wildomar, Murrieta Areas)
SAR Core Monitoring Stations
City Facilities
County Facilities
RCFC&WCD Facilities
Other Facilities
Outfall Sites
Landfill Sites
SewageTreatment Plants
Blue Line Streams
Thomas Bros Streets
Highways/Freeways
Incorporated Areas
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
GEOGRAPHIC INFORMATION SYSTEM
SAR 2009Arv#pt - MS4 Maps.gws Nov. 2009
The graphical and tabular information shown on this document may be derived from a variety of public agency and/or private commercial sources such as Riverside County Transportation and Land Management Agency, Thomas Brothers Mapping, the Stephen P. Teale Data Center, GIS Technology Center, State of California, the United States Geologic Survey and the United States National Atlas. These sources may possess varying levels of accuracy and precision and this product is meant only as a guide to the relative position and scale of the depicted features. This GIS document is in no case to be interpreted as fundamental or decisive for purposes of land surveying, field engineering, plan drafting, code enforcement, land boundary determination and/or land acquisition.

FIGURE 5

FIGURE 1-2
SANTA ANA RIVER AND TRIBUTARIES

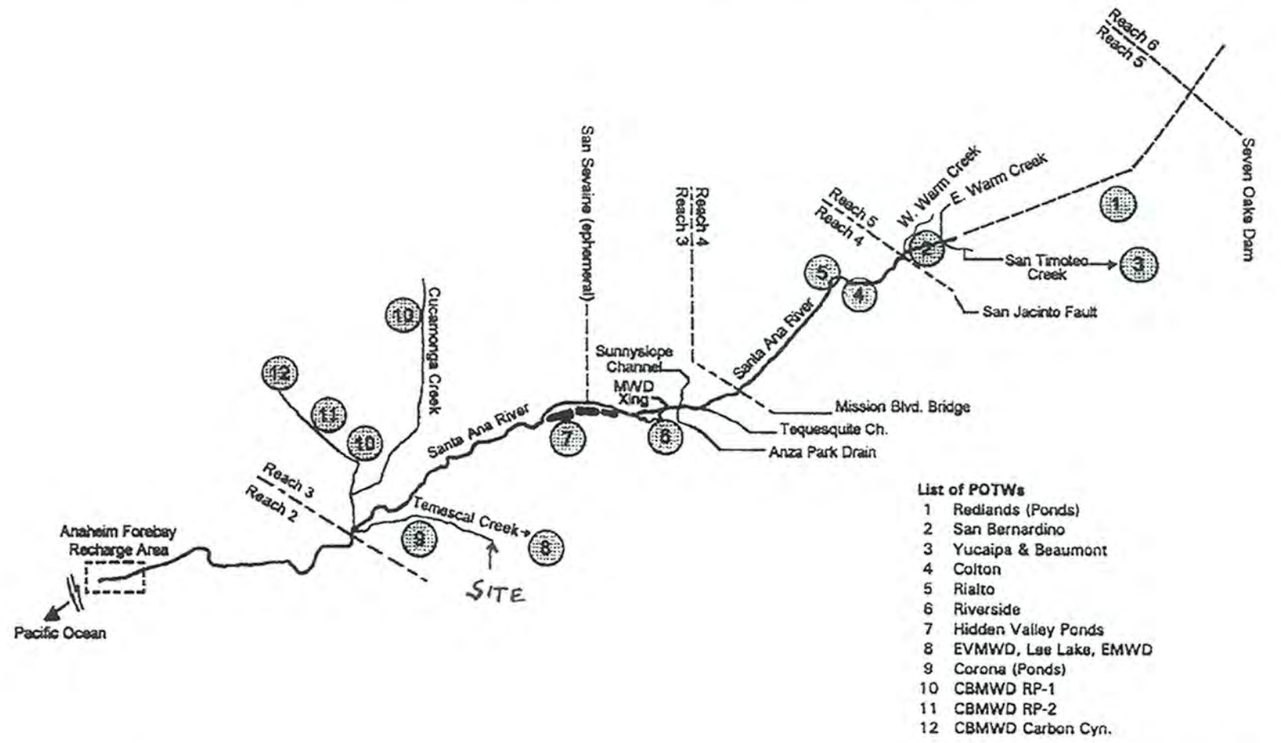


FIGURE 6

Appendix C

Supporting Detail Related to Hydraulic Conditions of Concern

(To be provided in Final WQMP)

Appendix D

Educational Materials

(To be provided in Final WQMP)

Appendix E

Soils Report

(To be provided in Final WQMP)

Appendix F

Treatment Control BMP Sizing Calculations and Design Details

ALBERHILL VILLAGES
WQMP BMP SIZING -2011 METHOD
BY: KWC ENGINEERS

BASIN	Tributary Area (A) (s.f.)	Tributary Area (A) (ac.)	Land Use	Recommended Value (%)	Design Capture Volume (cu.-ft.)	Required Volume (ac.-ft.)	Basin Depth (ft.)	Water Depth (ft.)	Average Water Surface Area (ac.)	Total Basin Area (ac.)
A0	400,210	9.2	MXU REG. COM	75%	14,144	0.32	6.00	4.00	0.08	0.24
A1	961,820	22.1	MXU REG. COM	75%	33,992	0.78	6.00	4.00	0.20	0.59
A2	1,695,487	38.9	UNIVERSITY	75%	59,920	1.38	6.00	4.00	0.34	1.03
A3	545,991	12.5	COM/MXU	75%	19,296	0.44	4.00	2.00	0.22	0.66
A4	308,092	7.1	MF-35	70%	*9,891*	0.23	4.00	2.00	0.11	0.34
A5	1,084,198	24.9	SF-10	50%	23,908	0.55	6.00	4.00	0.14	0.41
A6	2,241,046	51.4	SF-5.5	50%	49,418	1.13	6.00	4.00	0.28	0.85
A7	978,971	22.5	PARK	20%	10,847	0.25	4.00	2.00	0.12	0.37
A8	510,877	11.7	SF-5.5	50%	11,266	0.26	4.00	2.00	0.13	0.39
A9	794,650	18.2	PARK	20%	8,805	0.20	4.00	2.00	0.10	0.30
A10	333,069	7.6	SF-10	50%	7,345	0.17	6.00	4.00	0.04	0.13
A11	609,192	14.0	SF-10	50%	13,433	0.31	6.00	4.00	0.08	0.23
A12	628,810	14.4	MF-16	70%	20,169	0.46	6.00	4.00	0.12	0.35
A13	1,520,701	34.9	COM/MXU	75%	53,744	1.23	6.00	4.00	0.31	0.93
A14	761,184	17.5	SF-10	50%	16,785	0.39	4.00	2.00	0.19	0.58
A15	827,179	19.0	MF-16	70%	26,555	0.61	6.00	4.00	0.15	0.46
A16	540,128	12.4	SF-7	50%	11,911	0.27	4.00	2.00	0.14	0.41
A17	813,848	18.7	SF-7	50%	17,946	0.41	4.00	2.00	0.21	0.62
A18	870,500	20.0	SF-5	50%	19,196	0.44	6.00	4.00	0.11	0.33
A19	535,514	12.3	SF-5	50%	11,809	0.27	4.00	2.00	0.14	0.41
A20	1,021,879	23.5	SF-5	50%	22,534	0.52	6.00	4.00	0.13	0.39
A21	599,982	13.8	SF-7	50%	13,230	0.30	6.00	4.00	0.08	0.23
A22	656,254	15.1	SF-7	50%	14,451	0.33	4.00	2.00	0.17	0.50
A23	690,586	15.9	MF-16	70%	22,170	0.51	6.00	4.00	0.13	0.38
A24	1,140,509	26.2	COM/MXU	75%	40,308	0.93	6.00	4.00	0.23	0.69
A25	409,309	9.4	WORSHIP	70%	13,140	0.30	4.00	2.00	0.15	0.45
A26	1,997,414	45.9	PARK	20%	22,132	0.51	4.00	2.00	0.25	0.76
Subtotal	**23,477,399**	**539.0**	**-**		**588,344**	**13.51**			**4.34**	**13.03**
B0	654,613	15.0	MXU/OFFICE/MED	75%	23,135	0.53	6.00	4.00	0.13	0.40
B1	1,870,234	42.9	MXU/OFFICE/MED	75%	66,097	1.52	6.00	4.00	0.38	1.14
B2	1,175,932	27.0	MXU REG. COM	75%	41,560	0.95	6.00	4.00	0.24	0.72
B3	1,410,744	32.4	MF-35	70%	45,289	1.04	6.00	4.00	0.26	0.78
B4	1,484,150	34.1	UNIVERSITY	75%	52,452	1.20	6.00	4.00	0.30	0.90
B5	686,655	15.8	MF-35	70%	22,044	0.51	6.00	4.00	0.13	0.38
B6	960,788	22.1	MF-35	70%	30,844	0.71	6.00	4.00	0.18	0.53
B7	708,857	16.3	PARK	20%	7,854	0.18	4.00	2.00	0.09	0.27
B8	559,737	12.8	SF-7	50%	12,343	0.28	6.00	4.00	0.07	0.21
B9	637,082	14.6	ELEM. SCHOOL	75%	22,516	0.52	4.00	2.00	0.26	0.78
B10	288,233	6.6	WORSHIP	50%	6,356	0.15	4.00	2.00	0.07	0.22
B11	1,031,951	23.7	SF-5	50%	22,756	0.52	6.00	4.00	0.13	0.39
B12	1,038,771	23.8	SF-5	50%	22,906	0.53	6.00	4.00	0.13	0.39
Subtotal	**12,507,748**	**287.1**	**-**		**376,153**	**8.64**			**2.37**	**7.11**
C0	451,757	10.4	MF-35	70%	14,503	0.33	6.00	4.00	0.08	0.25
C1	1,389,530	31.9	MF-35	70%	47,646	1.09	6.00	4.00	0.27	0.82
C2	618,884	14.2	SF-7	50%	13,647	0.31	6.00	4.00	0.08	0.23
C3	897,669	20.6	SF-6	50%	19,133	0.44	4.00	2.00	0.22	0.66
Subtotal	**3,357,840**	**77.1**	**-**		**94,929**	**2.18**			**0.65**	**1.96**
D1	1,939,469	44.5	SF-4.5	50%	42,768	0.98	6.00	4.00	0.25	0.74
D2	1,557,310	35.8	SF-4.5	50%	34,341	0.79	6.00	4.00	0.20	0.59
Subtotal	**3,496,779**	**80.3**	**-**		**77,109**	**1.77**			**0.44**	**1.33**
E1	736,891	16.9	SF-4.5	50%	16,249	0.37	6.00	4.00	0.09	0.28
Total	**43,576,657**	**1,000**	**-**	**-**	**1,152,784**	**26.46**			**7.90**	**23.71**

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/3/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-0

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-0	*400210*	*Mixed Surface Types*	*0.75*	*0.54*	*217601.7*			
	400210		***Total***		**217601.7**	**0.78**	***14144.1***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
A-1	961820	Mixed Surface Types	0.75	0.54	522959.6			
	961820	Total			522959.6	0.78	33992.4	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-10

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-10	*333069*	*Mixed Surface Types*	*0.5*	*0.34*	*112993.7*			
	333069	***Total***			**112993.7**	**0.78**	***7344.6***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-11

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-11	*609192*	*Mixed Surface Types*	*0.5*	*0.34*	*206668.4*			
	609192		***Total***		**206668.4**	**0.78**	**13433.4**	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-12

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
A-12	628810	Mixed Surface Types	0.7	0.49	310565.5			
	628810	Total			310565.5	0.78	20186.8	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/7/2013
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-13

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
A-13	1520700	Mixed Surface Types	0.75	0.54	826833.1			
	1520700	Total			826833.1	0.78	53744.2	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/7/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-14

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-14	*761184*	*Mixed Surface Types*	*0.5*	*0.34*	*258231.7*			
	761184		***Total***		**258231.7**	**0.78**	***16785.1***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/7/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-15

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
A-15	*827179*	*Mixed Surface Types*	*0.7*	*0.49*	*408538.7*			
	827179		***Total***		**408538.7**	**0.78**	***26555***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-16

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
A-16	*540128*	*Mixed Surface Types*	*0.5*	*0.34*	*183238.4*			
	540128		***Total***		**183238.4**	**0.78**	***11910.5***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-17

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E: D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-17	*813848*	*Mixed Surface Types*	*0.5*	*0.34*	*276097.9*			
	813848	***Total***			**276097.9**	**0.78**	**17946.4**	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-18

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-18	*870500*	*Mixed Surface Types*	*0.5*	*0.34*	*295317.1*			
	870500		***Total***		**295317.1**	**0.78**	***19195.6***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-19

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-19	*535514*	*Mixed Surface Types*	*0.5*	*0.34*	*181673.1*			
	535514		***Total***		**181673.1**	**0.78**	***11808.8***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-2	*1695457*	*Mixed Surface Types*	*0.75*	*0.54*	*921851.8*			
	1695457		***Total***		**921851.8**	**0.78**	***59920.4***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	12/21/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-20

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-20	*1021879*	*Mixed Surface Types*	*0.5*	*0.34*	*346672.5*			
	1021879		***Total***		**346672.5**	**0.78**	**22533.7**	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	12/21/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-21

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-21	*599982*	*Mixed Surface Types*	*0.5*	*0.34*	*203543.9*			
	599982		***Total***		**203543.9**	**0.78**	***13230.4***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-22

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-22	*655343*	*Mixed Surface Types*	*0.5*	*0.34*	*222325.1*			
	655343		***Total***		**222325.1**	**0.78**	***14451.1***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-23

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-23	*690586*	*Mixed Surface Types*	*0.7*	*0.49*	*341076.3*			
	690586		***Total***		**341076.3**	**0.78**	***22170***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-24

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E: D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
A-24	1140509	Mixed Surface Types	0.75	0.54	620116.1			
	1140509	Total			620116.1	0.78	40307.5	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-25

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-25	*409309*	*Mixed Surface Types*	*0.7*	*0.49*	*202155.3*			
	409309		*Total*		*202155.3*	*0.78*	*13140.1*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/3/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-26

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E: D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
A-26	1997414.22	Mixed Surface Types	0.2	0.17	340487.2			
	1997414.22	Total			340487.2	0.78	22131.7	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-3	*545991*	*Mixed Surface Types*	*0.75*	*0.54*	*296865.5*			
	545991		***Total***		**296865.5**	**0.78**	***19296.3***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-4

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-4	*308092*	*Mixed Surface Types*	*0.7*	*0.49*	*152164.8*			
	308092	***Total***			**152164.8**	**0.78**	***9890.7***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID A-5

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-5	*1084198*	*Mixed Surface Types*	*0.5*	*0.34*	*367814.2*			
	1084198	***Total***			**367814.2**	**0.78**	**23907.9**	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: KWC Engineers — Date: 8/29/2012
Designed by: Victor Elia — Case No:
Company Project Number/Name: Alberhill Villages

BMP Identification

BMP NAME / ID: A-6

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-6	*2241046*	*Mixed Surface Types*	*0.5*	*0.34*	*760274.9*			
	2241046	***Total***			**760274.9**	**0.78**	**49417.9**	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-7

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-7	*978971*	*Mixed Surface Types*	*0.2*	*0.17*	*166879.3*			
	978971		***Total***		**166879.3**	**0.78**	***10847.2***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-8

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
A-8	510877	Mixed Surface Types	0.5	0.34	173315			
	510877	Total			173315	0.78	11265.5	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: A-9

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E: D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-9	*794650*	*Mixed Surface Types*	*0.2*	*0.17*	*135459.2*			
	794650		*Total*		135459.2	*0.78*	*8804.8*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/3/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-0

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-0	*654613*	*Mixed Surface Types*	*0.75*	*0.54*	*355925.4*			
	654613		*Total*		*355925.4*	*0.78*	*23135.2*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-1	*1870234*	*Mixed Surface Types*	*0.75*	*0.54*	*1016881.3*			
	1870234	*Total*			*1016881.3*	*0.78*	*66097.3*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/7/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-10

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-10	*288233*	*Mixed Surface Types*	*0.5*	*0.34*	*97783*			
	288233		***Total***		**97783**	**0.78**	***6355.9***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/7/2013
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-11

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E: D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
B-11	*1031951*	*Mixed Surface Types*	*0.5*	*0.34*	*350089.4*			
	1031951	*Total*			*350089.4*	*0.78*	*22755.8*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/3/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E: D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-2	*1175932.49*	*Mixed Surface Types*	*0.75*	*0.54*	*639376.5*			
	1175932.49		*Total*		*639376.5*	*0.78*	*41559.5*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-3	*1410744*	*Mixed Surface Types*	*0.7*	*0.49*	*696758*			
	1410744		*Total*		*696758*	*0.78*	*45289.3*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-4

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-4	*1484150*	*Mixed Surface Types*	*0.75*	*0.54*	*806960.2*			
	1484150		*Total*		*806960.2*	*0.78*	*52452.4*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-5

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-5	*686655*	*Mixed Surface Types*	*0.7*	*0.49*	*339134.8*			
	686655		***Total***		**339134.8**	**0.78**	***22043.8***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-6

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-6	*960788*	*Mixed Surface Types*	*0.7*	*0.49*	*474527.4*			
	960788		*Total*		*474527.4*	*0.78*	*30844.3*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/3/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-7

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
B-7	*708857*	*Mixed Surface Types*	*0.2*	*0.17*	*120834.6*			
	708857		***Total***		**120834.6**	**0.78**	***7854.2***	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	12/21/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-8

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
B-8	*559736*	*Mixed Surface Types*	*0.5*	*0.34*	*189890.4*			
	559736		*Total*		*189890.4*	*0.78*	*12342.9*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	12/21/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: B-9

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
B-9	637082	Mixed Surface Types	0.75	0.54	346393.4			
	637082	Total			346393.4	0.78	22515.6	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	4/3/2015
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: C-0

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
C-0	*451757*	*Mixed Surface Types*	*0.7*	*0.49*	*223120.1*			
	451757		*Total*		*223120.1*	*0.78*	*14502.8*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name KWC Engineers | Date 8/29/2012

Designed by Victor Elia | Case No

Company Project Number/Name Alberhill Villages

BMP Identification

BMP NAME / ID C-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
C-1	*1484163*	*Mixed Surface Types*	*0.7*	*0.49*	*733019.2*			
	1484163	***Total***			**733019.2**	**0.78**	**47646.2**	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: C-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
C-2	618884	Mixed Surface Types	0.5	0.34	209956.4			
	618884	Total			209956.4	0.78	13647.2	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: C-3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
C-3	867669	Mixed Surface Types	0.5	0.34	294356.7			
	867669	Total			294356.7	0.78	19133.2	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: D-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
D-1	*1939469*	*Mixed Surface Types*	*0.5*	*0.34*	*657964.9*			
	1939469	*Total*			*657964.9*	*0.78*	*42767.7*	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: D-2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
D-2	1557310	Mixed Surface Types	0.5	0.34	528317.4			
	1557310	Total			528317.4	0.78	34340.6	

Proposed Volume must be greater than the Design Capture Volume

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	KWC Engineers	Date	8/29/2012
Designed by	Victor Elia	Case No	
Company Project Number/Name	Alberhill Villages		

BMP Identification

BMP NAME / ID: E-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85} = 0.78 inches

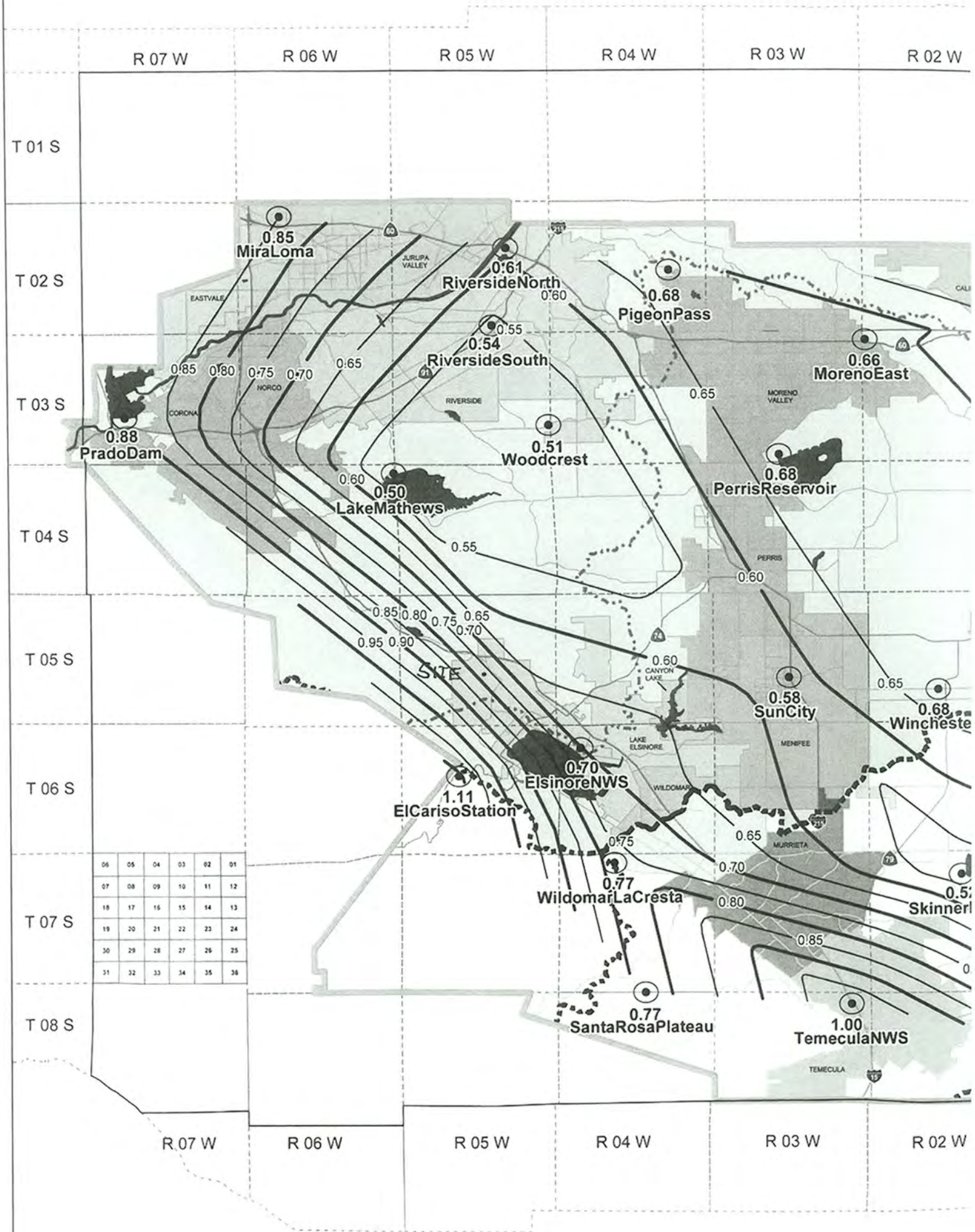
Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
E-1	*736891*	*Mixed Surface Types*	*0.5*	*0.34*	*249990.3*			
	736891		***Total***		**249990.3**	**0.78**	***16249.4***	

Proposed Volume must be greater than the Design Capture Volume

Notes:


R 07 W
R 06 W
R 05 W
R 04 W
R 03 W
R 02 W
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
0.68
PigeonPass
0.54
RiversideSouth
0.66
MorenoEast
0.88
PradoDam
0.51
Woodcrest
0.68
PerrisReservoir
0.50
LakeMathews
0.58
SunCity
0.68
Wincheste
0.70
ElsinoreNWS
1.11
ElCarisoStation
0.77
WildomarLaCresta
0.77
SantaRosaPlateau
1.00
TemeculaNWS
SITE
JURUPA VALLEY
EASTVALE
NORCO
CORONA
RIVERSIDE
MORENO VALLEY
PERRIS
CANYON LAKE
LAKE ELSINORE
MENIFEE
WILDOMAR
MURRIETA
TEMECULA
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.95
0.90

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
0.68 PigeonPass
0.54 RiversideSouth
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
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
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

SITE

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

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

3.6 Extended Detention Basin

Type of BMP	LID - Biotreatment
Treatment Mechanisms	Sedimentation, Infiltration, Biofiltration, Evapotranspiration, and Evaporation
Minimum Tributary Drainage Area	5 acres
Other Names	Enhanced Water Quality Basin

Overview

The Extended Detention Basin (EDB) is designed to detain the design volume of stormwater, V_{BMP}, and maximize opportunities for volume losses through infiltration, evaporation, evapotranspiration and surface wetting. Additional pollutant removal is provided through sedimentation, in which pollutants can attach to sediment accumulated in the basin through the process of settling. Stormwater enters the EDB through a *forebay* where any trash, debris, and sediment accumulate for easy removal. Flows from the forebay enter the basin which is vegetated with native grasses that enhance infiltration and evapotranspiration, and which is interspersed with gravel-filled trenches that help further enhance infiltration. Water that does not get infiltrated or evapotranspired is conveyed to the *bottom stage* of the basin. At the bottom stage of the basin, low or incidental dry weather flows will be treated through a sand filter and collected in a subdrain structure. Any additional flows will be detained in the basin for an extended period by incorporating an outlet structure that is more restrictive than a traditional detention basin outlet. The restrictive outlet structure extends the drawdown time of the basin which further allows particles and associated pollutants to settle out before exiting the basin, while maximizing opportunities for additional incidental volume losses.

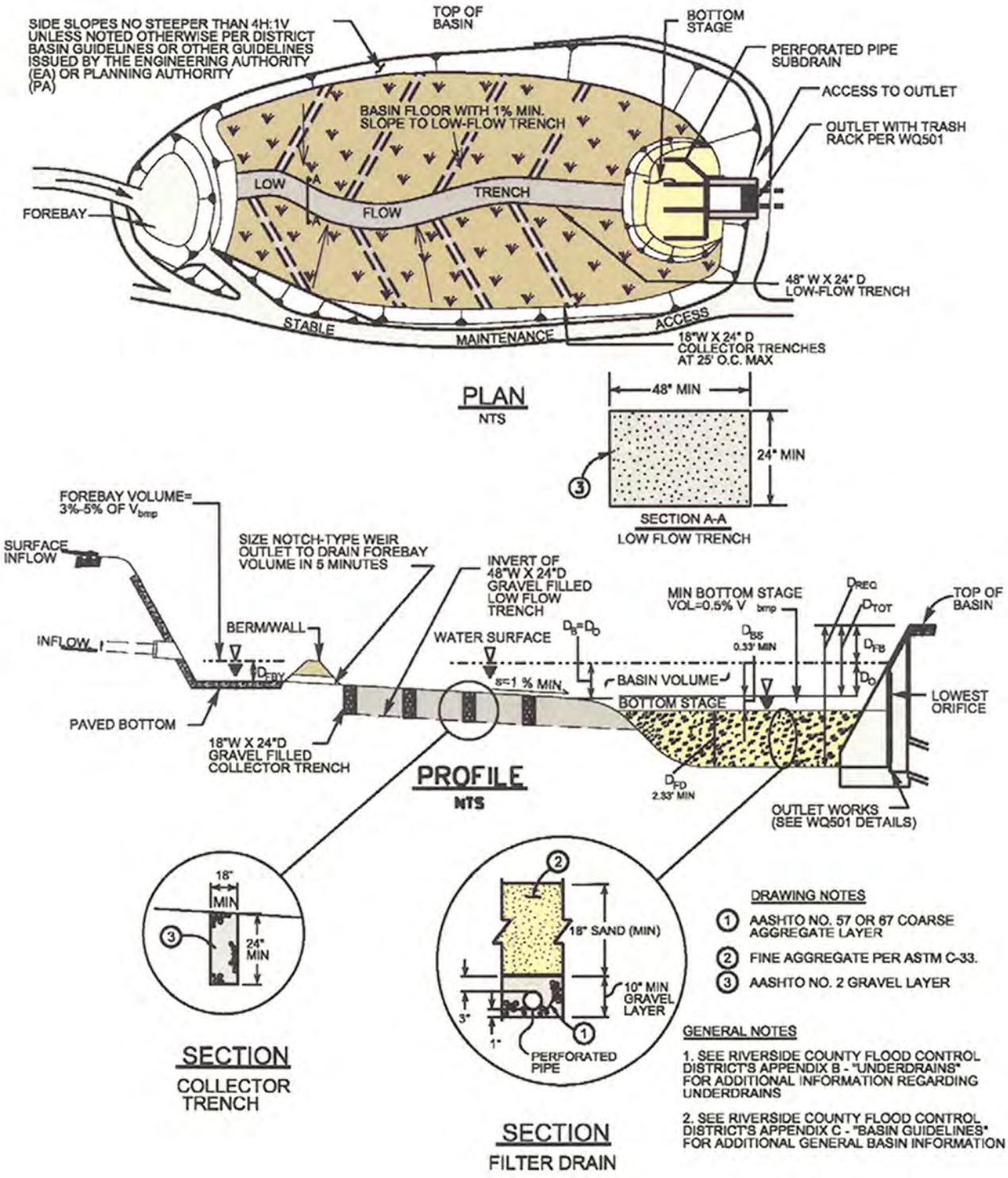


Figure 1 – Extended Detention Basin

Siting Considerations

Soils: EDBs can be used with almost all soils and geology. However, pollutant removal effectiveness is greatly improved when the underlying soil permits at least some infiltration.

Tributary Area: EDBs should only be used where the tributary drainage area is at least 5 acres, since meeting the draw-down requirements (discussed below) for smaller areas would result in very small outlet orifice diameters which would be prone to clogging.

Proximity to Receiving Waters: All site runoff must be treated to the MEP with appropriate BMPs *before* being discharged into Receiving Waters; as such the EDB cannot be constructed in-line within Receiving Waters.

Setbacks: Due to the infiltration characteristics incorporated into the EDB design, the lowest pervious point (beneath the filter drain) of the extended detention facility should be a minimum of 10' above the seasonal high groundwater table. All other setbacks shall be in accordance with applicable standards of the "Basin Guidelines" (Appendix C) or other guidelines issued by the Engineering Authority (EA).

Basin Guidelines: See Section 1 of the "Basin Guidelines" (Appendix C) for additional requirements (i.e., fencing, maintenance access, etc.) that may be required by the Engineering Authority (EA).

Landscaping Requirements

Basin vegetation provides erosion protection, enhances evapotranspiration and infiltration, and improves pollutant removal. The upper stage basin surface, berms and side slopes shall be planted with native grasses. Proper landscape management is also required to ensure that the vegetation does not contribute to water pollution through the use of pesticides, herbicides, or fertilizers. Landscaping shall be in accordance with applicable standards of the "Basin Guidelines" (Appendix C) or other guidelines issued by the EA.

Appendix G

AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

(To be provided in Final WQMP)

Appendix H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

(To be provided in Final WQMP)