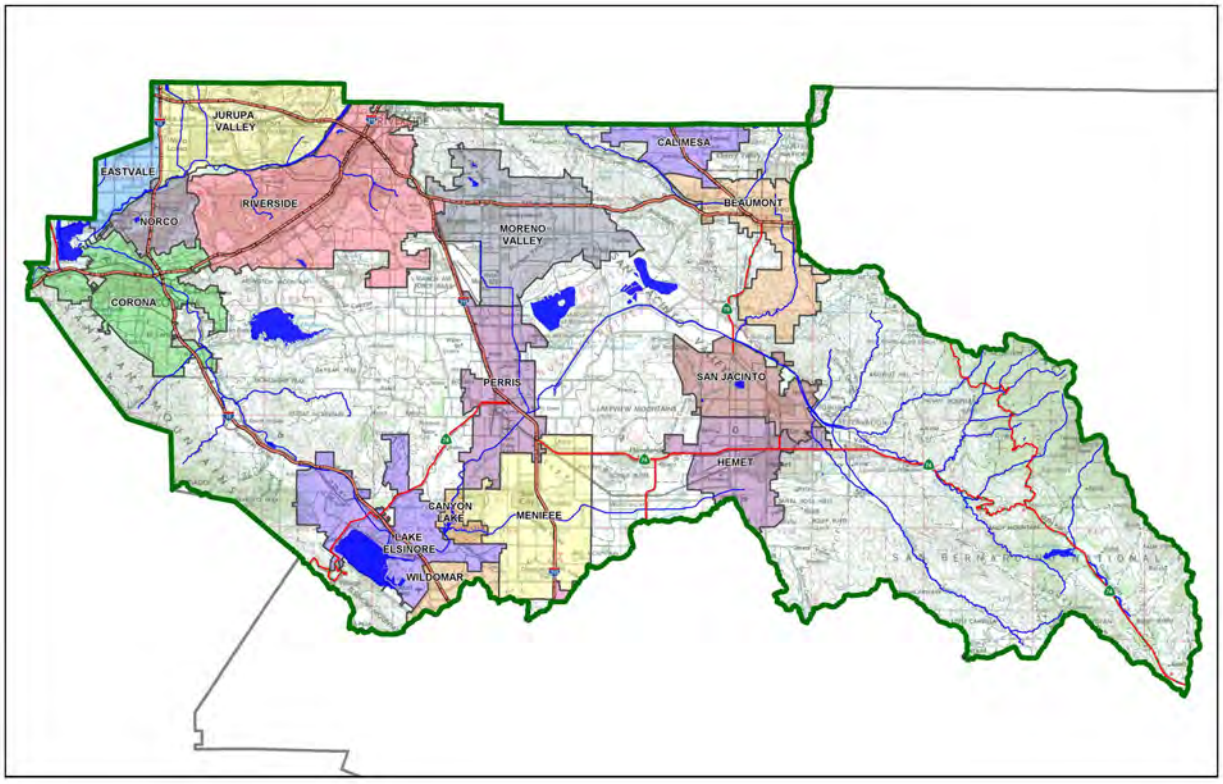
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Brew Ent. II-Harley Knox

Development No: TBD

Design Review/Case No: TBD



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☒ **Preliminary**
☐ **Final**

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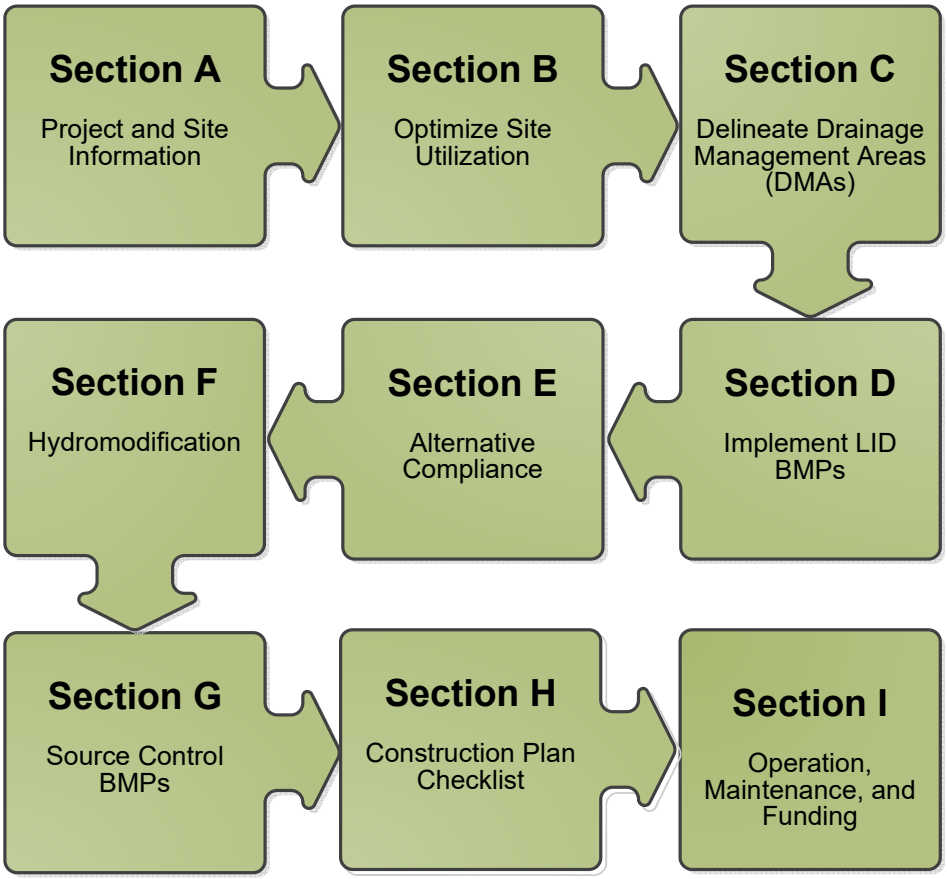
Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Brew Enterprises II for the Brew Ent. II-Harley Knox project (City Case No. TBD), located along Harley Knox Blvd. and west of N. Perris Blvd., in the City of Perris, California.

This WQMP is intended to comply with the requirements of City of Perris for Water Quality Ordinance 1194, which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Perris Water Quality Ordinance 1194.

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

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

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Nobu Murakami	Water Resources Engineer
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Industrial
Planning Area:	PVCC SP
Community Name:	City of Perris
Development Name:	Brew Enterprises II-Harley Knox

PROJECT LOCATION
Latitude & Longitude (DMS): 33°51'24.28"N, 117°13'43.47"W
Project Watershed and Sub-Watershed: Santa Ana (Watershed) Perris Reservoir (Sub Watershed)
Gross Acres: ~4.0 acres; Net: ~3.5 acres
APN(s): 302-090-021
Map Book and Page No.: Map Book 14, Page 688 of Maps

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Light Industrial
Proposed or Potential SIC Code(s)	1541
Area of Impervious Project Footprint (SF)	123,543 SF
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	123,543 SF
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N

EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	See Appendix 3 – NRCS Soil Groups A and C
What is the Water Quality Design Storm Depth for the project?	0.63 inch

Brew Enterprises II is proposing to develop an industrial tilt-up warehouse building and associated parking as part of this project, which is located along Harley Knox Boulevard, west of N. Perris Boulevard, in the City of Perris, California. A vicinity map is provided in Appendix 1 of this report for reference purpose. Applicable Assessor Parcel Numbers (APNs) are 302-090-021. The site is approximately 4.0 acres (parcel gross area) with a net area of approximately 3.5 acres. The proposed warehouse building footprint is approximately 54,819 square feet and there will be a total of 67 parking spaces to be provided. The proposed impervious and pervious footprints within the drainage management area are approximately 123,543 square feet and 30,431 square feet, respectively. The project also includes minor frontage street (sidewalk) improvements.

In the existing condition, the site consists of open, undeveloped space, draining generally from west to east. Based on available Riverside County Flood Control and Water Conservation District's (RCFC&WCD's) 4-ft contour topography in the area and Google Earth imagery, there is an offsite run-on to the site from the westerly undeveloped land with an approximate area of 6.7 acres (identified at Drainage Node 1010 on the Offsite Existing Drainage Study Map). All of this offsite drainage area may not run-on to the project; however, this area was accounted to be conservative for design purpose. Runoff from the project currently runs onto an existing vacant parcel to the east and sheet-flow thru the adjacent parcel towards Perris Blvd. to an existing catch basin

and MDP Storm Drain Lateral Line D-1. From there, runoff is conveyed via the existing storm drain in a southeasterly direction towards the existing MDP Perris Valley Storm Drain (PVSD) Channel, which ultimately discharges into Canyon Lake and then Lake Elsinore.

In the post-project condition, the drainage characteristics will be maintained similar as compared to the pre-project condition. Runoff from the project will be captured via proposed on-site catch basins and conveyed via proposed storm drain pipes towards a combination of an underground storage facility (i.e. – CMP detention system or approved equal) and a proprietary Modular Wetland System (MWS), located near the southeasterly corner of the project, for storm water quality treatment purpose, prior to discharging to a linear gravel trench flow spreader located along southeasterly edge of the site. Runoff is in the gravel trench is distributed across the gravel trench flow spreader for energy dissipation before the runoff sheet-flow onto the existing adjacent parcel. The westerly offsite run-on is collected via a proposed perimeter concrete ditch and conveyed easterly via a proposed storm drain pipe to the aforementioned gravel trench flow spreader near the southeasterly corner. The drainage characteristic from the project is maintained as similar to the existing condition and sheet-flow towards the existing Perris Blvd. storm drain system.

In support of the infiltration feasibility for the proposed permanent storm water BMP, the project-specific geotechnical engineer conducted infiltration testing and results indicated field infiltrate rates of 1.6in/hr and 0.1 in/hr at depths of 5' and 10', respectively. These rates are either at or below the infiltration threshold of 1.6 in/hr. Also, there are clayey materials below 5' depth. Therefore, infiltration is not deemed feasible for this project. The 0.1 in/hr is considered and this rate is even below the threshold for bioretention LID BMP. Therefore, a combination of an underground storage facility and a proprietary modular wetland system (MWS) is proposed for the project to address the storm water quality management plan requirements. Additionally, a low-flow pump is provided downstream of the MWS to pump the treated flow onto the finished grade (surface) level to the proposed gravel trench flow spreader along the southeasterly edge for energy dissipation prior to allowing sheet-flow onto the existing parcel to the east, in an effort to maintain the existing drainage characteristics.

Provided below is a summary list of the proposed BMPs for the project:

- **<u>LID Self-treating landscape areas</u> – The project will provide on-site landscape areas (considered as LID self treating landscape areas) throughout the development. In addition, there will be a pervious self-treating area along westerly, southerly, and easterly perimeters of the project that will drain away from the project.**
- **<u>Covered Trash Enclosure</u> (part of site design and source control) – The proposed trash enclosure area will be covered.**
- **<u>Pre-treatment BMPs</u> – The project plans to provide proprietary FloGard catch basin filter (by Oldcastle) at each of the on-site catch basin location to pre-treat the storm water runoff, prior to discharging into the proposed treatment control BMPs listed below. Also, a pre-treatment vegetated swale is provided along the northerly edge of the site to pre-treat a portion of the site, prior to discharging the flow to the treatment control BMPs.**
- **<u>Treatment Control BMPs (structural BMPs)</u>:**
    - **BMP 1 – A combination of underground detention storage facility (closed system such as Contech CMP Detention Pipes, or approved equivalent) and Modular Wetland System (MWS-L-6-8-V-UG) for storm water treatment (volume-based approach).**

A.1 Maps and Site Plans

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

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Perris Valley Storm Drain	N/A	N/A	San Jacinto River Rach 3 (downstream).
San Jacinto River Reach 3 – Canyon Lake to Nuevo Road (HU#802.11)	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	This river reach has existing or potential RARE beneficial use.
Canyon Lake (HU#802.11, 802.12)	Nutrients, Pathogens	MUN, AGR, GWR, REC1, REC2, COMM, WARM, WILD	San Jacinto River Reaches 1 (downstream).
San Jacinto River Rach 1 (HU#802.32, 802.31)	None	MUN, AGR, GWR, REC1, REC2, WARM, WILD, RARE	This river reach has existing or potential RARE beneficial use.
Lake Elsinore (HU#802.31)	Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs, Toxicity	MUN, REC1, REC2, COMM, WARM, WILD, RARE	The lake has existing or potential RARE beneficial use.

Note: Based on the direction from the City, the 2012 impairment listing is referenced.

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ 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
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage (dependent on tenant)	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* City of Perris – Grading Permit & Building Permit	☒ Y	☐ N

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

Section B: Optimize Site Utilization (LID Principles)

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

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

Site Optimization

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

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

The existing site drains in a southeasterly direction onto a vacant parcel (dirt and some vegetation) prior to drain onto N. Perris Blvd. into an existing catch basin. The project plans to drain the mitigated on-site flow onto the adjacent (easterly) existing parcel using a proposed gravel trench flow spreader to mimic the existing drainage characteristics. Runoff eventually drains to N. Perris Blvd. into the existing catch basin.

Did you identify and protect existing vegetation? If so, how? If not, why?

The site has little or no existing vegetation as it has been graded and consistently cleared over many years.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Where applicable, runoff from the proposed hardscape area will be directed towards landscape area in an effort to promote incidental infiltration and preserve the infiltration capacity. Additionally, roof runoff through downspouts will be directed to proposed landscape areas where feasible to help slow down the storm water runoff.

In support of the infiltration feasibility for the proposed permanent storm water BMP, the project-specific geotechnical engineer conducted infiltration testing and the results indicated field infiltration rates of 1.6 and 0.1 in/hr at 5' and 10' depths, respectively. These rates are at, or below, the infiltration threshold of 1.6 in/hr; and therefore, infiltration is not feasible for this project.

Did you identify and minimize impervious area? If so, how? If not, why?

Impervious areas are only used where necessary and have been minimized to the extent practicable. Parking spaces are minimized close to the required amount and the landscaped areas have been maximized to the extent practicable.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

Runoff from impervious surfaces is directed to the pervious landscape areas where possible to help promote incidental infiltration and evaporation, prior to being directed to the proposed structural BMP for water quality treatment.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
DMA 1-1	Ornamental Landscaping	18,602	Type D
DMA 1-2	Concrete or Asphalt	68,724	Type D
DMA 1-3	Roofs	54,819	Type D
DMA STA (perimeter)	Self-treating Area	11,829	Type A

[1] *Reference Table 2-1 in the WQMP Guidance Document to populate this column*
[2] *If multi-surface provide back-up*

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

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
DMA 1-1	18,602	Landscaping	Drip
DMA STA (perimeter)	11,829	Landscaping	N/A

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

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

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

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

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

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

DMA Name or ID	BMP Name or ID
DMA 1-1	BMP 1 – Underground Storage Facility (CMP Detention System) and Modular Wetland System (MWS-L-6-8-V)
DMA 1-2	BMP 1 – Underground Storage Facility (CMP Detention System) and Modular Wetland System (MWS-L-6-8-V)
DMA 1-3	BMP 1 – Underground Storage Facility (CMP Detention System) and Modular Wetland System (MWS-L-6-8-V)

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

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

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		✓
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		✓
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		✓
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	✓	
If Yes, list affected DMAs: DMA 1		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		✓
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		✓
Describe here: Clayey materials observed approximately 5' below existing grade and below and 25' setback would be needed from structures and retaining walls for infiltration facilities.		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: Insert Area (Acres)

Type of Landscaping (Conservation Design or Active Turf): List Landscaping Type

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: EIATIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: Insert Area (Acres)

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
Insert Area (Acres)	Insert Area (Acres)

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: Number of daily Toilet Users

Project Type: Enter 'Residential', 'Commercial', 'Industrial' or 'Schools'

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: TUTIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: Required number of toilet users

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
Insert Area (Acres)	Insert Area (Acres)

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

Insert narrative description here.

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: Enter Value

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☐ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☒ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

Note: The proposed site will be treated via a combination of an underground storage facility (i.e. – CMP Detention System by Contech) and a treatment BMP (i.e. – Modular Wetland System (MWS)).

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA 1-1	☐	☐	☐	☐	☒
DMA 1-2	☐	☐	☐	☐	☒
DMA 1-3	☐	☐	☐	☐	☒

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

Note: As indicated above, based on the measured infiltration rate by the project-specific geotechnical engineer, infiltration and bioretention are not technically feasible and the suitable BMP. The proposed site will be treated via a combination of an underground storage facility (i.e. – CMP Detention System by Contech) and a treatment BMP (i.e. – Modular Wetland System (MWS)).

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP 1 / Underground Storage Facility (CMP Detention System) and Modular Wetland System (MWS-L-6-8-V)*		
	[A]		[B]	[C]	[A] x [C]			
DMA 1-1	*18,602*	*Ornamental Landscaping*	*0.1*	*0.11*	*2054.7*			
DMA 1-2	*68,724*	*Concrete or Asphalt*	*1.0*	*0.89*	*61301.8*			
DMA 1-3	*54,819*	*Roofs*	*1.0*	*0.89*	*48898.5*			
						Design Storm Depth (in)	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	A_T = Σ[A] 142,145				Σ= [D] 112255	[E] 0.63	$[F] = \frac{[D]x[E]}{12}$ 5893.4	[G] **5,962**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document.

[E] is obtained from Section 2.3.1 in the WQMP Guidance Document.

[G] is obtained from the proprietary BMP manufacturer (i.e. –Contech) at a water quality ponding depth.

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☐ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. **No alternative compliance measures are required for this project and thus this Section is not required to be completed.**

- Or -

☒ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

Note: DMA 1 will be treated via a combination of an underground storage facility (CMP Detention System) and proprietary Modular Wetland System (MWS-L-6-8-V).

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1] *Cannot Exceed 50%*
[2] *Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*BMP 1 / Underground Storage Facility (CMP Detention System) and Modular Wetland System (MWS-L-6-8-V)*		
	[A]		[B]	[C]	[A] x [C]				
DMA 1-1	*18,602*	*Ornamental Landscaping*	*0.1*	*0.11*	*2054.7*	*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
DMA 1-2	*68,724*	*Concrete or Asphalt*	*1.0*	*0.892*	*61301.8*				
DMA 1-3	*54,819*	*Roofs*	*1.0*	*0.892*	*48,898.5*				
	$A_T = \Sigma[A]$ 142,145				Σ= [D] 112255	[E] 0.20	[F] $= \frac{[D]x[E]}{[G]}$ 0.5	[F] X (1-[H]) N/A	[I] **N/A**

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document

[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document

[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12

[H] is from the Total Credit Percentage as Calculated from Table E.2 above

[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6. It is important to note that this Modular Wetland System was sized using the volume-based approach by storing the minimum required design capture volume in a proposed underground storage facility (i.e. – Contech CMP Detention Pipes) located upstream of the MWS.

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
Modular Wetland System (BMP 1)	Metals, Nutrients, Pesticides, Toxic Organic Compounds, Sediments, Trash & Debris, and Oil & Grease	Metal (Medium), Nutrients/Pesticides (Medium), Toxic Organic Compounds (Medium), Sediments (High), Trash & Debris (High), Oil & Grease (High)

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

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	N/A		
Volume (Cubic Feet)			

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Note: The project is within the Riverside County WAP HCOC Exemption area approved on April 20, 2017. Therefore, the project should be exempt from the HCOC requirements.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. 3See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to

		storm drain."
Interior floor drains	Interior floor drains shall be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
Need for future indoor & structural pest control	Building design features including sealants barriers and fully closing windows and doors have been included to discourage entry of pests.	Integrated Pest Management (IPM) information to be provided to owners, lessees, and operators.
Landscape/outdoor pesticide use	Final Landscape Plans will accomplish the following: Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. Prevent erosion of slopes by planting fast-growing, dense ground covering plants. Plant native vegetation to reduce the amount of water, fertilizers, and pesticides applied to the landscape. Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers. Do not rake or blow leaves, clippings, or pruning waste into the street, gutter, or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program. Integrated Pest Management (IPM) information to be provided to owners, lessees, and operators.
Refuse areas	Site design features dumpster enclosures. Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	Periodic inspections for leaky, overfilled, uncovered, or other problematic conditions will occur. Corrective action will be made upon detection, as circumstances permit. Dumping of liquid or hazardous wastes will be prohibited. Spill control materials will be available on-site. All wastes to properly stored and disposed of in accordance with all applicable Local, State and Federal regulations
Industrial Processes	All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.	All process activities to be performed indoors. No processes to drain to exterior or to storm drain system. See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/
Loading Docks	Maintain in a clean and orderly fashion. Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. Provide a roof overhang over the loading area or	Move loaded and unloaded items indoors as soon as possible. See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

	install door skirts (cowling) at each bay that enclose the end of the trailer.	
Fire Sprinkler Test Water	Provide a means to drain fire sprinkler test water to the sanitary sewer.	See the note in the Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Miscellaneous Drain or Wash Water or Other Sources	Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain. Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary. Roofing, gutters, and trim made out of unprotected metals that may leach into runoff shall be avoided.	Inspect periodically to verify that equipment is not leaking or discharging to the storm drain system.
Plazas, Sidewalks, and Parking Lots	Maintain in a clean and orderly fashion.	Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer, not to a storm drain.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
BMP 1	Contech CMP Detention Pipes (54" CMPs) and Modular Wetland System (MWS-L-6-8-V) (BMP 1)	Precise Grading Plan Sheet #: TBD	33°51'23.67" N / 117°13'39.70" W (Approx.)

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

Note: The corresponding plan sheet numbers in the above table will be included at the time of the Final WQMP.

Section I: Operation, Maintenance and Funding

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

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

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

Maintenance Mechanism: See Appendix 9

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

☐ Y ☒ N

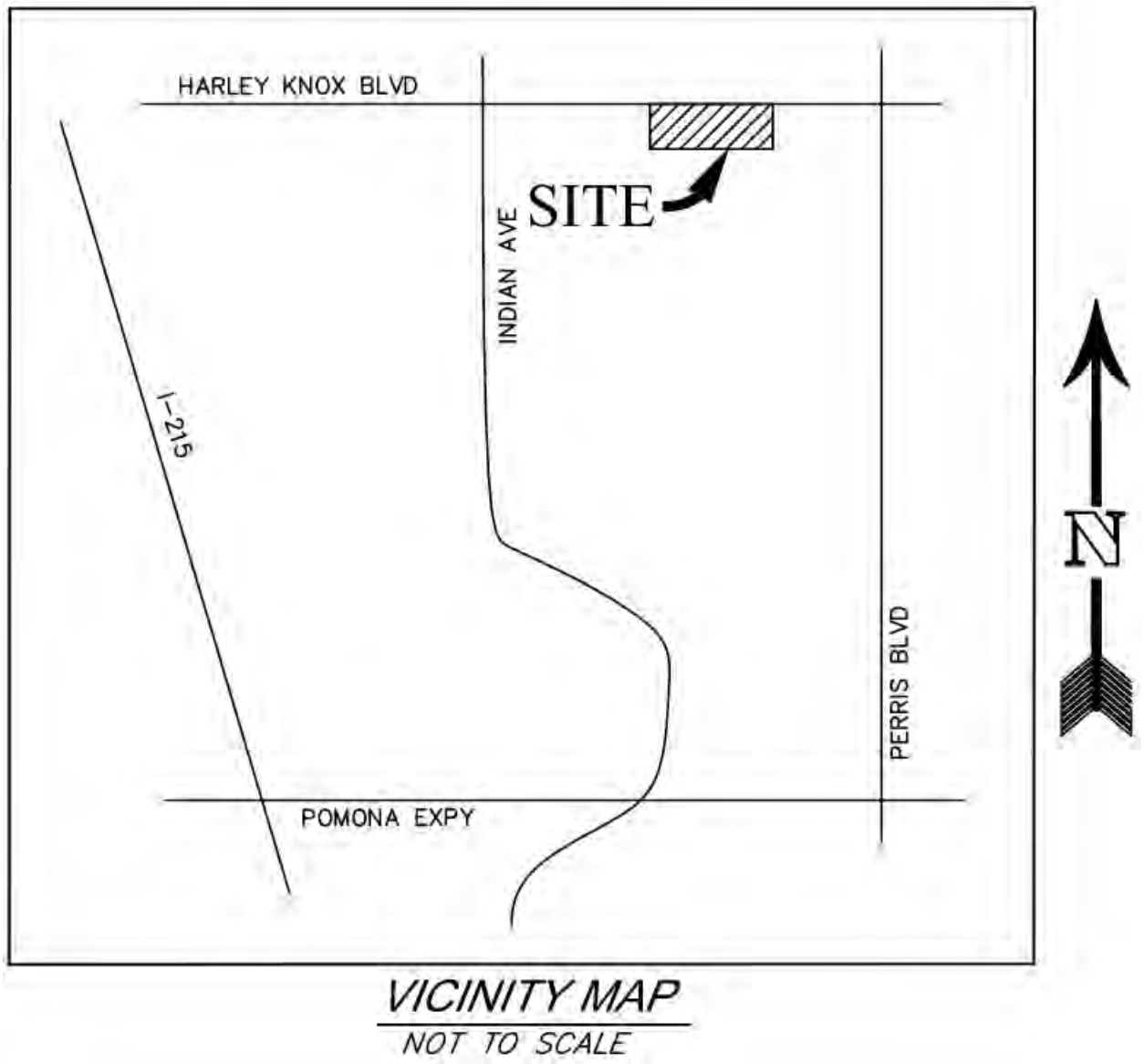
Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Note: To be completed at the time of the FWQMP.

Appendix 1: Maps and Site Plans

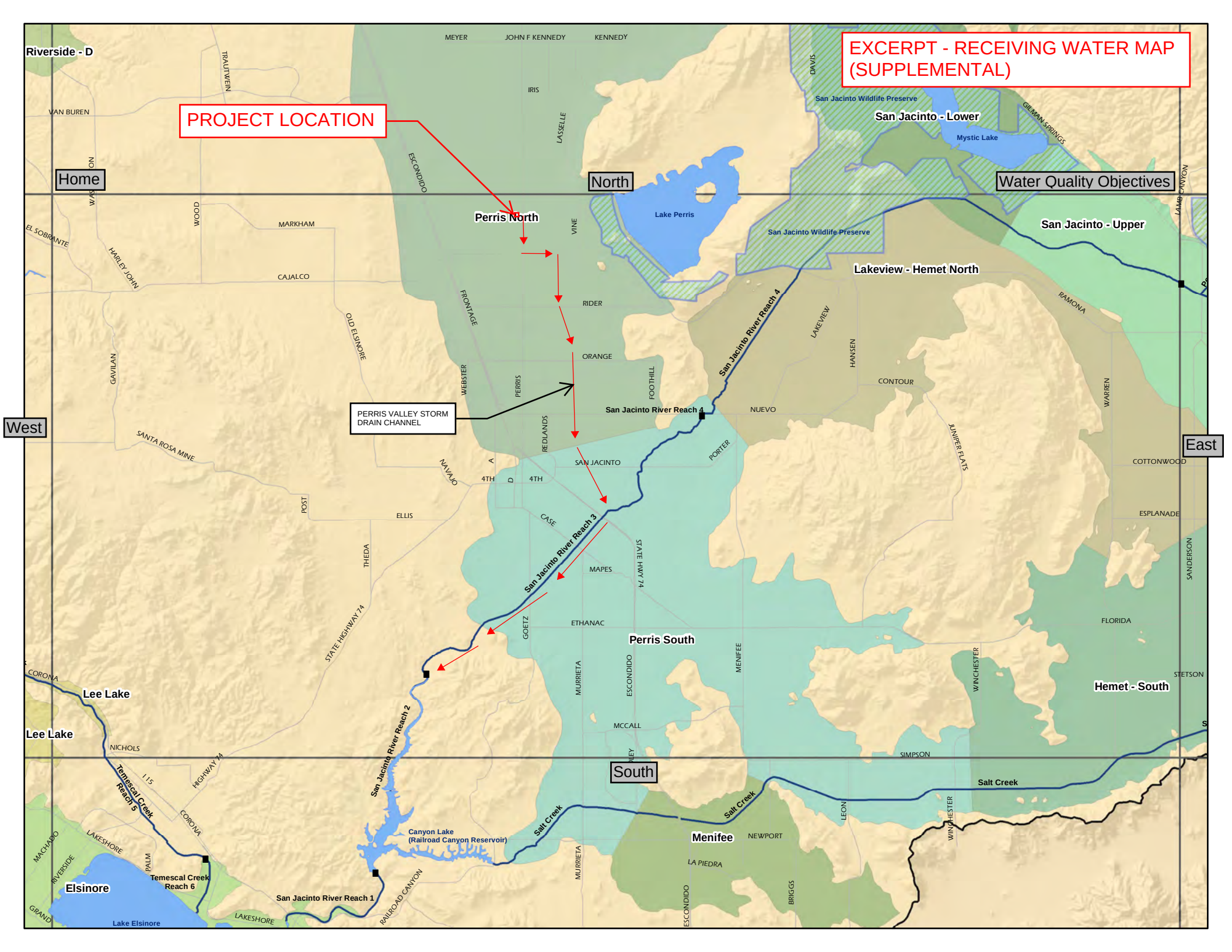
Location Map, WQMP Site Plan and Receiving Waters Map

Vicinity Map

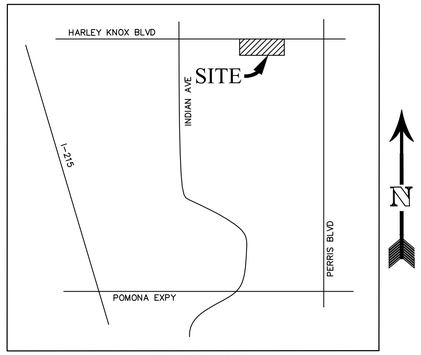


VICINITY MAP
NOT TO SCALE

The project is located along Harley Knox Blvd. and west of Perris Blvd., in the City of Perris, CA.


EXCERPT - RECEIVING WATER MAP (SUPPLEMENTAL)
PROJECT LOCATION
PERRIS VALLEY STORM DRAIN CHANNEL
Home
North
Water Quality Objectives
West
East
South
Riverside - D
Perris North
Lake Perris
San Jacinto Wildlife Preserve
San Jacinto - Lower
Mystic Lake
San Jacinto - Upper
Lakeview - Hemet North
San Jacinto River Reach 4
San Jacinto River Reach 3
San Jacinto River Reach 2
San Jacinto River Reach 1
Perris South
Hemet - South
Menifee
Lee Lake
Canyon Lake
(Railroad Canyon Reservoir)
Elsinore
Lake Elsinore
Temescal Creek Reach 5
Temescal Creek Reach 6
Salt Creek
MEYER
JOHN F KENNEDY
KENNEDY
IRIS
VAN BUREN
TRAUTWEIN
LASSELLE
ESCONDIDO
DAVIS
GILMAN SPRINGS
WASHINGTON
WOOD
MARKHAM
EL SOBRANTE
HARLEY JOHN
CAJALCO
VINE
RIDER
ORANGE
FRONTAGE
OLD ELSINORE
GAVILAN
WEBSTER
PERRIS
FOOTHILL
REDLANDS
SANTA ROSA MINE
NAVAJO
4TH
SAN JACINTO
POST
ELLIS
CASE
THEDA
STATE HIGHWAY 74
MAPES
STATE HWY 74
GOETZ
ETHANAC
MURRIETA
MENIFEE
MCCALL
NICHOLS
HIGHWAY 74
CORONA
LAKESHORE
MACHADO
RIVERSIDE
PALM
GRAND
RAILROAD CANYON
LAKEVIEW
HANSEN
CONTOUR
NUEVO
RAMONA
PORTER
JUNIPER FLATS
WARREN
COTTONWOOD
ESPLANADE
SANDERSON
FLORIDA
STETSON
WINCHESTER
SIMPSON
LEON
NEWPORT
LA PIEDRA
BRIGGS
LAMB CANYON

DMA PLAN
BREW ENT. II-HARLEY KNOX



VICINITY MAP
NOT TO SCALE

DMA LEGEND & AREAS

DRAINAGE MANAGEMENT AREA

DISCHARGE LOCATION

DMA LEGEND & AREAS

DMA 1 DRAINING TO MWS (BMP 1)

DMA 1-1 (ORNAMENTAL LANDSCAPING) = 18,602 S.F.

DMA 1-2 (CONCRETE OR ASPHALT) = 68,724 S.F.

DMA 1-3 (ROOFS) = 54,819 S.F.

TOTAL AREA = 142,145 S.F.

MISC. - OTHER DMAs

SELF-TREATING AREA DMA = 11,829 S.F.

PERMANENT STRUCTURAL BMP

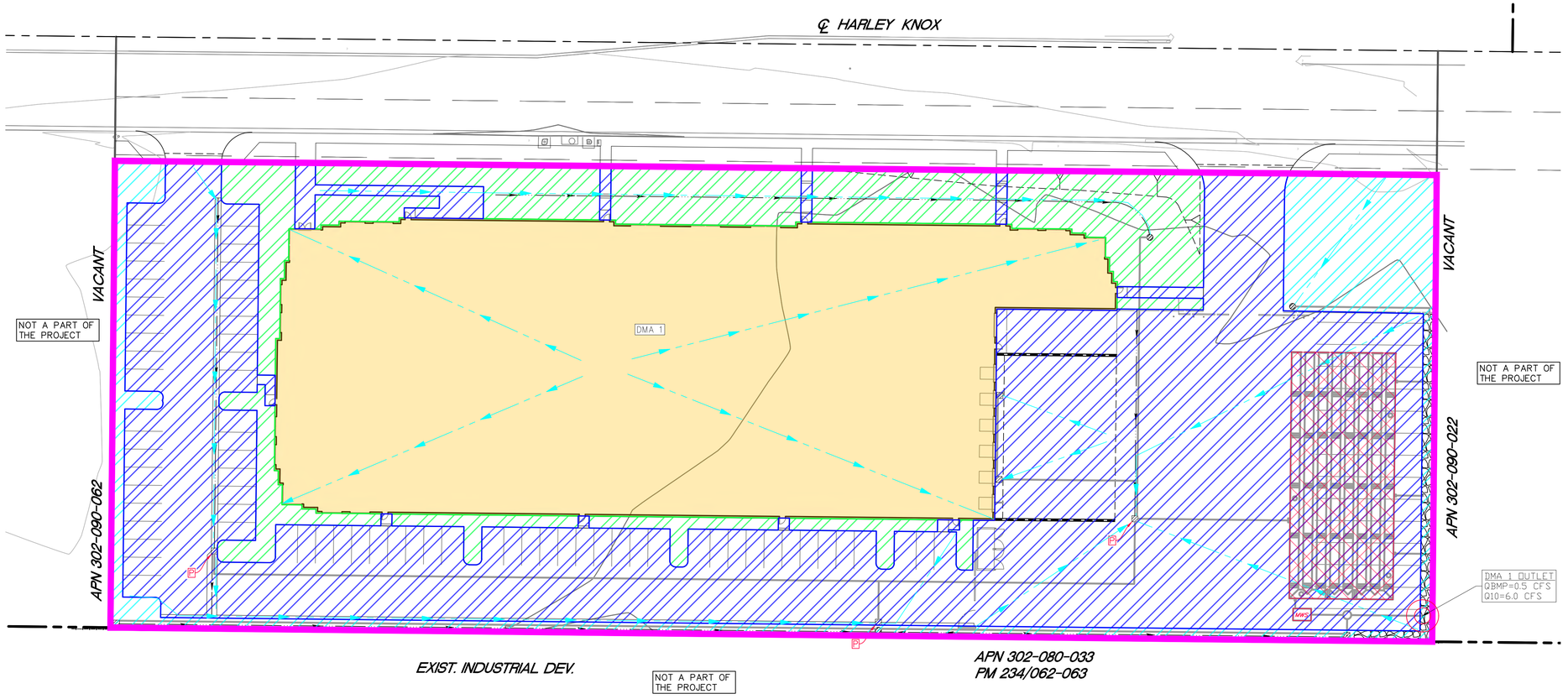
BMP 1 = CMP DETENTION SYSTEM BY CONTECH (OR APPROVED EQUIVALENT)
= 8 ROWS OF 54" CMPs

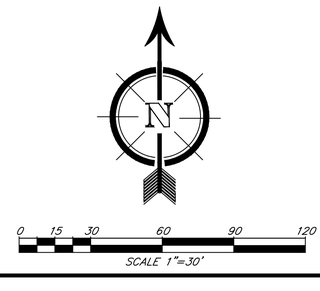
MWS — BMP 1 = MODULAR WETLAND SYSTEM (MWS)
= MODEL NO. MWS-L-6-8-V

PRE-TREATMENT BMP

P — PRE-TREATMENT: PROPOSED TRENCH DRAIN FILTER (FLOGARD CATCH BASIN FILTER INSERTS OR EQUIVALENT)

PRE-TREATMENT: VEGETATED SWALE
= B=2'; Z=3:1; D=1.0'





OCTOBER 2022

CITY OF PERRIS	
DMA PLAN BREW ENT. II-HARLEY KNOX (CITY CASE NO. TBD)	1 OF 3 SHEETS

NOT FOR CONSTRUCTION - THIS PRE-CONSTRUCTION BMP SITE PLAN IS FOR WQMP REVIEW PURPOSE

POST-CONSTRUCTION BMP SITE PLAN
BREW ENT. II-HARLEY KNOX

GENERAL NOTES

1. BASED ON AVAILABLE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S (RCFC&WCD'S) 4-FT CONTOUR TOPOGRAPHY IN THE AREA AND GOOGLE EARTH IMAGERY, THERE IS AN OFFSITE RUN-ON TO THE SITE FROM THE WESTERLY UNDEVELOPED LAND WITH AN APPROXIMATE AREA OF 6.7 ACRES. IN THE POST-PROJECT CONDITION, THE WESTERLY OFFSITE RUN-ON IS COLLECTED VIA A PROPOSED PERIMETER CONCRETE DITCH AND CONVEYED EASTERLY VIA A PROPOSED STORM DRAIN PIPE TO A PROPOSED GRAVEL TRENCH FLOW SPREADER ALONG THE SOUTHEASTERLY EDGE OF THE SITE, AS SIMILAR TO THE EXISTING CONDITION.
2. IN SUPPORT OF THE INFILTRATION FEASIBILITY FOR THE PROPOSED PERMANENT STORM WATER BMP, THE PROJECT-SPECIFIC GEOTECHNICAL ENGINEER CONDUCTED INFILTRATION TESTING AND RESULTS INDICATED FIELD INFILTRATE RATES OF 0.1 AND 1.6 IN/HR. THESE RATES ARE AT, OR BELOW, THE INFILTRATION THRESHOLD OF 1.6 IN/HR. FURTHERMORE, THERE ARE CLAYEY MATERIALS BELOW 5' DEPTH, WHICH MAKES INFILTRATION CHALLENGING. THEREFORE, INFILTRATION IS NOT FEASIBLE FOR THIS PROJECT. THEREFORE, THE PROJECT PROPOSES A COMBINATION OF AN UNDERGROUND STORAGE FACILITY AND A PROPRIETARY MODULAR WETLAND SYSTEM (MWS) TO ADDRESS THE STORM WATER QUALITY REQUIREMENTS.
3. THE PROJECT IS SHOWN ON THE FEMA FLOOD INSURANCE RATE MAP (FIRM) NUMBER 06065C1430H, EFFECTIVE AUGUST 18, 2014 AND LABELED AS ZONE D / ZONE X. NO FEMA SUBMITTALS ARE ANTICIPATED TO BE REQUIRED FOR THIS PROJECT.
4. PRELIMINARY DETAILS FOR TRASH ENCLOSURE WITH COVER, STENCIL, AND/OR ROOF DRAIN OUTLET LOCATIONS ARE PROVIDED ON THIS EXHIBIT OR BMP DETAIL SHEET; HOWEVER, THOSE DETAILS COULD BE REFINED FURTHER AT THE TIME OF FINAL WQMP.

PERMANENT SOURCE CONTROL BMPs

(1) MARK ALL INLETS WITH THE WORDS "ONLY RAIN DOWN THE STORM DRAIN" OR SIMILAR
(2) ENCLOSED REFUSE AREA WITH SIGNS POSTED NEARBY STATING "DO NOT DUMP HAZARDOUS MATERIALS HERE" OR SIMILAR

- LANDSCAPING DESIGNED TO MINIMIZE IRRIGATION AND RUNOFF, TO PROMOTE SURFACE INFILTRATION
- WHERE APPROPRIATE, AND TO MINIMIZE THE USE OF FERTILIZERS AND PESTICIDES THAT CAN CONTRIBUTE TO STORMWATER POLLUTION.

OPERATIONAL SOURCE CONTROL BMPs

- MAINTAIN LANDCAPING USING MINIMUM OR NO PESTICIDES
- PREVENT EROSION OF SLOPES BY PLANTING FAST-GROWING, DENSE GROUND COVERING PLANTS
- PLANT NATIVE VEGETATION TO REDUCE THE AMOUNT OF WATER, FERTILIZERS, AND PESTICIDES APPLIED TO THE LANDSCAPE
- DO NOT OVERWATER
- USE IRRIGATION PRACTICES SUCH AS DRIP IRRIGATION, SOAKER HOSES OR MICRO-SPRAY SYSTEMS
- PERIODICALLY INSPECT AND FIX LEAKS AND MISDIRECTED SPRINKLERS.
- DO NOT RAKE OR BLOW LEAVES, CLIPPINGS, OR PRUNING WASTE INTO THE STREET, GUTTER OR STORM DRAIN
- DISPOSE OF GREEN WASTE BY COMPOSTING, HAULING IT TO A PERMITTED LANDFILL, OR RECYCLING IT THROUGH YOUR CITY'S PROGRAM
- PROVIDE IPM INFORMATION TO NEW OWNERS, LESSEES AND OPERATORS
- PERIODIC INSPECTIONS FOR LEAKY, OVERFILLED, UNCOVERED, OR OTHER PROBLEMATIC CONDITIONS WILL OCCUR
- CORRECTIVE ACTION WILL BE MADE UPON DETECTION, AS CIRCUMSTANCES PERMIT
- DUMPING OF LIQUID OR HAZARDOUS WASTES WILL BE PROHIBITED
- SPILL CONTROL MATERIALS WILL BE AVAILABLE ON-SITE
- MOVE LOADED AND UNLOADED ITEMS INDOORS AS SOON AS POSSIBLE
- SWEEP PLAZAS, SIDEWALKS, AND PARKING LOTS REGULARLY TO PREVENT ACCUMULATION OF LITTER AND DEBRIS
- COLLECT DEBRIS FROM PRESSURE WASHING TO PREVENT ENTRY INTO THE STORM DRAIN SYSTEM
- COLLECT WASHWATER CONTAINING ANY CLEANING AGENT OR DEGREASER AND DISCHARGE TO THE SANITARY SEWER (NOT TO THE STORM DRAIN)

LID OPPORTUNITIES

1. PRESERVE EXISTING PERVIOUS AREA WHERE POSSIBLE.
2. LANDSCAPED AREAS DESIGNED TO BE SELF-RETAINING WHERE FEASIBLE.

DMA LEGEND & AREAS

DMA 1 DRAINING TO MWS (BMP 1)

DMA 1-1 (ORNAMENTAL LANDSCAPING) = 18,602 S.F.

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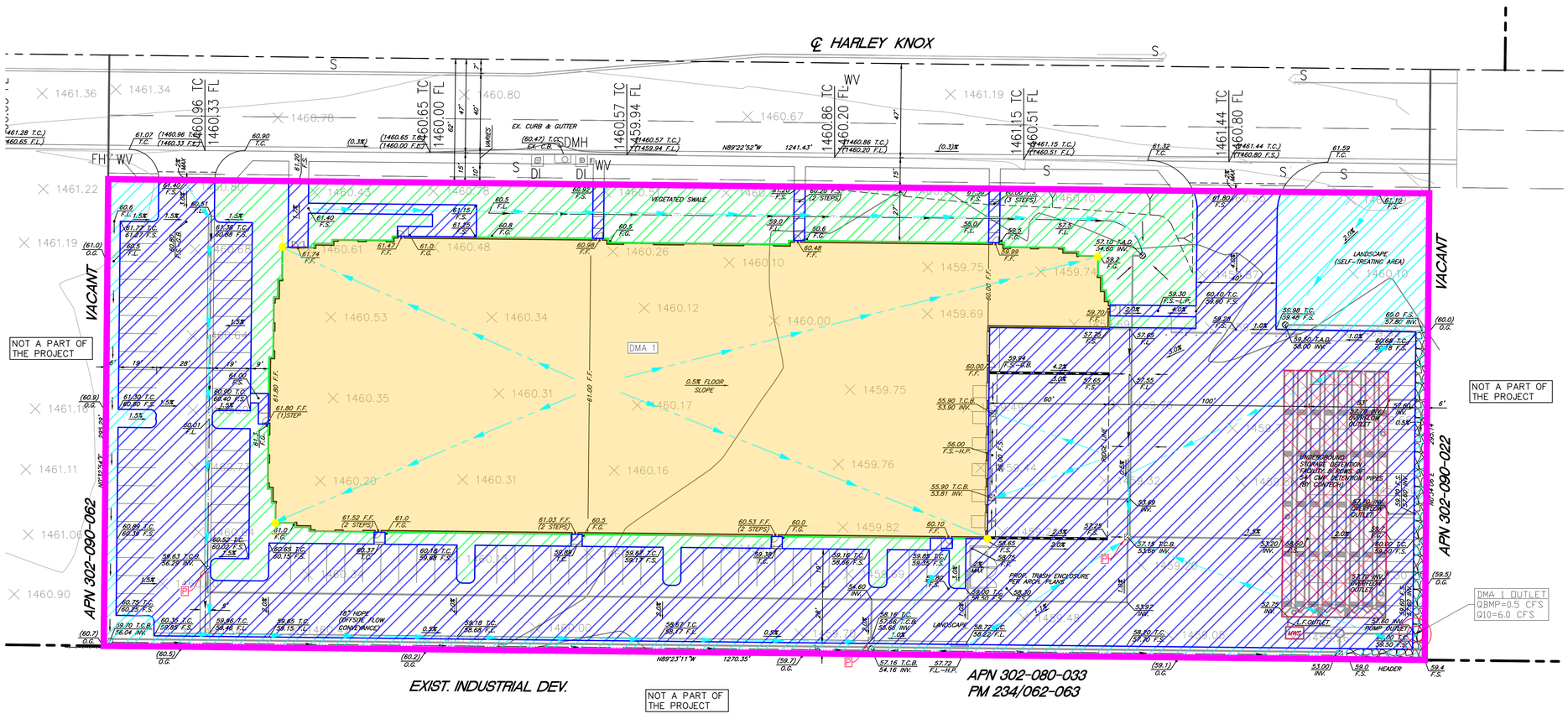


LEGEND

- DRAINAGE MANAGEMENT AREA
- TRACT BOUNDARY
- CENTERLINE
- CURB AND GUTTER
- 1280 EXISTING CONTOUR LINE
- SLOPE
- ROOF DRAIN LOCATION (TBD)
- DISCHARGE LOCATION
- PROPOSED STORM DRAIN
- GENERAL SURFACE FLOW PATH

PERMANENT STRUCTURAL BMP

- BMP 1 – CMP DETENTION SYSTEM BY CONTECH (OR APPROVED EQUIVALENT)
  – 8 ROWS OF 54" CMPs
- MWS BMP 1 – MODULAR WETLAND SYSTEM (MWS)
  – MODEL NO. MWS-L-6-8-V

PRE-TREATMENT BMP

- PRE-TREATMENT: PROPOSED TRENCH DRAIN FILTER (FLOGARD CATCH BASIN FILTER INSERTS OR EQUIVALENT)
- PRE-TREATMENT: VEGETATED SWALE
  – B=2'; Z=3:1; D=1.0'

N

0 15 30 60 90 120

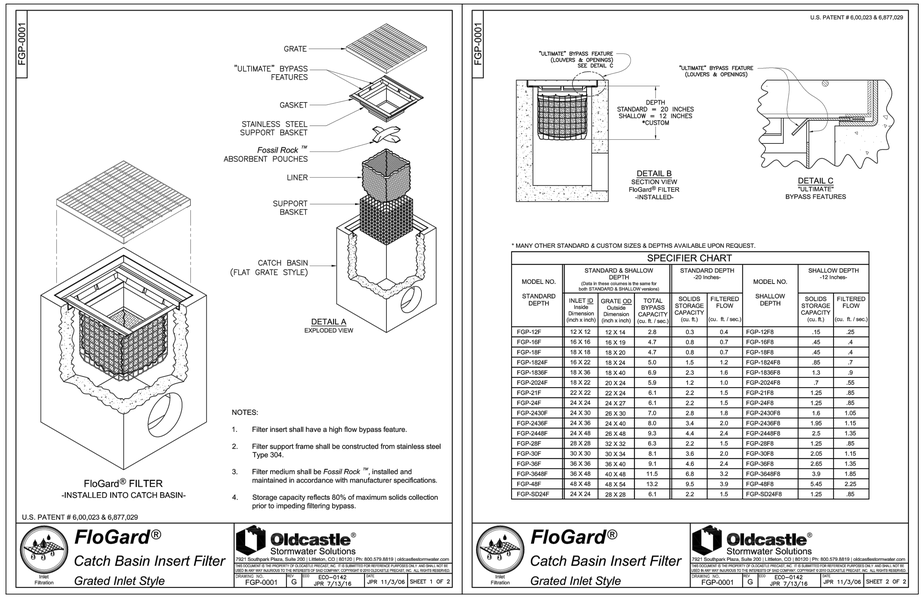
SCALE 1"=30'

OCTOBER 2022

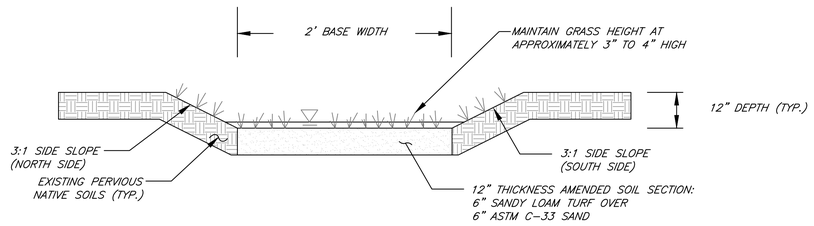
CITY OF PERRIS	
POST-CONSTRUCTION BMP SITE PLAN BREW ENT. II-HARLEY KNOX (CITY CASE NO. TBD)	2 OF 3 SHEETS

NOT FOR CONSTRUCTION - THIS PRE-CONSTRUCTION BMP SITE PLAN IS FOR WQMP REVIEW PURPOSE

POST-CONSTRUCTION BMP SECTION DETAILS
BREW ENT. II-HARLEY KNOX

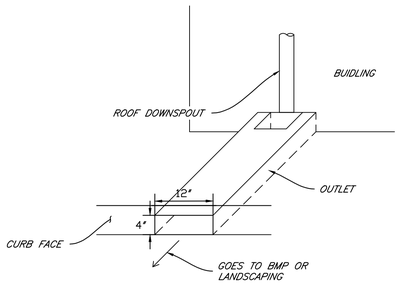


PRE-TREATMENT: PROPRIETARY FLOGARD CATCH BASIN INSERT FILTER - TYP.
NOT TO SCALE

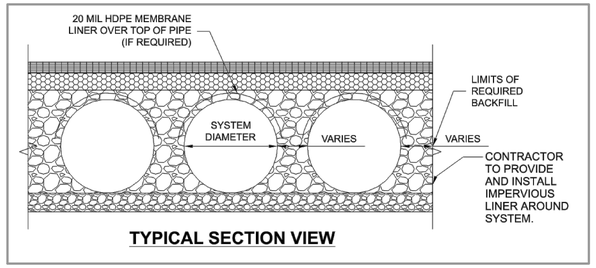


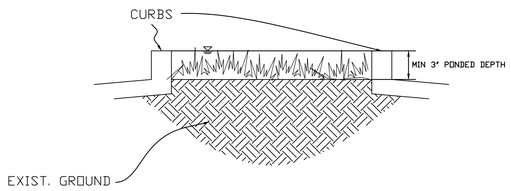
PRE-TREATMENT: FLOW-THRU VEGETATED SWALE - TYPICAL SECTION
NOT TO SCALE

INLET PLACARD DETAIL (TYP.)
NOT TO SCALE

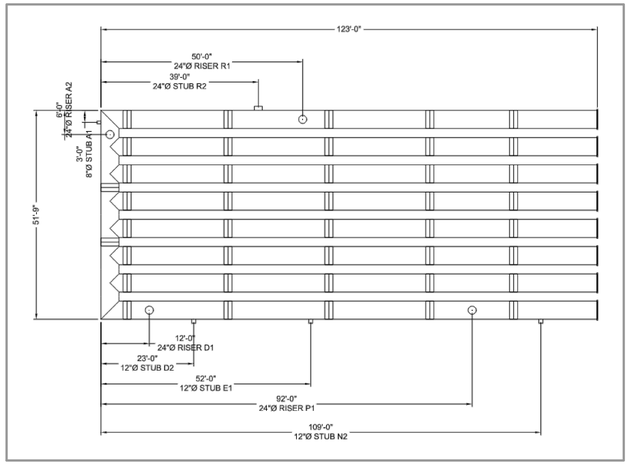


ROOF DRAIN CURB OUTLET STRUCTURE DETAIL (TYP.)
NOT TO SCALE

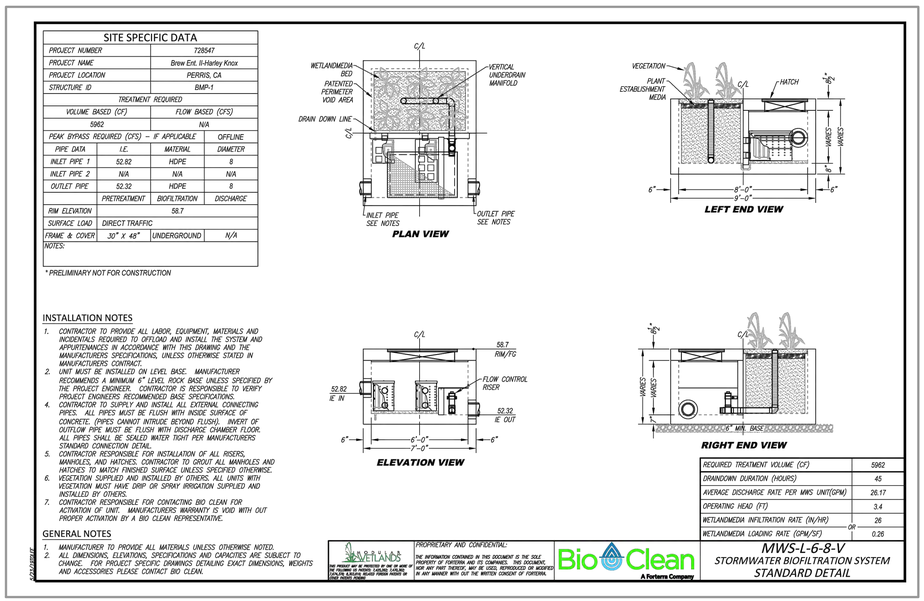




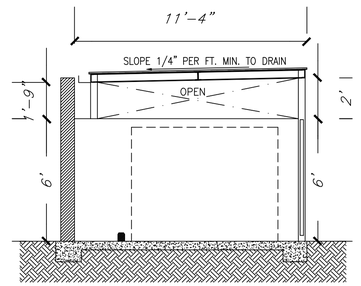
LANDSCAPED ISLAND DETAIL (TYP.)
NOT TO SCALE



BMP 1 - 54" CMP DETENTION STORAGE FACILITY (CONTECH OR EQUIVALENT) - TYP.
NOT TO SCALE



BMP 1 - MODULAR WETLAND SYSTEM (MWS) DETAIL - MWS-L-6-8-V
NOT TO SCALE



TRASH ENCLOSURE STRUCTURE DETAIL (TYP.)
NOT TO SCALE

OCTOBER 2022

CITY OF PERRIS
POST-CONSTRUCTION BMP SECTION DETAILS
BREW ENT. II-HARLEY KNOX
(CITY CASE NO. TBD)

3 OF 3 SHEETS

NOT FOR CONSTRUCTION – THIS PRE-CONSTRUCTION BMP SITE PLAN IS FOR WQMP REVIEW PURPOSE

Appendix 2: Construction Plans

Grading and Drainage Plans

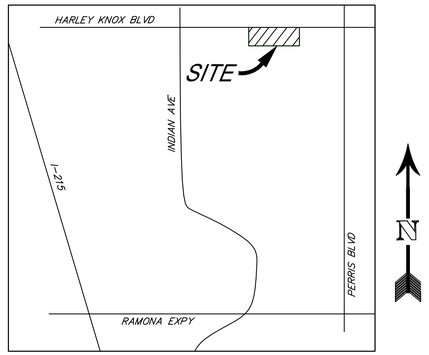
Note: Preliminary site plans are provided.

IN THE CITY PERRIS, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

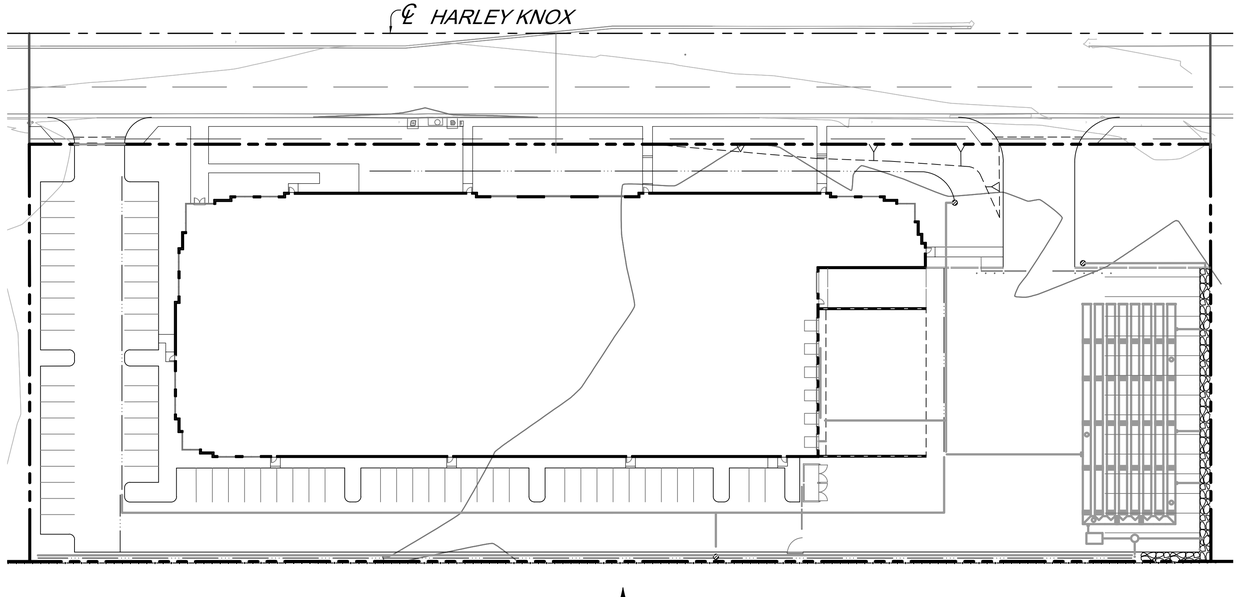
BREW ENT. II - HARLEY KNOX

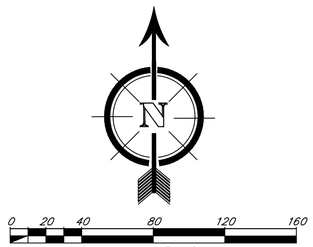
PRELIMINARY GRADING PLAN

OCTOBER 2022



VICINITY MAP
NOT TO SCALE





0 20 40 80 120 160

SCALE 1"=40'

OWNER/APPLICANT

BREW ENTERPRISES II
3535 INLAND EMPIRE BLVD
ONTARIO, CA 91764
TEL: (909) 373-2915
ATTN: MR. MIKE WOLFE

ENGINEER

SDH & ASSOCIATES, INC.
27363 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691

TOPOGRAPHY SOURCE

AERIAL PHOTOGRAMMETRY PERFORMED BY:
ARROWHEAD MAPPING
TEL: (909) 889-2420

ARCHITECT

RGA ARCHITECTURE 15231 ALTON PARKWAY, STE. #100 IRVINE, CA 92618 VOICE: (949) 341-0920

EARTHWORK

CUT: 10,500 C.Y.
FILL: 10,500 C.Y.

UTILITY PURVEYORS

WATER.....EASTERN MUNICIPAL WATER DISTRICT
GAS.....SO CAL GAS
ELECTRICAL.....SCE
TELEPHONE.....VERIZON
SEWER.....EASTERN MUNICIPAL WATER DISTRICT

PROJECT DATA

GROSS SITE AREA: 174,675 S.F. (4.01 AC.)
NET SITE AREA: 154,543 S.F. (3.55 AC.)
BUILDING AREA: 62,505 S.F.

PARKING INFO

PARKING REQUIRED: 62 SPACES
PARKING PROVIDED: 67 SPACES

COMMUNITY FACILITIES DISTRICT

SITE IS NOT WITHIN A COMMUNITY FACILITIES DISTRICT

HAZARDOUS MATERIALS

NOT IN A FIRE HAZARD ZONE

FEMA FLOOD ZONE DESIGNATION

ZONE D / ZONE X

ZONING AND LAND USE

EXISTING ZONING..... COMMERCIAL PVCC
EXISTING LAND USE..... GENERAL PLAN LAND USE
PROPOSED ZONING..... LI (LIGHT INDUSTRIAL)
PROPOSED LAND USE..... INDUSTRIAL

WATER QUALITY

A PROJECT SPECIFIC WQMP HAS BEEN PREPARED FOR THIS PROJECT

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF PERRIS, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS: LOT 7 IN BLOCK 2 OF RIVERSIDE TRACT, AS SHOWN BY MAP ON FILE IN BOOK 14, PAGE 688 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA. EXCEPTING FROM SAID LOT 7 THE SOUTH 365 FEET MEASURED FROM THE CENTER LINE OF NANCE STREET, 60 FEET WIDE.

THOMAS BROTHERS INFO.

PAGE: 747, GRID: G7

APN:

302-090-021

GEOTECHNICAL ENGINEER

NORCAL ENGINEERING
SOILS AND GEOTECHNICAL CONSULTANTS
10641 HUMBOLT STREET
LOS ALAMITOS, CA 90720
TEL: (562) 799-9469

SCHOOL DISTRICT

VAL VERDE UNIFIED

SHEET INDEX

SHEET 1: TITLE SHEET
SHEET 2: PRELIMINARY GRADING PLAN
SHEET 3: SECTIONS AND DETAILS

LEGEND

T.C.B.	-	TOP CATCH BASIN
F.G.	-	FINISHED GRADE
F.L.	-	FLOW LINE
H.P.	-	HIGH POINT
EXIST.	-	EXISTING
P.E.	-	PAD ELEVATION
G.B.	-	GRADE BREAK
◯	-	STEM WALL HEIGHT
		TRACT BOUNDARY
		CENTERLINE
		CURB AND GUTTER
1280		EXISTING CONTOUR LINE
		LOT LINE
		SLOPE

CONSTRUCTION NOTES

1. CONSTRUCT 3" A.C. OVER 4" A.B. PAVEMENT DRIVE AND PARKING AREAS
2. CONSTRUCT 6" CURB ONLY
3. CONSTRUCT 6" CURB AND AND GUTTER
4. CONSTRUCT 4" PCC SIDEWALK (FINISH PER LANDSCAPE PLANS)
5. CONSTRUCT 24" CATCH BASIN (BROOKS 2424CB OR APPROVED EQUAL) WITH FLOGARD+CATCH BASIN FILTER MODEL FGP24-F
6. CONSTRUCT 3" WIDE CONCRETE RIBBON GUTTER
7. CONSTRUCT 12" HDPE STORM DRAIN PIPE
8. CONSTRUCT COMMERCIAL DRIVEWAY APPROACH 207A
9. CONSTRUCT RETAINING WALL
10. CONSTRUCT RIP-RAP PAD
11. CONSTRUCT HANDICAP RAMP
12. CONSTRUCT PCC SIDEWALK PER CITY STD. IN R/W
13. CONSTRUCT AC. OVER A.B. (OFFSITE) T1=7.5
14. CONSTRUCT OFFSITE 6" CURB & GUTTER PER RIVERSIDE COUNTY STD. 200
15. CONSTRUCT (2) 4" PIPES UNDER SIDEWALK
16. CONSTRUCT ATRIUM GRATE IN LANDSCAPE AREA
17. CONSTRUCT CONCRETE V-GUTTER (Z=2:1; D=1.0')
18. CONSTRUCT GRAVEL TRENCH (NO.2 BACKING; T=1.0')(WIDTH=5'MIN; DEPTH 3')
19. CONSTRUCT VEGETATED SWALE
20. CONSTRUCT UNDERGROUND DETENTION STORAGE FACILITY (54" CMP DETENTION SYSTEM BY CONTECH OR APPROVED EQUAL)
21. CONSTRUCT MODULAR WETLAND SYSTEM (MWS-L-6-8)
22. CONSTRUCT MECHANICAL PUMP (LOW-FLOW)
23. CONSTRUCT 8" HDPE STORM DRAIN PIPE
24. CONSTRUCT 18" HDPE STORM DRAIN PIPE
25. CONSTRUCT 24" HDPE STORM DRAIN PIPE

PRELIMINARY
NOT FOR CONSTRUCTION

REVISIONS

MARK	DESCRIPTION	BY	APPR	DATE

DESIGNED BY: S.S. DRAWN BY: X.O.F.
CHECKED BY: D.S. PROJECT MANAGER: S.J.S.

PLANNING DIVISION: DATE:

PREPARED BY: DATE:

DANE SOMMERS
R.C.E. NO.: 90433 EXP. 9-30-23

SEAL: REGISTERED PROFESSIONAL ENGINEER — DANE A. SOMMERS — No. 90433 Exp. 9-30-23 — CIVIL — STATE OF CALIFORNIA

PREPARED BY:

SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
27363 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1" =40'

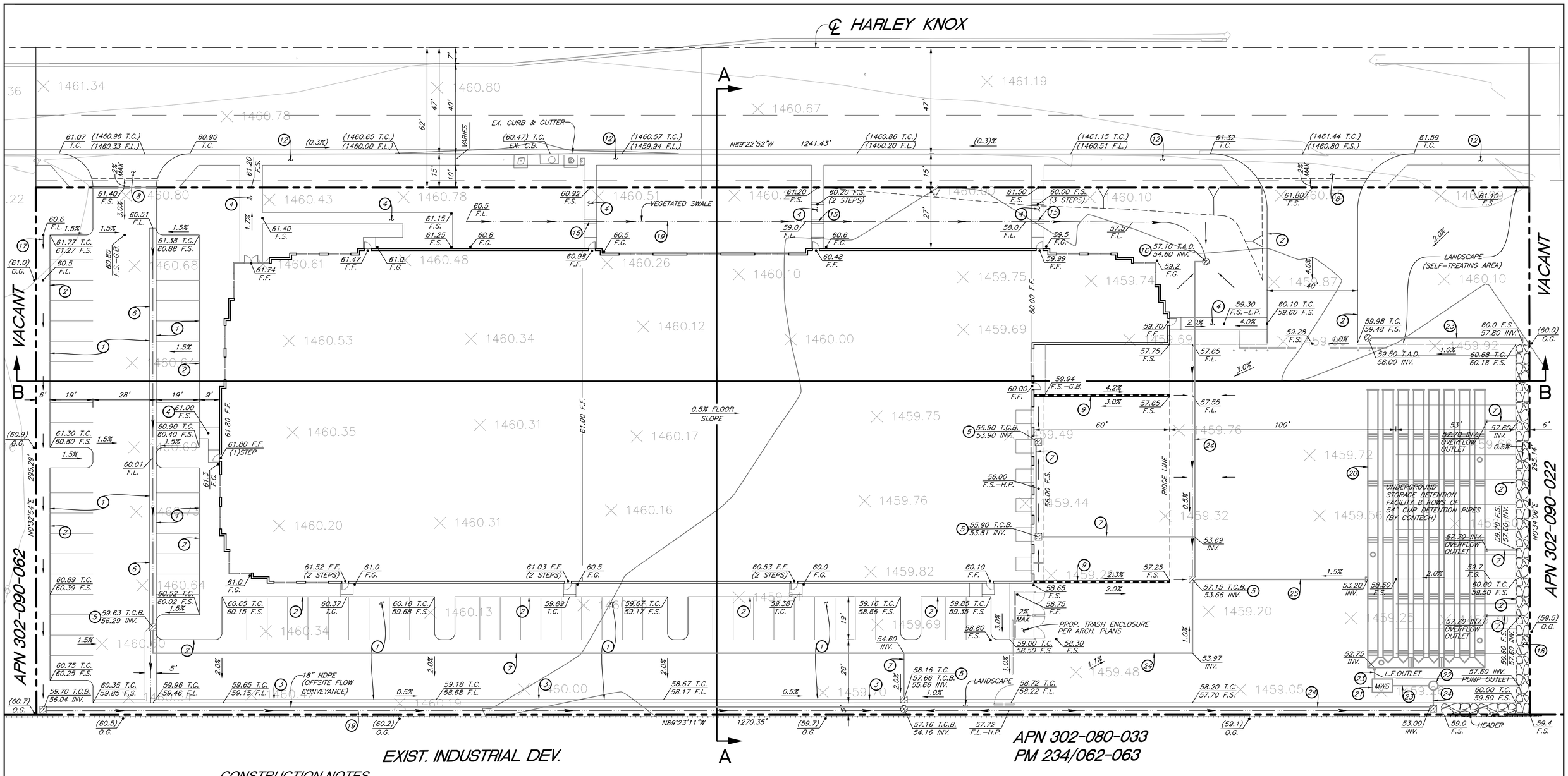
DATE: OCTOBER 2022

BENCHMARK
DESCRIBED BY METRO WATER DISTRICT SO. CALIFORNIA 1992 LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERRIS BOULEVARD AND RIDER ST. AT THE BASE OF A STEEL TRAFFIC SIGNAL LIGHT, A 3.5 FOOT (1.1 M) BY 2.7 FOOT (0.8 M) CONCRETE BASE . A 3-1/4 INCH STANDARD MWDSC ALUMINUM DISK SET ON EASTSIDE FLUSH.

CITY OF PERRIS
BREW ENT. II - HARLEY KNOX
PRELIMINARY GRADING PLAN
TITLE SHEET

1 OF 3 SHEETS

FOR: W.O. CITY FILE NO.



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17. CONSTRUCT CONCRETE V-GUTTER (Z=2:1; D=1.0')
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0 10 20 40 60 80
SCALE 1"=20'

PRELIMINARY
NOT FOR CONSTRUCTION

REVISIONS			
MARK	DESCRIPTION	BY	APPR	DATE
DESIGNED BY: S.S.	DRAWN BY: X.O.F.		
CHECKED BY: D.S.	PROJECT MANAGER: S.J.S.		

PLANNING DIVISION: DATE:

PREPARED BY: DATE:

DANE SOMMERS
R.C.E. NO.: 90433 EXP. 9-30-23

SEAL: REGISTERED PROFESSIONAL ENGINEER — DANE A. SOMMERS — No. 90433 Exp. 9-30-23 — CIVIL — STATE OF CALIFORNIA

PREPARED BY:

SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
27363 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1"=20'

DATE: OCTOBER 2022

BENCHMARK
DESCRIBED BY METRO WATER DISTRICT SO. CALIFORNIA 1992
LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERRIS BOULEVARD AND RIDER ST, AT THE BASE OF A STEEL TRAFFIC SIGNAL LIGHT, A 3.5 FOOT (1.1 M) BY 2.7 FOOT (0.8 M) CONCRETE BASE . A 3-1/4 INCH STANDARD MWDSC ALUMINUM DISK SET ON EASTSIDE FLUSH.

CITY OF PERRIS

BREW ENT.II - HARLEY KNOX
PRELIMINARY GRADING PLAN

2 OF 3 SHEETS

FOR: W.O. CITY FILE NO.

CONSTRUCTION NOTES

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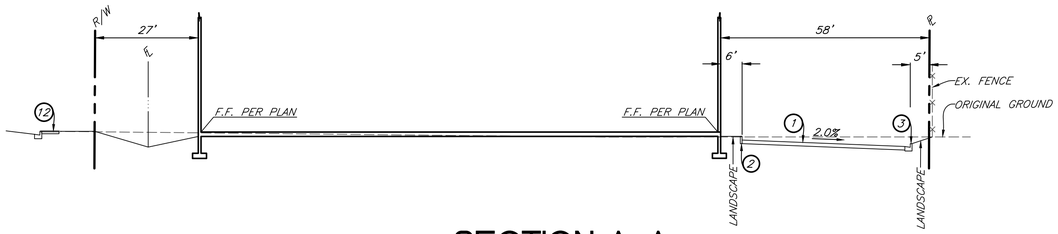
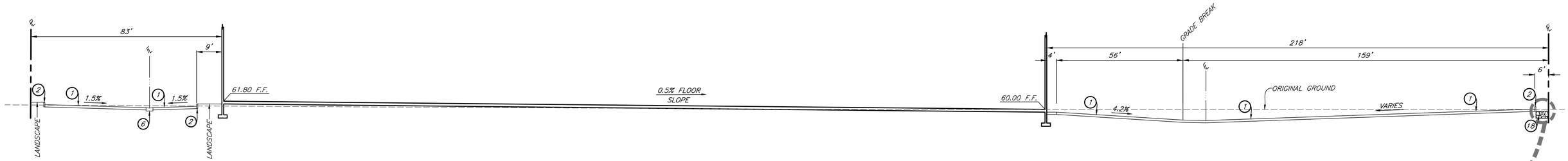


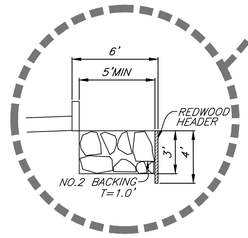
SECTION A-A

1"=20' HORIZONTAL
1"=10' VERTICAL



SECTION B-B

1"=20' HORIZONTAL
1"=10' VERTICAL



PRELIMINARY
NOT FOR CONSTRUCTION

REVISIONS

MARK	DESCRIPTION	BY	APPR	DATE

DESIGNED BY: S.S. | DRAWN BY: X.O.F.
CHECKED BY: D.S. | PROJECT MANAGER: S.J.S.

PLANNING DIVISION: DATE:

PREPARED BY: DATE:
DANE SOMMERS
R.C.E. NO.: 90433 EXP. 9-30-23

SEAL: REGISTERED PROFESSIONAL ENGINEER — DANE A. SOMMERS — No. 90433 Exp. 9-30-23 — CIVIL — STATE OF CALIFORNIA

PREPARED BY:
SDH & ASSOCIATES INCORPORATED
SDH AND ASSOCIATES INC.
27363 VIA INDUSTRIA
TEMECULA, CA 92590
TEL: (951) 683-3691 FAX (951) 788-2314

SCALE: 1" =20'
DATE: OCTOBER 2022

BENCHMARK
DESCRIBED BY METRO WATER DISTRICT SO. CALIFORNIA 1992
LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF PERRIS BOULEVARD AND RIDER ST. AT THE BASE OF A STEEL TRAFFIC SIGNAL LIGHT, A 3.5 FOOT (1.1 M) BY 2.7 FOOT (0.8 M) CONCRETE BASE . A 3-1/4 INCH STANDARD MWDSC ALUMINUM DISK SET ON EASTSIDE FLUSH.

CITY OF PERRIS
BREW ENT.II - HARLEY KNOX
PRELIMINARY GRADING PLAN
SECTIONS

3 OF 3 SHEETS

FOR: | W.O. | CITY FILE NO.

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Geotechnical Engineering Investigation
Proposed Industrial Warehouse Development
400 block and south side of Harley Knox Boulevard
Perris, California

Brew Enterprises II
c/o Lee & Associates
3535 Inland Empire Boulevard
Ontario, California 91764

Attn: Mr. Mike Wolfe

Project Number 23529-22
September 30, 2022

NorCal Engineering

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NorCal Engineering

Soils and Geotechnical Consultants
10641 Humbolt Street Los Alamitos, CA 90720
(562) 799-9469 Fax (562) 799-9459

September 30, 2022

Project Number 23529-22

Brew Enterprises II
c/o Lee & Associates
3535 Inland Empire Boulevard
Ontario, California 91764

Attn.: Mr. Mike Wolfe

RE: **Geotechnical Engineering Investigation** - Proposed Industrial Warehouse Development - Located within the 400 block and south side of Harley Knox Boulevard, in the City of Perris, California

Dear Mr. Wolfe:

Pursuant to your request, this firm has performed a Geotechnical Engineering Investigation for the above referenced project in accordance with your approval of our proposal dated September 9, 2022. The purpose of this investigation is to evaluate the geotechnical conditions of the subject site and to provide recommendations for the proposed industrial warehouse development.

The scope of work included the following: 1) site reconnaissance; 2) subsurface geotechnical exploration and sampling; 3) laboratory testing; 4) soil infiltration testing; 5) engineering analysis of field and laboratory data; 6) preparation of a geotechnical engineering report. It is the opinion of this firm that the proposed development is feasible from a geotechnical standpoint provided that the recommendations presented in this report are followed in the design and construction of the project.

1.0 Project Description

It is proposed to construct an industrial warehouse development consisting of 53,000 square feet building as shown on the attached Site Plan. The proposed concrete tilt-up structure will be supported by a conventional slab-on-grade foundation system with perimeter-spread footings and isolated interior footings. Other improvements will include asphalt and concrete pavement areas, screen walls, hardscape and landscaping. It is assumed that the proposed grading for the development will include cut and fill procedures on the order of a few feet to achieve finished grade elevations. Final building plans shall be reviewed by this firm prior to submittal for city approval to determine the need for any additional study and revised recommendations pertinent to the proposed development, if necessary.

2.0 Site Description

The 3.58-acre subject property is located within the 400 block and south side of Harley Knox Boulevard and approximately 500 feet west from Perris Boulevard, in the City of Perris. The generally rectangular-shaped parcel is elongated in an east to west direction with topography of the relatively level descending slightly from front to back direction on the order of a few feet. The property is undeveloped land covered with a light vegetation growth of natural grasses and weeds.

3.0 Site Exploration

The investigation consisted of the placement of nine (9) exploratory borings drilled by a truck mounted hollow stem auger to depths ranging from 5 to 20 feet in depth below current ground elevations. The explorations were visually classified and logged by a field engineer with locations of the subsurface explorations shown on the attached site plan.

The exploratory borings revealed the existing earth materials to consist of fill and natural soil. Detailed descriptions of the subsurface conditions are listed on the boring logs in Appendix A. It should be noted that the transition from one soil type to another as shown on the boring logs is approximate and may in fact be a gradual transition. The soils encountered are described as follows:

Fill: A fill soil classifying as a brown, clayey SILT was encountered across the site to a depth of one foot below ground surface. These soils were noted to be soft and damp.

Natural: A natural undisturbed soil classifying predominantly as a brown, clayey SILT to a grey brown, sandy SILT was encountered beneath the fill soils. The native soils were observed to be stiff and damp to moist.

The overall engineering characteristics of the earth material were relatively uniform with each excavation. No groundwater was encountered to the depth of explorations and no caving occurred.

4.0 Laboratory Tests

Relatively undisturbed samples of the subsurface soils were obtained to perform laboratory testing and analysis for direct shear, consolidation tests, and to determine in-place moisture/densities. These relatively undisturbed ring samples were obtained by driving a thin-walled steel sampler lined with one-inch long brass rings with an inside diameter of 2.42 inches into the undisturbed soils. Bulk bag samples were obtained in the upper soils for expansion index tests and maximum density tests. All test results are included in Appendix B, unless otherwise noted.

4.1 **Field Moisture Content** (ASTM: D 2216) and the dry density of the ring samples were determined in the laboratory. This data is listed on the logs of explorations.

4.2 **Maximum Density tests** (ASTM: D 1557) were performed on typical samples of the upper soils. Results of these tests are shown on Table I.

4.3 **Expansion Index tests** (ASTM: D 4829) were performed on remolded samples of the upper soils to determine expansive characteristics. Results of these tests are provided on Table II.

4.4 **Atterberg Limits** (ASTM: D 4318) consisting of liquid limit, plastic limit and plasticity index were performed on representative soil samples. Results are shown on Table III.

4.5 **Corrosion tests** consisting of sulfate, pH, resistivity and chloride analysis to determine potential corrosive effects of soils on concrete and underground utilities. Test results are provided on Table IV.

4.6 **R-Value test** per California Test Method 301 was performed on a representative sample, which may be anticipated to be near subgrade to determine pavement design. Results are provided within the pavement design section of the report.

4.7 **Direct Shear tests** (ASTM: D 3080) were performed on undisturbed and/or remolded samples of the subsurface soils. The test is performed under saturated conditions at loads of 1,000 lbs./sq.ft., 2,000 lbs./sq.ft., and 3,000 lbs./sq.ft. with results shown on Plate A.

4.8 **Consolidation tests** (ASTM: D 2435) were performed on undisturbed samples to determine the differential and total settlement which may be anticipated based upon the proposed loads. Water was added to the samples at a surcharge of one KSF and the settlement curves are plotted on Plates B and C.

5.0 Seismicity Evaluation

The proposed development lies outside of any Alquist Priolo Special Studies Zone and the potential for damage due to direct fault rupture is considered unlikely. The site is situated in an area of high regional seismicity and the San Jacinto (San Jacinto Valley) fault is located about 12 kilometers from the site. Ground shaking originating from earthquakes along other active faults in the region is expected to induce lower horizontal accelerations due to smaller anticipated earthquakes and/or greater distances to other faults. The seismic design acceleration parameters for the project site are provided below based on the ASCE/SEI 7-22 American Society of Civil Engineers (ASCE) website, https://asce7hazardtool.online/. The ASCE/SEI 7-22 report is attached is Appendix C.

Seismic Design Acceleration Parameters

Latitude	33.857
Longitude	-117.231
Site Class	D
Risk Category	II
Peak Ground Acceleration	PGA_M = 0.61
Adjusted Maximum Acceleration	S_{MS} = 1.77 S_{M1} = 1.52
Design Spectral Response Acceleration Parameters	S_{DS} = 1.18 S_{D1} = 1.01
Mapped Spectral Response Acceleration	S_S = 1.58 S_1 = 0.59

Use of these values is dependent on the latest requirements of the latest ASCE, 11-4.8, Exception 2 that requires the value of the seismic response coefficient C_s be determined by Equation 12.8.2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either 12.8-3 for $T_L \geq T \geq 1.5T_s$ or Equation 12.8-4 for $T > T_L$. Computations and verification of these conditions is referred to the structural engineer.

6.0 Liquefaction Evaluation

The site is expected to experience ground shaking and earthquake activity that is typical of Southern California area. It is during severe ground shaking that loose, granular soils below the groundwater table can liquefy. Based on review of the *County of Riverside– Liquefaction Zone Map (September 2019)*, the site is situated in an area of very low liquefaction susceptibility. Thus, the design of the proposed construction in conformance with the latest Building Code provisions for earthquake design is expected to provide mitigation of ground shaking hazards that are typical to Southern California.

7.0 Infiltration Characteristics

Infiltration tests within the site were performed to provide preliminary infiltration rates for the purpose of planning and design of an on-site water disposal system field testing in accordance with the Riverside County – Low Impact Development BMP Design Handbook Appendix A – Infiltration Testing Manual. A truck mounted Simco 2800 Drill Rig equipped with a hollow stem auger was used to excavate the exploratory borings (B-1 and B-2) at depths of 5 and 10 feet below existing ground surface within the proposed infiltration areas.

The borings consisted of six-inch diameter test holes. A three-inch diameter perforated PVC casing with solid end cap was installed in the borings and then surrounded with gravel materials to prevent caving. The infiltration holes were carefully filled with clean water and refilled after two initial readings. Based upon the initial rates of infiltration at each location, test measurements were measured at selected maximum intervals thereafter. Measurements were obtained by using an electronic tape measure with 1/16-inch divisions and timed with a stopwatch. Field data sheets are provided in Appendix D.

Based upon the results of our testing, the soils encountered in the planned on-site drainage disposal system area exhibit the following field infiltration rates calculated using the Porchet Method (aka Inverse Borehole Method). The drainage disposal system shall utilize design infiltration rates based on the safety factor required by the county standard.

Boring/Test No.	Depth	Soil Classification	Field Infiltration Rate
B-1/TH-1	5'	Sandy SILT	1.6 in/hr
B-2/TH-2	10'	Clayey SILT	0.1 in/hr

Groundwater was not encountered to a depth of 20 feet below existing ground surface based on the logs of our deeper borings. A nearby groundwater monitoring well located approximately 500 feet to the west from the subject site noted a groundwater depth of 108 feet below ground surface last measured in January 2022.

All systems must meet the latest county specifications and the California Regional Water Quality Control Board (CRWQCB) requirements. It is recommended that foundations shall be setback a minimum distance of 10 feet from the drainage disposal system and the bottom of footing shall be a minimum of 10 feet from the expected zone of saturation. The boundary of the zone of saturation may be assumed to project downward from the top of the permeable portion of the disposal system at an inclination of 1 to 1 or flatter, as determined by the geotechnical engineer.

8.0 Conclusions and Recommendations

Based upon our evaluations, the proposed development is acceptable from a geotechnical engineering standpoint. By following the recommendations and guidelines set forth in our report, the structures will be safe from excessive settlements under the anticipated design loadings and conditions. The proposed development shall meet all requirements of the City Building Ordinance and will not impose any adverse effect on existing adjacent structures.

The following recommendations are based upon soil conditions encountered in our field investigation; these near-surface soil conditions could vary across the site. Variations in the soil conditions may not become evident until the commencement of grading operations for the proposed development and revised recommendations from the soils engineer may be necessary based upon the conditions encountered. It is recommended that site inspections be performed by a representative of this firm during all grading and construction of the development to verify the findings and recommendations documented in this report. Any unusual conditions which may be encountered in the course of the project development may require the need for additional study and revised recommendations.

8.1 Site Grading Recommendations

Any vegetation and/or demolition debris shall be removed and hauled from proposed grading areas prior to the start of grading operations. Existing vegetation shall not be mixed or disced into the soils. Any removed soils may be reutilized as compacted fill once any deleterious material or oversized materials (in excess of eight inches) is removed. Grading operations shall be performed in accordance with the attached *Specifications for Placement of Compacted Fill.*

8.1.1 Removal and Recompaction Recommendations

All disturbed soils and/or fill (about one foot below ground surface) shall be removed to competent native material (relative compaction > 90%), the exposed surface scarified to a depth of 12 inches, brought to within 2% of optimum moisture content and compacted to a minimum of 85% of the laboratory standard (ASTM: D 1557) prior to placement of any additional compacted fill soils, foundations, slabs-on-grade and pavement. Grading shall extend a minimum of five horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

It is possible that isolated areas of undiscovered fill not described in this report are present on site; if found, these areas should be treated as discussed earlier. A diligent search shall also be conducted during grading operations in an effort to uncover any underground structures, irrigation or utility lines. If encountered, these structures and lines shall be either removed or properly abandoned prior to the proposed construction.

Any imported fill material should be preferably soil similar to the upper soils encountered at the subject site. All soils shall be approved by this firm prior to importing at the site and will be subjected to additional laboratory testing to assure concurrence with the recommendations stated in this report.

If placement of slabs-on-grade and pavement is not completed immediately upon completion of grading operations, additional testing and grading of the areas may be necessary prior to continuation of construction operations. Likewise, if adverse weather conditions occur which may damage the subgrade soils, additional assessment by the soils engineer as to the suitability of the supporting soils may be needed.

Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase. Adequate drainage away from the structures, pavement and slopes should be provided at all times.

8.1.2 **Fill Blanket Recommendations**

Due to the potential for differential settlement of foundations placed on compacted fill and native materials, it is recommended that all foundations including floor slab areas be underlain by a uniform compacted fill blanket at least two feet in thickness. This fill blanket shall extend a minimum of five horizontal feet outside the edges of foundations or equidistant to the depth of fill placed, whichever is greater.

8.2 **Shrinkage and Subsidence**

Results of our in-place density tests reveal that the soil shrinkage will be on the order of 5 to 10% due to excavation and recompaction, based upon the assumption that the fill is compacted to 92% of the maximum dry density per ASTM standards. Subsidence should be 0.2 feet die to earthwork operations. The volume change does not include any allowance for vegetation or organic stripping, removal of subsurface improvements, or topographic approximations. Although these values are only approximate, they represent our best estimate of lost yardage, which will likely occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field testing the actual equipment and grading techniques should be conducted.

8.3 **Temporary Excavations**

Temporary unsurcharged excavations in the existing site materials may be made at vertical inclinations up to 4 feet in height unless cohesionless soils are encountered. In areas where soils with little or no binder are encountered, where adverse geological conditions are exposed, or where excavations are adjacent to existing structures, shoring or flatter excavations may be required. The temporary cut slope gradients given above do not preclude local raveling and sloughing. Additional recommendations regarding specific excavations may be provided once typical detail sections are made available.

All excavations shall be made in accordance with the requirements of the soils engineer, CAL-OSHA and other public agencies having jurisdiction. Care should be taken to provide or maintain adequate lateral support for all adjacent improvements and structures at all times during the grading operations and construction phase.

8.4 **Foundation Design**

All foundations may be designed utilizing the following allowable bearing capacities for an embedded depth of 24 inches into approved engineered fill with the corresponding widths:

Allowable Bearing Capacity (psf)		
Width (feet)	Continuous Foundation	Isolated Foundation
1.5	2000	2500
2.0	2075	2575
4.0	2375	2875
6.0	2500	3000

The bearing value may be increased by 500 psf for each additional foot of depth in excess of the 24-inch minimum depth, up to a maximum of 4,000 psf. A one-third increase may be used when considering short-term loading and seismic forces. Any foundations located along property line may utilize an allowable bearing capacity of 1,500 psf and embedded into competent native soils. All foundations shall be reinforced a minimum of one No. 4 bar, top and bottom. A representative of this firm shall inspect all foundation excavations prior to pouring concrete.

8.5 **Settlement Analysis**

Resultant pressure curves for the consolidation tests are shown on Plates B and C. Computations utilizing these curves and the recommended allowable soil bearing capacities reveal that the foundations will experience settlements on the order of ¾ inch and differential settlements of less than ¼ inch.

8.6 **Lateral Resistance**

The following values may be utilized in resisting lateral loads imposed on the structure. Requirements of the California Building Code should be adhered to when the coefficient of friction and passive pressures are combined.

Coefficient of Friction - 0.35

Equivalent Passive Fluid Pressure = 200 lbs./cu.ft.

Maximum Passive Pressure = 2,000 lbs./cu.ft.

The passive pressure recommendations are valid only for approved compacted fill soils or competent native materials.

8.7 **Retaining Wall Design Parameters**

Active earth pressures against retaining walls will be equal to the pressures developed by the following fluid densities. These values are for **approved granular backfill material** placed behind the walls at various ground slopes above the walls.

Surface Slope of Retained Materials (Horizontal to Vertical	Equivalent Fluid Density (lb./cu.ft.)
Level	30
5 to 1	35
4 to 1	38
3 to 1	40
2 to 1	45

Any applicable short-term construction surcharges and seismic forces should be added to the above lateral pressure values. An equivalent fluid pressure of 45 pcf may be utilized for the restrained wall condition with a level grade behind the wall.

The seismic-induced lateral soil pressure for walls greater than 6 feet may be computed using a triangular pressure distribution with the maximum value at the top of the wall. The maximum lateral pressure of (20 pcf) H where H is the height of the retained soils above the wall footing should be used in final design of retaining walls. Sliding resistance values and passive fluid pressure values may be increased by 1/3 during short-term wind and seismic loading conditions.

All walls shall be waterproofed as needed and protected from hydrostatic pressure by a reliable permanent subdrain system. The granular backfill to be utilized immediately adjacent to retaining walls shall consist of an approved select granular soil with a sand equivalency greater than 30. This backfill zone of free draining material shall consist of a wedge beginning a minimum of one horizontal foot from the base of the wall extending upward at an inclination of no less than ¾ to 1 (horizontal to vertical).

8.8 **Slab Design**

All concrete slabs shall be a minimum of six inches in thickness in the proposed warehouse areas and four inches in office and hardscape both reinforced a minimum of No. 3 bars, sixteen inches in each direction and positioned in the center of slab and placed on approved subgrade soils moisture conditioned to 3% over optimum moisture content to a depth eighteen inches. Additional reinforcement requirements and an increase in thickness of the slabs-on-grade may be necessary based upon soils expansion potential and proposed loading conditions in the structures and should be evaluated further by the project engineers and/or architect.

A vapor retarder (10-mil minimum thickness) should be utilized in areas which would be sensitive to the infiltration of moisture. This retarder shall meet requirements of ASTM E 96, *Water Vapor Transmission of Materials* and ASTM E 1745, *Standard Specification for Water Vapor Retarders used in Contact with Soil or Granular Fill Under Concrete Slabs.* The vapor retarder shall be installed in accordance with procedures stated in ASTM E 1643, *Standard practice for Installation of Water Vapor Retarders used in Contact with Earth or Granular Fill Under Concrete Slabs.*

The moisture retarder may be placed directly upon compacted subgrade soils conditioned to near optimum moisture levels, although one to two inches of sand beneath the membrane is desirable. The subgrade upon which the retarder is placed shall be smooth and free of rocks, gravel or other protrusions which may damage the retarder. Use of sand above the retarder is under the purview of the structural engineer; if sand is used over the retarder, it should be placed in a dry condition.

8.9 **Pavement Section Design**

The table on the following page provides a preliminary pavement design based upon an R-Value of 20 for the subgrade soils for the proposed pavement areas. Final pavement design may need to be based on R-Value testing of the subgrade soils near the conclusion of site grading to assure that these soils are consistent with those assumed in this preliminary design.

The recommendations are based upon estimated traffic loads. Client should submit any other anticipated traffic loadings to the geotechnical engineer, if necessary, so that pavement sections may be reviewed to determine adequacy to support the proposed loadings.

Type of Traffic	Traffic Index	Asphalt (in.)	Base Material (in.)
Automobile Parking Stalls	4.0	3.0	6.0
Light Vehicle Circulation Areas	6.0	3.5	10.0
Heavy Truck Access Areas	7.0	4.0	13.0

Any concrete slab-on-grade in pavement areas shall be a minimum of seven inches in thickness and may be placed on approved subgrade soils. All pavement areas shall have positive drainage toward an approved outlet from the site. Drain lines behind curbs and/or adjacent to landscape areas should be considered by client and the appropriate design engineers to prevent water from infiltrating beneath pavement. If such infiltration occurs, damage to pavement, curbs and flow lines, especially on sites with expansive soils, may occur during the life of the project.

Any approved base material shall consist of a Class II aggregate or equivalent and should be compacted to a minimum of 95% relative compaction. All pavement materials shall conform to the requirements set forth by the City of Perris. The base material; and asphaltic concrete should be tested prior to delivery to the site and during placement to determine conformance with the project specifications. A pavement engineer shall designate the specific asphalt mix design to meet the required project specifications.

8.10 **Utility Trench and Excavation Backfill**

Trenches from installation of utility lines and other excavations may be backfilled with on-site soils or approved imported soils compacted to a minimum of 90% relative compaction. All utility lines shall be properly bedded with clean sand having a sand equivalency rating of 30 or more. This bedding material shall be thoroughly water jetted around the pipe structure prior to placement of compacted backfill soils.

8.11 **Corrosion Design Criteria**

Representative samples of the surficial soils, typical of the subgrade soils expected to be encountered within foundation excavations and underground utilities were tested for corrosion potential. The minimum resistivity value obtained for the samples tested is representative of an environment that may be severely corrosive to metals. The soil pH value was considered mildly acidic and may not have a significant effect on soil corrosivity. Consideration should be given to corrosion protection systems for buried metal such as protective coatings, wrappings or the use of PVC where permitted by local building codes.

According to Table 4.3.1 of ACI 318 Building Code and Commentary, these contents revealed negligible sulfate concentrations. Therefore, a Type II cement according to latest CBC specifications may be utilized for building foundations at this time. It is recommended that additional sulfate tests be performed at the completion of site grading to assure that the as graded conditions are consistent with the recommendations stated in this design. Corrosion test results may be found on the attached Table IV.

8.12 **Expansive Soil**

Since expansive soils were encountered, special attention should be given to the project design and maintenance. The attached *Expansive Soil Guidelines* should be reviewed by the engineers, architects, owner, maintenance personnel and other interested parties and considered during the design of the project and future property maintenance.

9.0 Closure

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. It is the responsibility of the owner to ensure that all information within this report is submitted to the Architect and appropriate Engineers for the project.

A preconstruction conference should be held between the developer, general contractor, grading contractor, city inspector, architect, and geotechnical engineer to clarify any questions relating to the grading operations and subsequent construction. Our representative should be present during the grading operations and construction phase to certify that such recommendations are complied within the field.

This geotechnical investigation has been conducted in a manner consistent with the level of care and skill exercised by members of our profession currently practicing under similar conditions in the Southern California area. No other warranty, expressed or implied is made.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING

Keith D. Tucker
Project Engineer
R.G.E. 841

Scott D. Spensiero
Project Manager

References

1. American Society of Civil Engineers (ASCE) website, https://asce7hazardtool.online/
2. California Building Code, 2019.
3. California Department of Conservation, California Geological Survey, 2007, Fault-Rupture Hazard Zones in California; Special Publication 42.
4. California Department of Water Resources, Internet Website, http://www.water.ca.gov/waterdatalibrary/index.cfm.
5. California Division of Mines and Geology, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California: Special Publication 117A.
6. Riverside County Mapping and Spatial Data Portal – Liquefaction Zones September 2019.
7. Riverside County Geographic Information Systems (GIS) website https://rcitgis-countyofriverside.hub.arcgis.com/
8. Riverside County – Low Impact Development BMP Design Handbook (revised 9/2011) Appendix A – Infiltration Testing Manual.

SPECIFICATIONS FOR PLACEMENT OF COMPACTED FILL

Excavation

Any existing low-density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Geotechnical Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90% relative compaction (in accordance with ASTM: D 1557).

In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure.

Material for Fill

The on-site soils or approved import soils may be utilized for the compacted fill provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Geotechnical Engineering firm a minimum of 72 hours prior to importation of site.

Placement of Compacted Fill Soils

The approved fill soils shall be placed in layers not excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2% of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90% relative compaction (in accordance with ASTM: D 1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Geotechnical Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every 2 feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Geotechnical Engineering firm.

Grading Observations

The controlling governmental agencies should be notified prior to commencement of any grading operations. This firm recommends that the grading operations be conducted under the observation of a Soils Engineering firm as deemed necessary. A 24-hour notice must be provided to this firm prior to the time of our initial inspection.

Observation shall include the clearing and grubbing operations to assure that all unsuitable materials have been properly removed; approve the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished grade and designate areas of overexcavation; and perform field compaction tests to determine relative compaction achieved during fill placement. In addition, all foundation excavations shall be observed by the Geotechnical Engineering firm to confirm that appropriate bearing materials are present at the design grades and recommend any modifications to construct footings.

EXPANSIVE SOIL GUIDELINES

The following expansive soil guidelines are provided for your project. The intent of these guidelines is to inform you, the client, of the importance of proper design and maintenance of projects supported on expansive soils. ***You, as the owner or other interested party, should be warned that you have a duty to provide the information contained in the soil report including these guidelines to your design engineers, architects, landscapers and other design parties in order to enable them to provide a design that takes into consideration expansive soils.***

In addition, you should provide the soil report with these guidelines to any property manager, lessee, property purchaser or other interested party that will have or assume the responsibility of maintaining the development in the future.

Expansive soils are fine-grained silts and clays which are subject to swelling and contracting. The amount of this swelling and contracting is subject to the amount of fine-grained clay materials present in the soils and the amount of moisture either introduced or extracted from the soils. Expansive soils are divided into five categories ranging from "very low" to "very high". Expansion indices are assigned to each classification and are included in the laboratory testing section of this report. *If the expansion index of the soils on your site, as stated in this report, is 21 or higher, you have expansive soils.* The classifications of expansive soils are as follows:

Classification of Expansive Soil*

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

*From Table 18A-I-B of California Building Code (1988)

When expansive soils are compacted during site grading operations, care is taken to place the materials at or slightly above optimum moisture levels and perform proper compaction operations. Any subsequent excessive wetting and/or drying of expansive soils will cause the soil materials to expand and/or contract. These actions are likely to cause distress of foundations, structures, slabs-on-grade, sidewalks and pavement over the life of the structure. ***It is therefore imperative that even after construction of improvements, the moisture contents are maintained at relatively constant levels, allowing neither excessive wetting or drying of soils.***

Evidence of excessive wetting of expansive soils may be seen in concrete slabs, both interior and exterior. Slabs may lift at construction joints producing a trip hazard or may crack from the pressure of soil expansion. Wet clays in foundation areas may result in lifting of the structure causing difficulty in the opening and closing of doors and windows, as well as cracking in exterior and interior wall surfaces. In extreme wetting of soils to depth, settlement of the structure may eventually result. Excessive wetting of soils in landscape areas adjacent to concrete or asphaltic pavement areas may also result in expansion of soils beneath pavement and resultant distress to the pavement surface.

Excessive drying of expansive soils is initially evidenced by cracking in the surface of the soils due to contraction. Settlement of structures and on-grade slabs may also eventually result along with problems in the operation of doors and windows.

Projects located in areas of expansive clay soils will be subject to more movement and "hairline" cracking of walls and slabs than similar projects situated on non-expansive sandy soils. There are, however, measures that developers and property owners may take to reduce the amount of movement over the life the development. The following guidelines are provided to assist you in both design and maintenance of projects on expansive soils:

- Drainage away from structures and pavement is essential to prevent excessive wetting of expansive soils. Grades should be designed to the latest building code and maintained to allow flow of irrigation and rain water to approved drainage devices or to the street. Any "ponding" of water adjacent to buildings, slabs and pavement after rains is evidence of poor drainage; the installation of drainage devices or regrading of the area may be required to assure proper drainage. Installation of rain gutters is also recommended to control the introduction of moisture next to buildings. Gutters should discharge into a drainage device or onto pavement which drains to roadways.

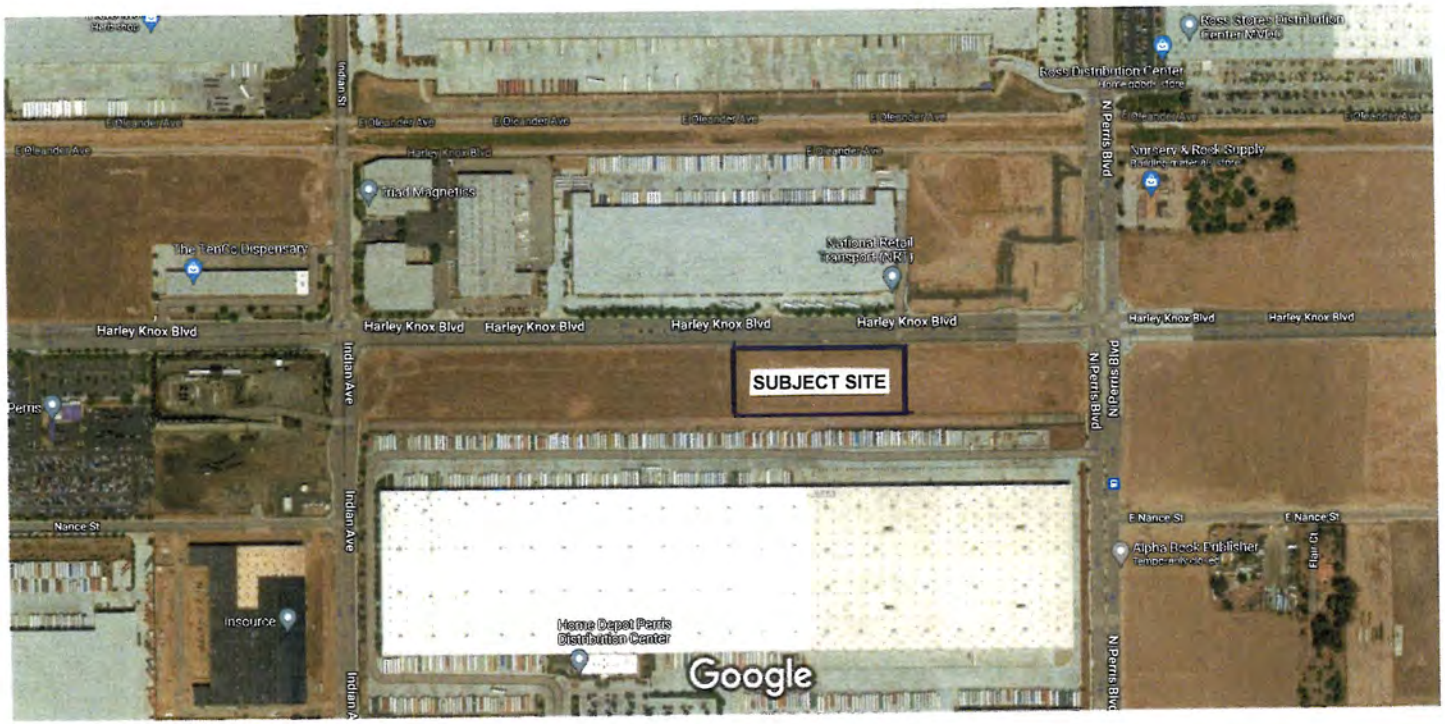
- Irrigation should be strictly controlled around building foundations, slabs and pavement and may need to be adjusted depending upon season. This control is essential to maintain a relatively uniform moisture content in the expansive soils and to prevent swelling and contracting. Over-watering adjacent to improvements may result in damage to those improvements. NorCal Engineering makes no specific recommendations regarding landscape irrigation schedules.

- Planting schemes for landscaping around structures and pavement should be analyzed carefully. Plants (including sod) requiring high amounts of water may result in excessive wetting of soils. Trees and large shrubs may actually extract moisture from the expansive soils, thus causing contraction of the fine-grained soils.

- Thickened edges on exterior slabs will assist in keeping excessive moisture from entering directly beneath the concrete. A six-inch thick or greater deepened edge on slabs may be considered. Underlying interior and exterior slabs with 6 to 12 inches or more of non-expansive soils and providing presaturation of the underlying clayey soils as recommended in the soil report will improve the overall performance of on-grade slabs.

- Increase the amount of steel reinforcing in concrete slabs, foundations and other structures to resist the forces of expansive soils. The precise amount of reinforcing should be determined by the appropriate design engineers and/or architects.

- Recommendations of the soil report should always be followed in the development of the project. Any recommendations regarding presaturation of the upper subgrade soils in slab areas should be performed in the field and verified by the Soil Engineer.



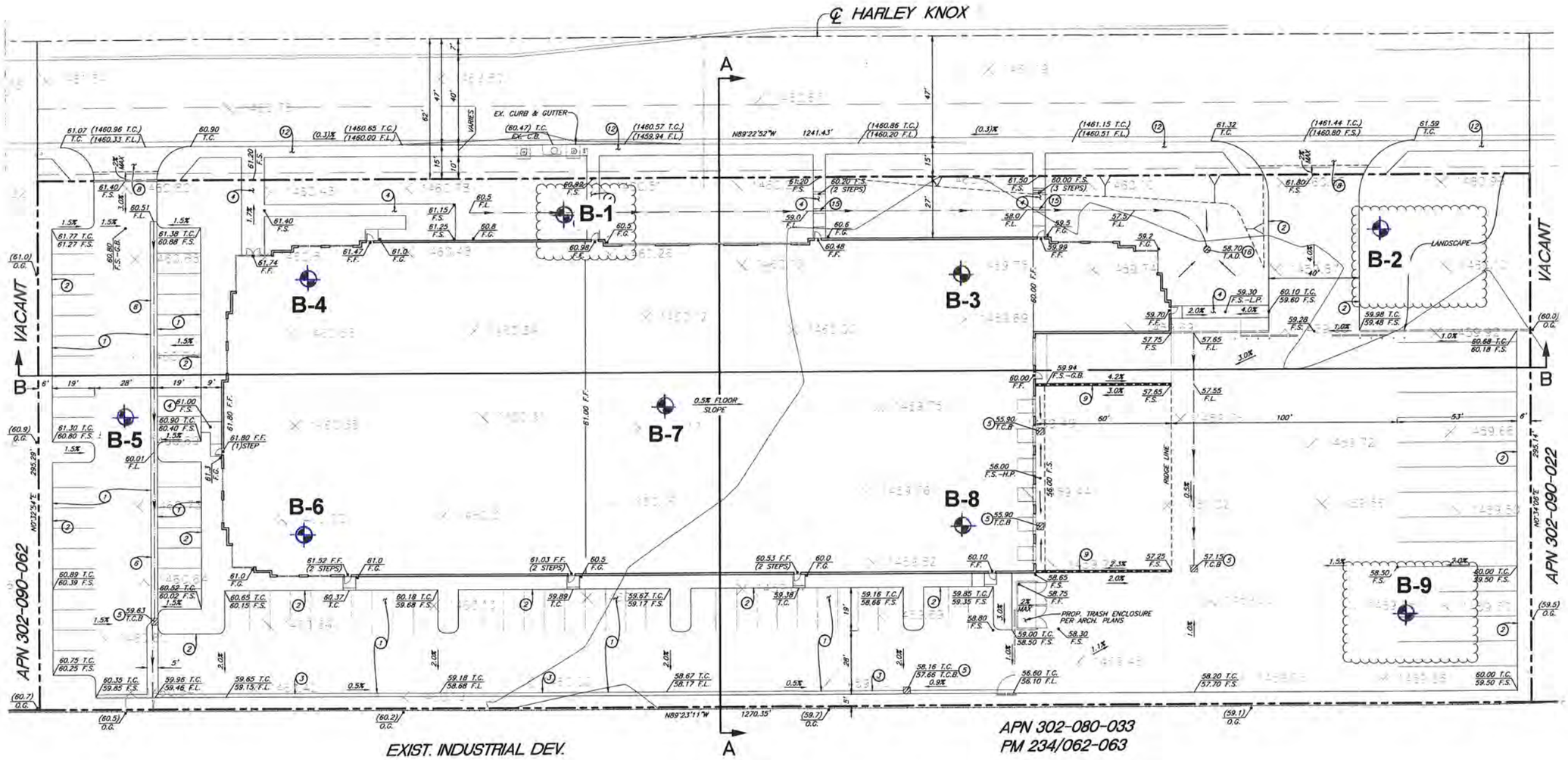
Imagery ©2022 County of San Bernardino, Maxar Technologies, U.S. Geological Survey, USDA/FPAC/GEO, Map data ©2022

NORTH

NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

PROJECT: **23529-22** DATE: **SEPTEMBER 2022**

VICINITY MAP



NORTH

0 10 20 40 60 80

1 INCH = 50 FEET

NorCal Engineering SOILS AND GEOTECHNICAL CONSULTANTS		SITE PLAN
PROJECT 23529-22	DATE SEPTEMBER 2022	

List of Appendices
(in order of appearance)

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Log of Borings B-1 to B-9

Appendix B – Laboratory Tests

Table I – Maximum Dry Density
Table II – Expansion
Table III – Atterberg Limits
Table IV – Corrosion
Plate A – Direct Shear
Plates B and C - Consolidation

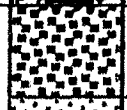
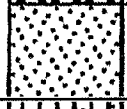
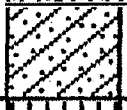
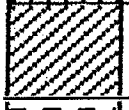
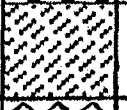
Appendix C – Seismic Design Report

ASCE/SEI 7-22 Seismic Design Report

Appendix D – Soil Infiltration Data

Field Tests and Calculations

Appendix A
Log of Excavations

MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL, SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

KEY:

 Indicates 2.5-inch Inside Diameter. Ring Sample.

 Indicates 2-inch OD Split Spoon Sample (SPT).

 Indicates Shelby Tube Sample.

 Indicates No Recovery.

 Indicates SPT with 140# Hammer 30 in. Drop.

 Indicates Bulk Sample.

 Indicates Small Bag Sample.

 Indicates Non-Standard

 Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

Brew Enterprises II
23529-22

Log of Boring B-1

Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL					
		Clayey SILT					
		Brown, soft, damp					
		NATURAL					
		Clayey SILT					
		Brown, stiff, moist					
5		Sandy SILT					
		Grey brown, stiff, moist					
		Boring completed at depth of 5'					
10							
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\23529-22.log Date: 10/3/2022

NorCal Engineering

Brew Enterprises II
23529-22

Log of Boring B-2

Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist					
5		Sandy SILT Grey brown, stiff, moist					
		Clayey SILT Brown, stiff, moist					
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\23529-22.log Date: 10/3/2022

NorCal Engineering

Brew Enterprises II
23529-22

Log of Boring B-3

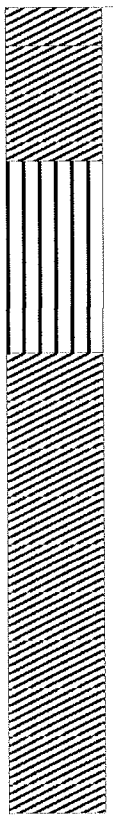
Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:



Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey SILT Brown, soft, damp		6/11	8.5	112.9	
		NATURAL Clayey SILT Brown, stiff, moist					
5		Sandy SILT Grey brown, stiff, moist		16/28	5.1	118.3	
10		Clayey SILT Brown to grey brown, stiff, moist		19/22	7.5	116.0	
15				18/23	12.3	117.3	
20				19/24	8.1	114.5	
		Boring completed at depth of 21'					
25							
30							
35							

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\23529-22.log Date: 10/3/2022

NorCal Engineering

Brew Enterprises II
23529-22

Log of Boring B-4

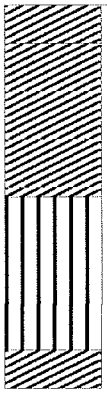
Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:



Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist	■	8/14	10.3	108.9	
5		Sandy SILT Grey brown, stiff, moist	■	11/20	7.5	111.3	
10		Clayey SILT Brown, stiff, moist					
		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\23529-22.log Date: 10/3/2022

Brew Enterprises II
23529-22

Log of Boring B-5

Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, medium stiff, moist					
5		GWT not encountered					
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

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NorCal Engineering

Brew Enterprises II
23529-22

Log of Boring B-6

Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist	■	15/20	3.0	110.2	
5			■	17/23	7.5	112.7	
10			■	18/22	9.7	115.3	
15		Boring completed at depth of 15'					
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog\123529-22.log Date: 10/3/2022

NorCal Engineering

Brew Enterprises II
23529-22

Log of Boring B-7

Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist	■	14/22	4.6	114.3	
5		Sandy SILT Grey brown, medium stiff, moist; slightly Clayey to Clayey	■	17/21	5.2	116.0	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\23529-22.log Date: 10/3/2022

NorCal Engineering

Brew Enterprises II
23529-22

Log of Boring B-8

Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist	■	18/25	5.0	114.4	
5			■	19/28	8.1	118.3	
		Sandy SILT Grey brown, stiff, moist; slightly Clayey	■	15/23	5.5	114.4	
10		Boring completed at depth of 10'					
15							
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\23529-22.log Date: 10/3/2022

NorCal Engineering

Brew Enterprises II
23529-22

Log of Boring B-9

Boring Location: 400 block & S. side of Harley Knox Blvd.

Date of Drilling: 9/23/2022 | Groundwater Depth: None Encountered

Drilling Method: Simco 2800 HS

Hammer Weight: 140 lbs. | Drop: 30"

Surface Elevation:

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL Clayey SILT Brown, soft, damp					
		NATURAL Clayey SILT Brown, stiff, moist	■	19/28	6.8	109.9	
5							
		Sandy SILT Grey brown, stiff, moist; slightly Clayey	■	16/24	5.5	115.2	
10		Clayey SILT Grey brown, stiff, moist					
			■	15/25	12.3	111.4	
15		Boring completed at depth of 15'					
20							
25							
30							
35							

GWT not encountered

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\23529-22.log Date: 10/3/2022

Appendix B
Laboratory Tests

TABLE I
MAXIMUM DENSITY TESTS

Sample	Classification	Optimum Moisture (%)	Maximum Dry Density (lbs/cu.ft)
B-3 @ 2'	Clayey SILT	13.0	118.0

TABLE II
EXPANSION TESTS

Sample	Classification	Expansion Index
B-3 @ 2'	Clayey SILT	70

TABLE III
ATTERBERG LIMITS

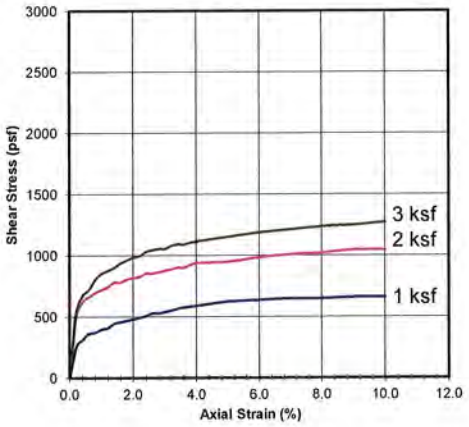
Sample	Liquid Limit	Plastic Limit	Plasticity Index
B-3 @ 5'	25	21	4
B-3 @ 15'	33	23	10

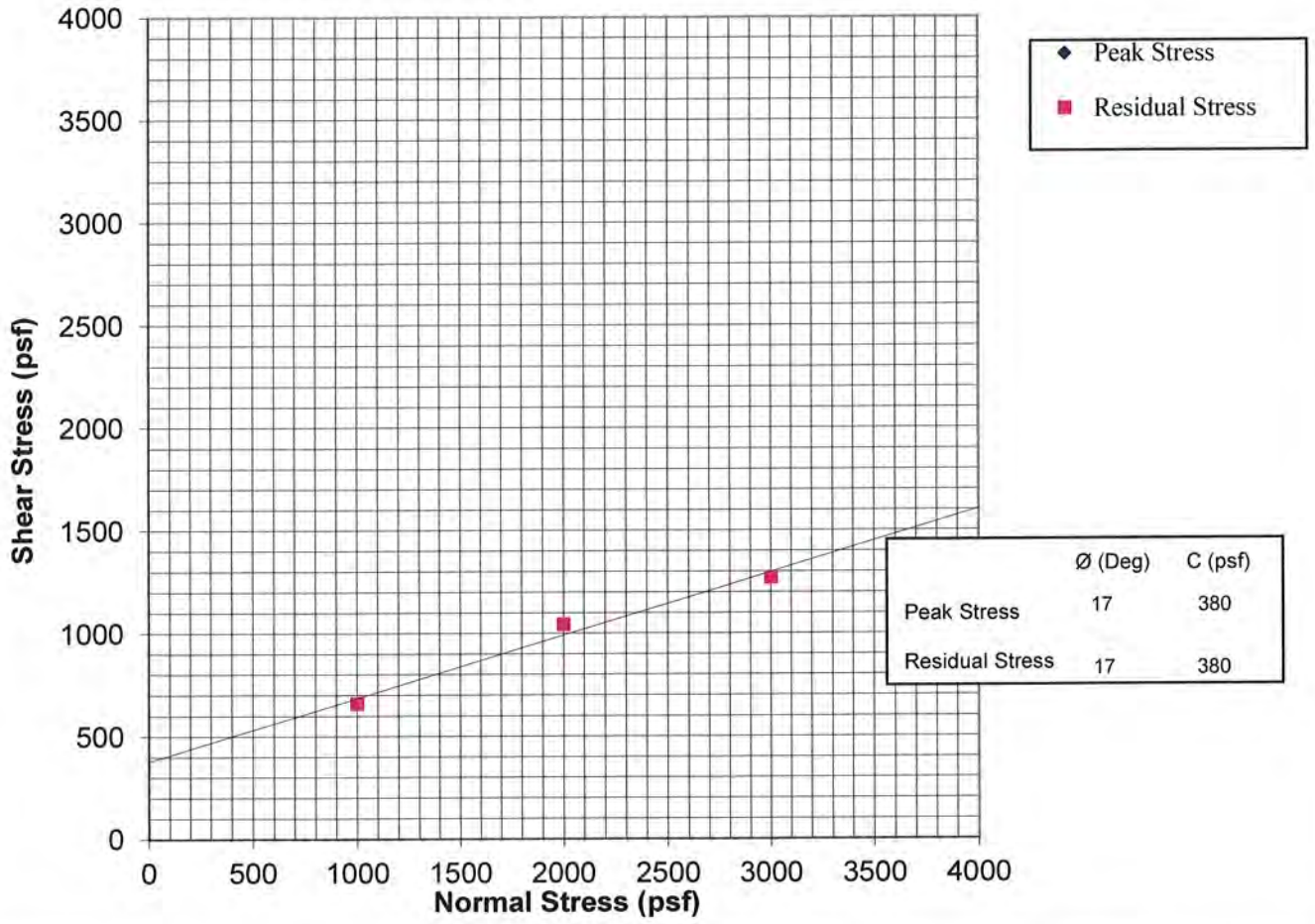
TABLE IV
CORROSION TESTS

Sample	pH	Electrical Resistivity	Sulfate (%)	Chloride (ppm)
B-3 @ 2'	6.9	1,760	0.003	255

% by weight
ppm – mg/kg

Sample No.		B3@2'		
Sample Type:		Undisturbed-Saturated		
Soil Description:		Clayey Silt		
		1	2	3
Normal Stress	(psf)	1000	2000	3000
Peak Stress	(psf)	660	1044	1272
Displacement	(in.)	0.225	0.225	0.250
Residual Stress	(psf)	660	1044	1272
Displacement	(in.)	0.250	0.250	0.250
Initial Dry Density	(pcf)	112.9	112.9	112.9
Initial Water Content	(%)	8.5	8.5	8.5
Strain Rate	(in./min.)	0.020	0.020	0.020





NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Brew Enterprises II

PROJECT NUMBER: 23529-22 DATE: 9/30/2022

DIRECT SHEAR TEST

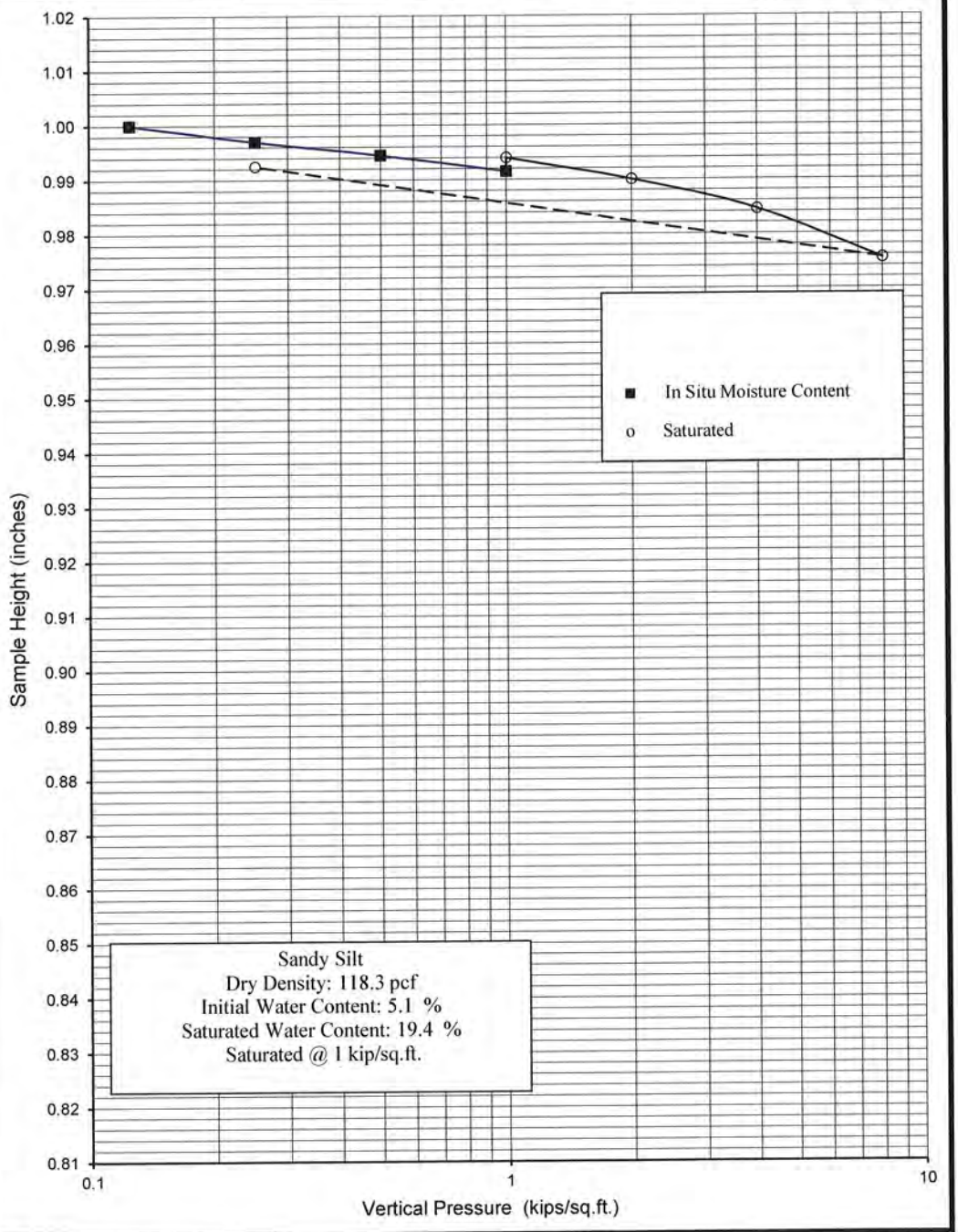
ASTM D3080

Plate A

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9970	0.3	
0.5	0.9945	0.6	
1	0.9915	0.8	
1	0.9940	0.6	Saturated
2	0.9900	1.0	
4	0.9845	1.6	
8	0.9755	2.5	
0.25	0.9925	0.8	

Sample No. B3 | Depth 5' | Date 9/30/2022

Date Tested: 9/30/2022
Sample: B3
Depth: 5'



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SOILS AND GEOTECHNICAL CONSULTANTS

Bre Enterprises II

PROJECT NUMBER: 23529-22 DATE: 9/30/2022

CONSOLIDATION TEST

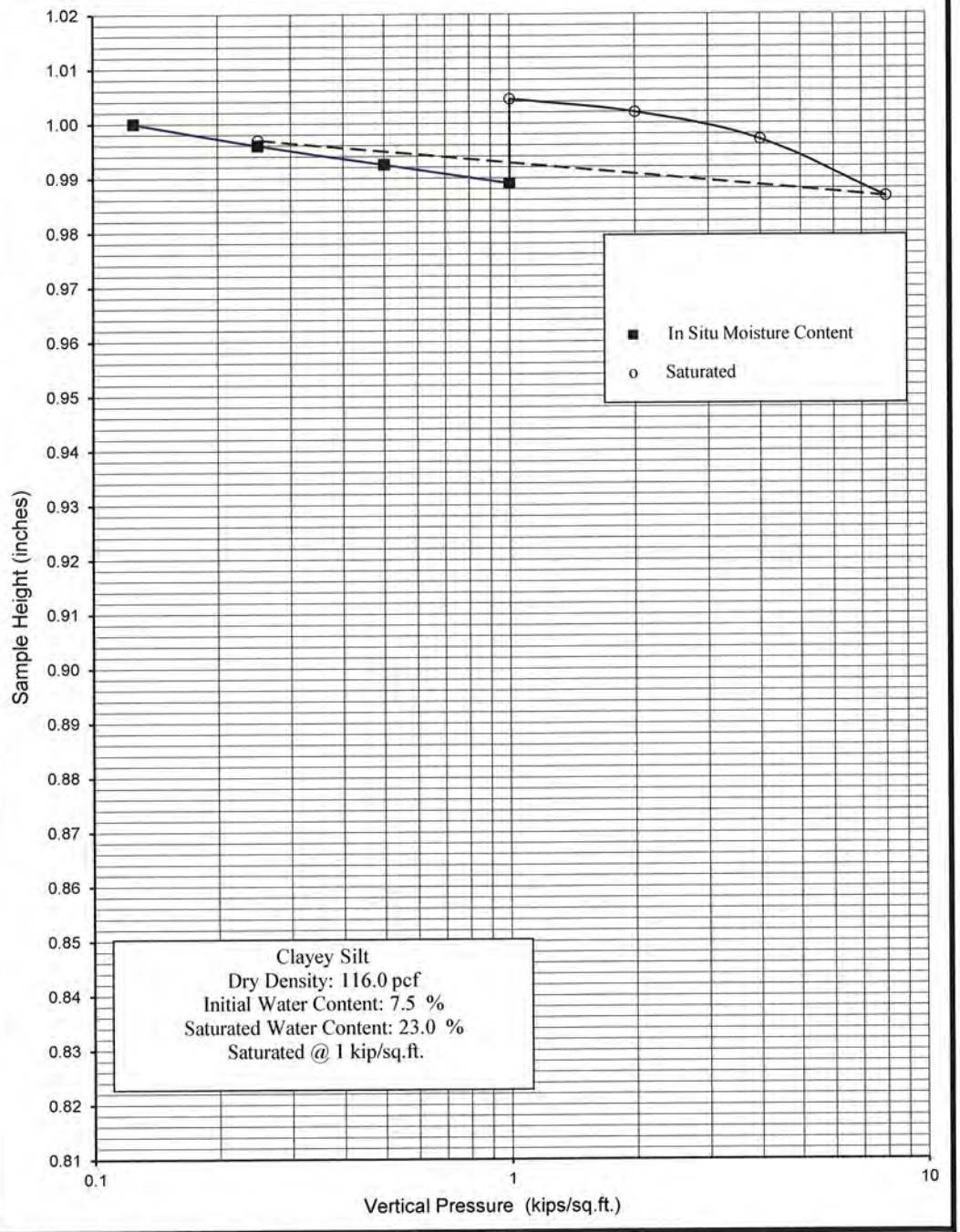
ASTM D2435

Plate B

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consolidation (percent)	
0.125	1.0000	0.0	
0.25	0.9960	0.4	
0.5	0.9925	0.8	
1	0.9890	1.1	
1	1.0045	-0.4	Saturated
2	1.0020	-0.2	
4	0.9970	0.3	
8	0.9865	1.4	
0.25	0.9970	0.3	

Sample No. B3 | Depth 10' | Date 9/30/2022

Date Tested: 9/30/2022
Sample: B3
Depth: 10'



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Brew Enterprises II

PROJECT NUMBER: 23529-22 DATE: 9/30/2022

CONSOLIDATION TEST

ASTM D2435

Plate C

Appendix C
Seismic Design Report

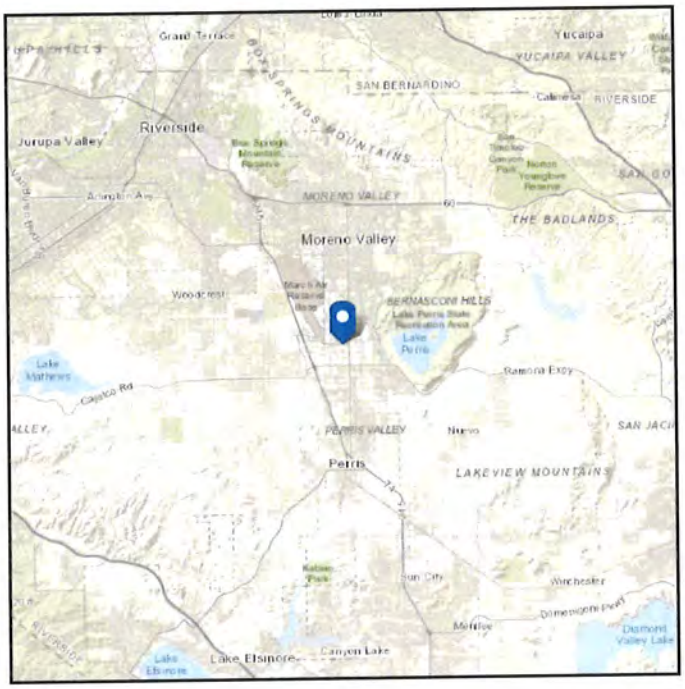
NorCal Engineering

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-22
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 1463.54 ft (NAVD 88)
Latitude: 33.856583
Longitude: -117.230927



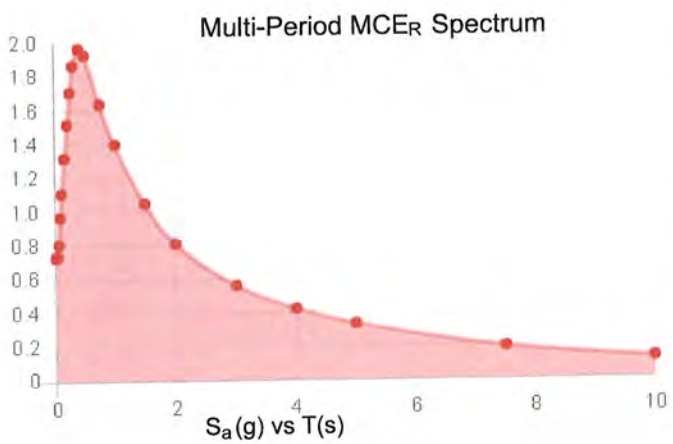
ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

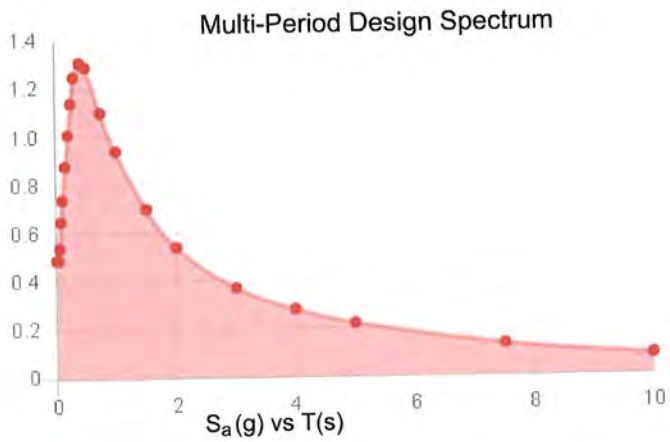
Seismic

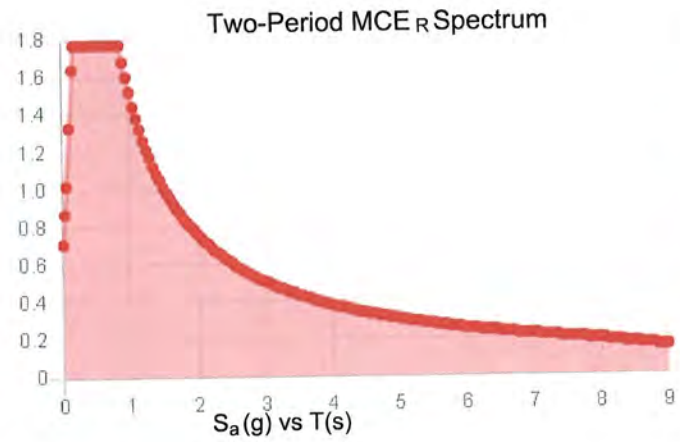
Site Soil Class:

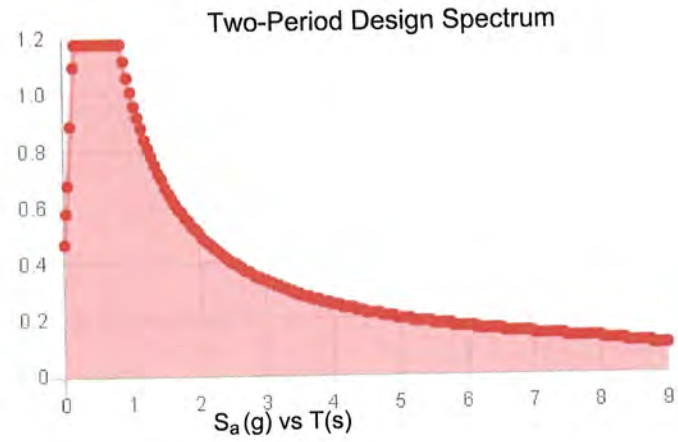
Results:

PGA_M :	0.61	T_L :	8
S_{MS} :	1.77	S_S :	1.58
S_{M1} :	1.52	S_1 :	0.59
S_{DS} :	1.18	S_{DC} :	
S_{D1} :	1.01	V_{S30} :	260









MCER Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Data Accessed: Tue Sep 27 2022

Date Source:
USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Appendix D
Soil Infiltration Data

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

PERCOLATION TEST DATA

Client: Brew Enterprises II	**Date:** 9/23/2022
Project No.: 23529-22	**Tested By:** J.S.
Test Hole: 1	**USCS Soil Classification:**
Depth of Test Hole: 5' (60")	**Sides (if rectangular):**
Diameter of Test Hole: 6"	**Length:**
Sandy Soil Criteria Test*:	**Width:**

TRIAL NO.	START TIME	STOP TIME	TIME INTERVAL (MIN)	INITIAL DEPTH TO WATER (IN)	FINAL DEPTH TO WATER (IN)	CHANGE IN WATER LEVEL (IN)	GREATER THAN OR EQUAL TO 6"
1	7:02	7:27	25	38.0	57.0	19.0	Y
2	7:27	7:52	25	44.0	55.5	11.5	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30-minute intervals) with a precision of at least 0.25".

TRIAL NO	START TIME	STOP TIME	ΔT TIME INTERVAL (MIN)	Do INITIAL DEPTH TO WATER (IN)	Df FINAL DEPTH TO WATER (IN)	ΔD CHANGE IN WATER LEVEL (IN)	PERCOLATION RATE (MIN/IN)
1	7:52	8:02	10	43.0	48.0	5.0	
2	8:02	8:12	10	43.5	47.0	3.5	
3	8:12	8:22	10	44.0	47.5	3.5	
4	8:22	8:32	10	43.5	47.0	3.5	
5	8:32	8:42	10	43.5	46.5	3.0	
6	8:42	8:52	10	45.0	48.0	3.0	
7	8:52	9:02	10	45.0	48.0	3.0	

COMMENTS:

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

PERCOLATION TEST DATA

Client: Brew Enterprises II	**Date:** 9/23/2022
Project No.: 23529-22	**Tested By:** J.S.
Test Hole: 2	**USCS Soil Classification:**
Depth of Test Hole: 10' (120")	**Sides (if rectangular):**
Diameter of Test Hole: 6"	**Length:**
Sandy Soil Criteria Test*:	**Width:**

TRIAL NO.	START TIME	STOP TIME	TIME INTERVAL (MIN)	INITIAL DEPTH TO WATER (IN)	FINAL DEPTH TO WATER (IN)	CHANGE IN WATER LEVEL (IN)	GREATER THAN OR EQUAL TO 6"
1	7:35	8:00	25	101.5	102.5	1.0	N
2	8:00	8:25	25	102.5	103.5	1.0	N

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30-minute intervals) with a precision of at least 0.25".

TRIAL NO	START TIME	STOP TIME	ΔT TIME INTERVAL (MIN)	Do INITIAL DEPTH TO WATER (IN)	Df FINAL DEPTH TO WATER (IN)	ΔD CHANGE IN WATER LEVEL (IN)	PERCOLATION RATE (MIN/IN)
1	7:04	7:34	30	104.0	105.0	1.0	
2	7:34	8:04	30	105.0	106.0	1.0	
3	8:04	8:34	30	105.0	106.0	1.0	
4	8:34	9:04	30	105.0	105.5	0.5	
5	9:04	9:34	30	105.0	106.0	1.0	
6	9:34	10:04	30	105.0	106.0	1.0	
7	10:04	10:34	30	104.0	105.0	1.0	
8	10:34	11:04	30	105.0	105.5	0.5	
9	11:04	11:34	30	104.5	105.5	1.0	
10	11:34	12:04	30	105.0	106.0	1.0	
11	12:04	12:34	30	104.0	104.5	0.5	
12	12:34	1:04	30	105.0	105.5	0.5	

COMMENTS:

SOIL INFILTRATION RATE CALCS ⇒ PORCHET METHOD

Location:	TH-1	TH-2
• Depth of Hole =	5.0'	10.0'
• Hole Radius =	3"	3"
• Drop = Δh	3"	0.5"
• Time = Δt Interval	10 min	30 min
• Initial Water Depth = H_o	16.5"	16"
• Final Water Depth = H_t	13.5"	15.5"
• Average Water Head = H_{avg}	15"	15.75"
• INFILTRATION RATE	1.6 in/hr	0.1 in/hr

$$\text{Infiltration Rate} = \frac{\Delta h\,(60)(r)}{\Delta t\,(r + 2 \cdot H_{avg})}$$

$$\text{Average Water Head} = \tfrac{1}{2}(H_t - H_o)$$

NorCal Engineering
SOILS AND GEOTECHNICAL CONSULTANTS

DATE

Appendix 4: Historical Site Conditions

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

Not included.

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A – Runoff from the project is directed to Canon Lake, which ultimately drains to Lake Elsinore. Based on the infiltration investigation from the geotechnical engineer, infiltration is not technically feasible for this project. The project proposes a combination of an underground storage facility (CMP Detention Facility) and a proprietary Modular Wetland System (MWS) is proposed to treat the runoff from the site.

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

(Rev. 10-2011)

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 SDH & Associates, Inc. Date 10/14/2022

Designed by NM Case No TBD

Company Project Number/Name 2220 / Brew Ent. II-Harley Knox

BMP Identification

BMP NAME / ID Underground Storage & MWS / BMP 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}= 0.63 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)*
DMA 1-1	*18,602*	*Ornamental Landscaping*	*0.1*	*0.11*	*2054.7*			
DMA 1-2	*68,724*	*Concrete or Asphalt*	*1*	*0.89*	*61301.8*			
DMA 1-3	*54,819*	*Roofs*	*1*	*0.89*	*48898.5*			
	142145	***Total***			**112255**	**0.63**	***5893.4***	***5962***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

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: SDH & Associates, Inc. — Date: 10/14/2022

Designed by: NM — Case No: TBD

Company Project Number/Name: 2220 / Brew Ent. II-Harley Knox

BMP Identification

BMP NAME / ID: Underground Storage & MWS / BMP 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity — I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA 1-1	*18,602*	*Ornamental Landscaping*	*0.1*	*0.11*	*2054.7*			
DMA 1-2	*68,724*	*Concrete or Asphalt*	*1*	*0.892*	*61301.8*			
DMA 1-3	*54,819*	*Roofs*	*1*	*0.892*	*48898.5*			
	142145	***Total***			**112255**	**0.20**	***0.5***	***N/A***

Notes:

MWS - LINEAR VOLUME BASED SIZING SHEET

Horizontal Flow Biofiltration System

Project Location

Project Name	Brew Ent. II-Harley Knox
City/Town	Perris
State	CA
Zip Code	

SIZING CALCULATIONS	**Inputs**	**Units**	**Notes/References**
Impervious Area			
BMP Drainage Area (not required - manual entry - not part of formula)		**Acres**	This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP.
Watershed Impervious Ratio (not required - manual entry - not part of formula)			Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100
Runoff Coefficient "C" (not required - manual entry - not part of formula)			
Water Quality Volume (required)	5893.4	cubic feet	Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method.
Design Storm Duration	0	hours	Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details.
MWS - Linear Sizing			
MWS - Linear Model Number (from matrix)	MWS-L-6-8	quantity	Please choose size from "Model Size Matrix" Tab
# Of Units	1	quantity	Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons.
Discharge Rate (from matrix)	16.62	gallons/minute	Loading Rate of 0.26 gpm/sq ft or 25 in/hr. Field Verified.
Volume Treated During Event			
Processed through MWS - Linear	0	cubic feet	**16.62 gals/minute**
Volume Treated Following Event			
MWS - Linear Static Capacity (from matrix)	91	cubic feet	
Volume Needed in *Pre-Storage*	5802	cubic feet	Set at zero to start. Size pre-storage system to hold this volume
			Sizing complete when eqaul to value of zero.
TOTAL STORMWATER TREATED	5893	cubic feet	Note: This amount should be equal to the "Water Quality Volume"
Drain Down Time	44.32	hours	Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours.

Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.

Phone: 760.433.7640

Fax: 760.433.3176

Email: Info@modularwetlands.com

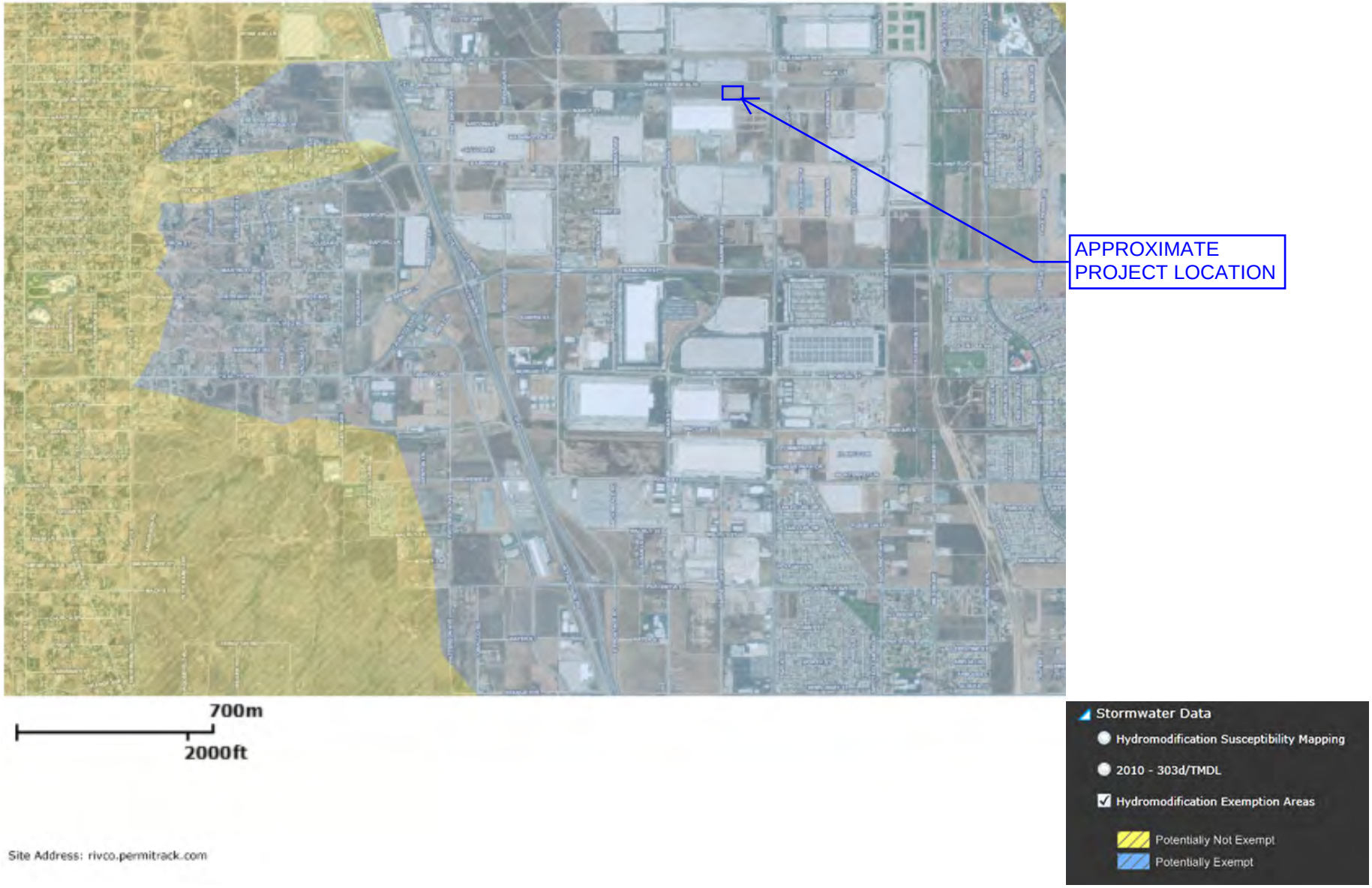
Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Note: The project is within the Riverside County WAP HCOC Exemption area approved on April 20, 2017. Therefore, the project is exempt from the HCOC requirements.

SCREEN CAPTURE - RIVERSIDE COUTY STORM WATER & WATER CONSERVATION TRACKING TOOL

HCOC EXEMPTION AREAS



NOTE: THE PROJECT IS WITHIN THE RIVERSIDE COUNTY WAP HCOC EXEMPTION AREA APPROVED ON APRIL 20, 2017. THEREFORE, THE PROJECT SHOULD BE EXEMPT FROM THE HCOC REQUIREMENTS.

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Note: The Source Control checklist will be prepared during final engineering (construction document) stage at the time of the final WQMP.

Appendix 9: O&M

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

Note: The O&M Plan will be prepared during final engineering (construction document) stage at the time of the final WQMP.

Appendix 10: Educational Materials

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

Note: The following reference materials are anticipated to be included in this Appendix during final engineering stage at the time of the final WQMP. At this time, copies of proposed BMP information/details are included for reference purpose.

- **SC-10 – Non-Stormwater Discharges**
- **SC-11 – Spill Prevention, Control & Cleanup**
- **SC-30 – Outdoor Loading/Unloading**
- **SC-34 – Waste Handling and Disposal**
- **SC-41 – Building & Grounds Maintenance**
- **SC-43 – Parking/Storage Area Maintenance**
- **SC-60 – Housekeeping Practices**
- **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**

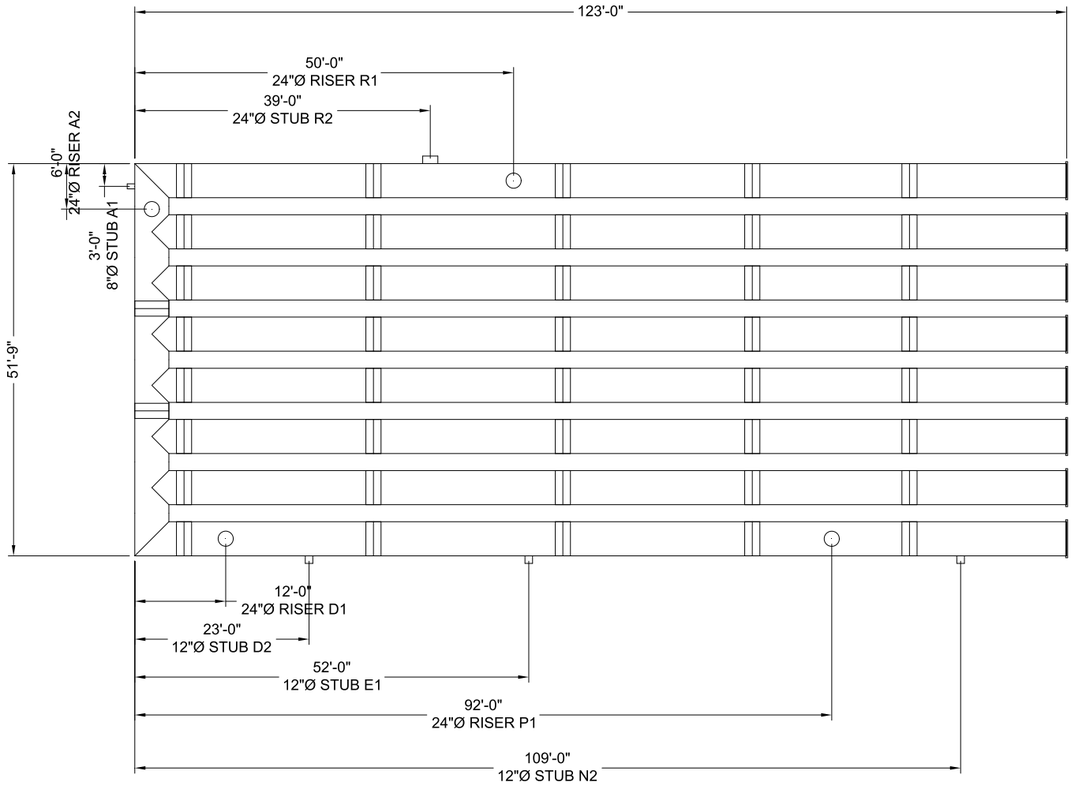
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 1,000 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 22,807 CF
- PIPE STORAGE VOLUME = 15,900 CF
- BACKFILL STORAGE VOLUME = 7,077 CF
- TOTAL STORAGE PROVIDED = 22,978 CF

PIPE DETAILS
- DIAMETER = 54"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 27"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 6"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY

SCALE: 1" = 20'

DATE	REVISION DESCRIPTION	BY

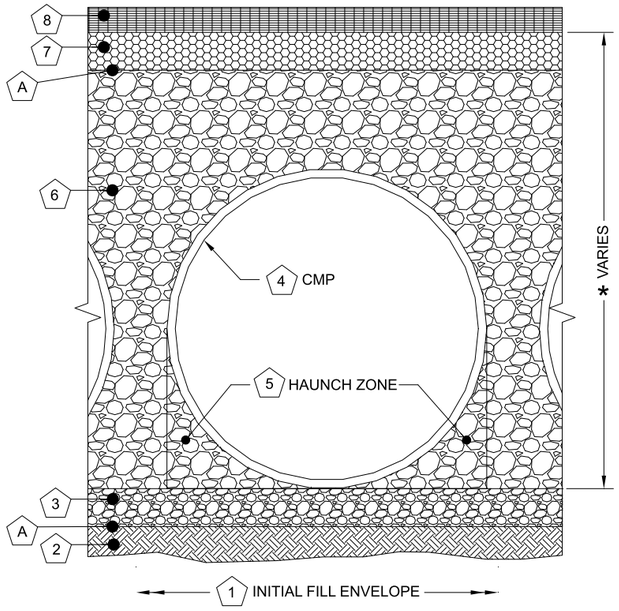
CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO22534 Brew Ent. II-Harley Knox
Contech 54-inch Diameter CMP Detention Pipes
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
14820	22534	10/14/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

C:\EXPORTS\TEMPLATES\CMP_V8.DWG 10/18/2019 10:02 AM



	Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
6	Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction"
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
A	Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.
*	Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

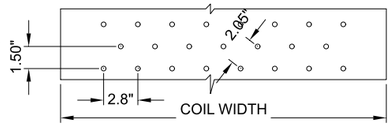
BACKFILL

MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

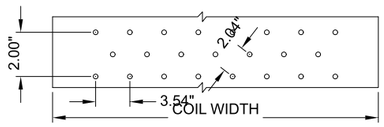
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



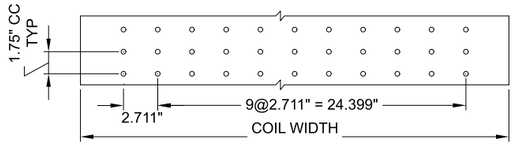
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY
EDGE SPACING EQUAL ON BOTH SIDES



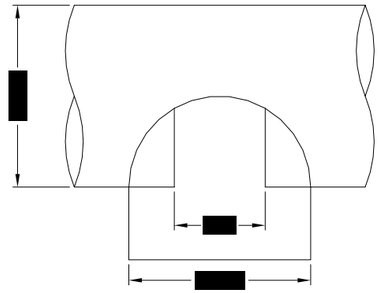
OPEN AREA = 3.33 SQ IN/SQ FT

NOTES:

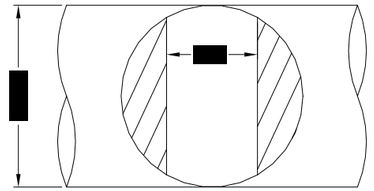
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES ⌀3/8".

TYPICAL PERFORATION DETAIL

SCALE: N.T.S.



PLAN

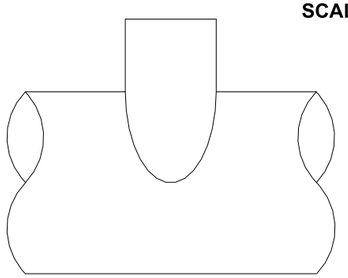


FRONT

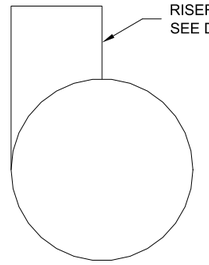
TYPICAL MANWAY DETAIL

SCALE: N.T.S.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



ELEVATION

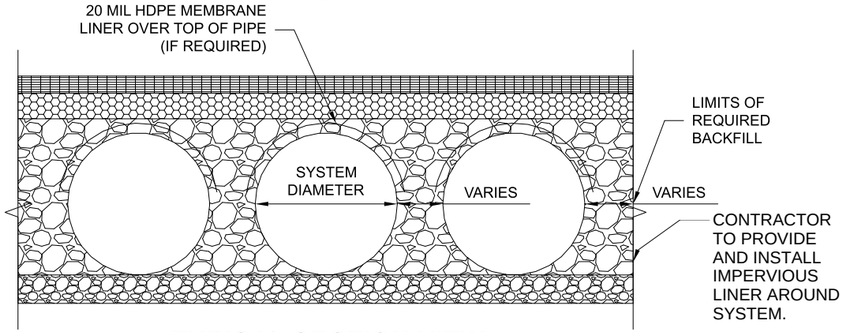


END

TYPICAL RISER DETAIL

SCALE: N.T.S.

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO22534 Brew Ent. II-Harley Knox
Contech 54-inch Diameter CMP Detention Pipes
Perris, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
14820	22534	10/14/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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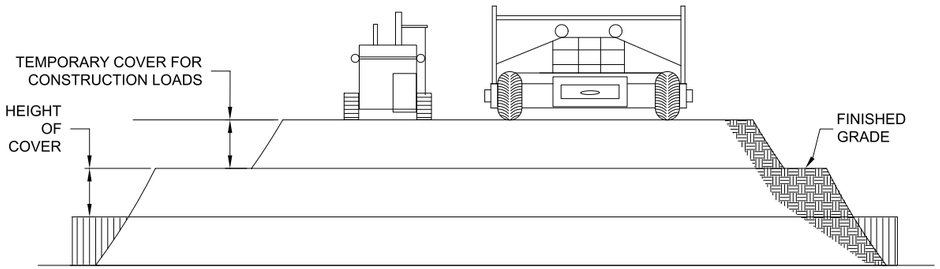


CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

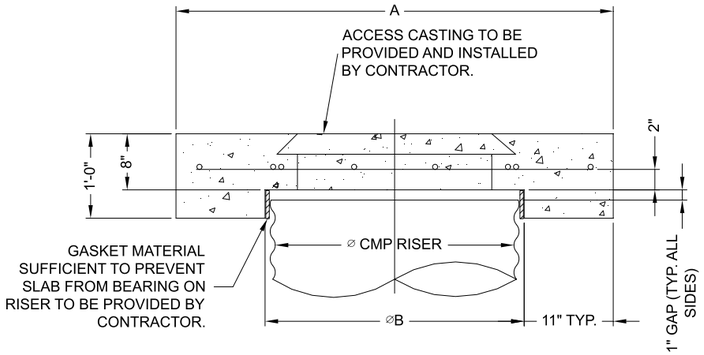
APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

APPLICABLE
HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS
INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

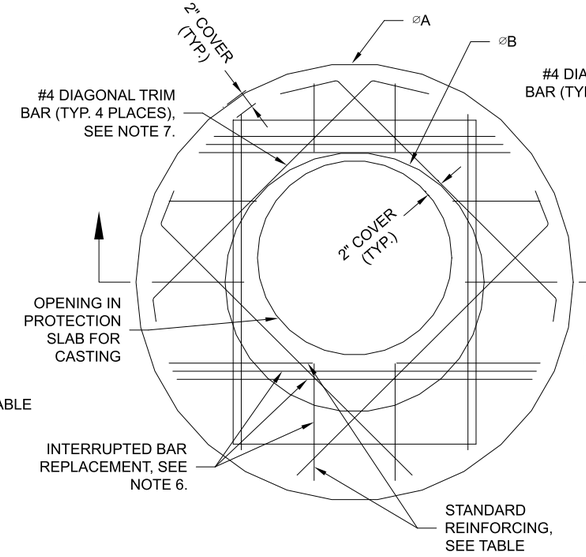
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



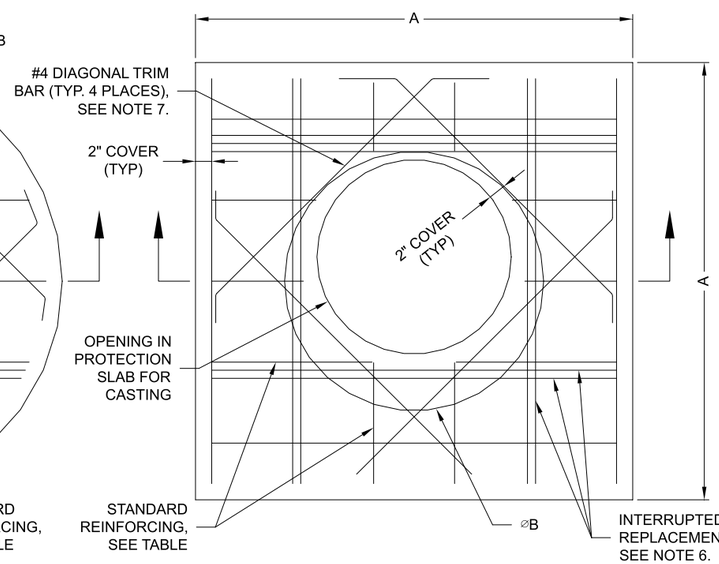
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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CONTECH CMP DETENTION SYSTEMS
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DYO22534 Brew Ent. II-Harley Knox
Contech 54-inch Diameter CMP Detention Pipes
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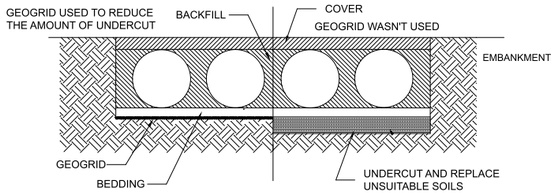
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

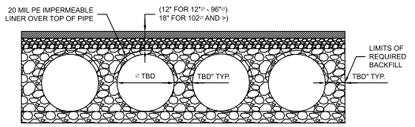


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

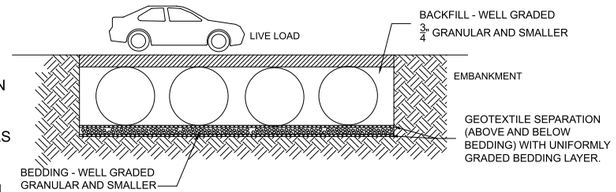
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

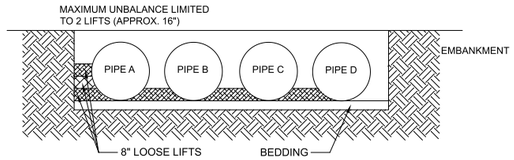
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



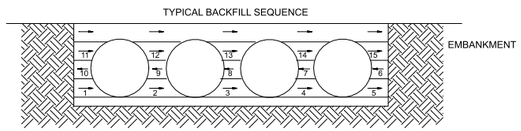
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

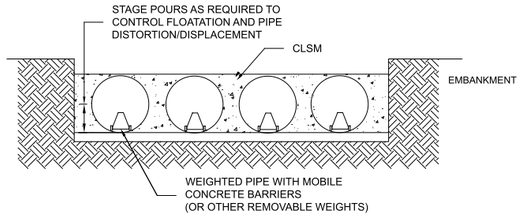


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

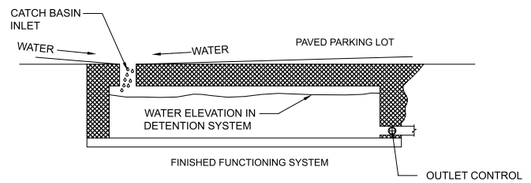


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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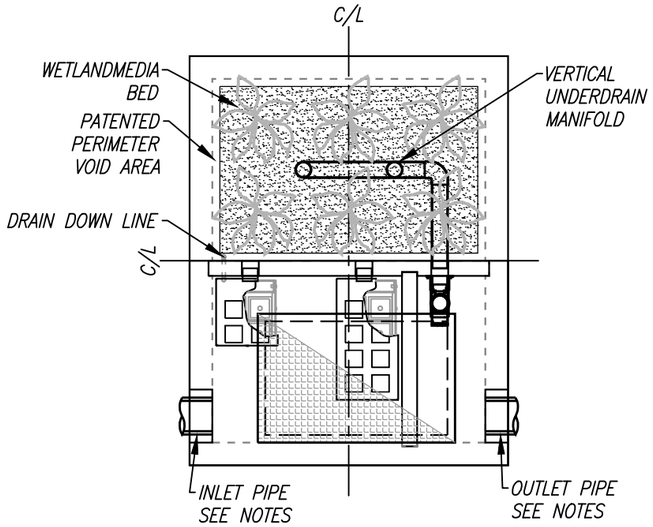
CONTECH CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO22534 Brew Ent. II-Harley Knox
Contech 54-inch Diameter CMP Detention Pipes
Perris, CA
DETENTION SYSTEM

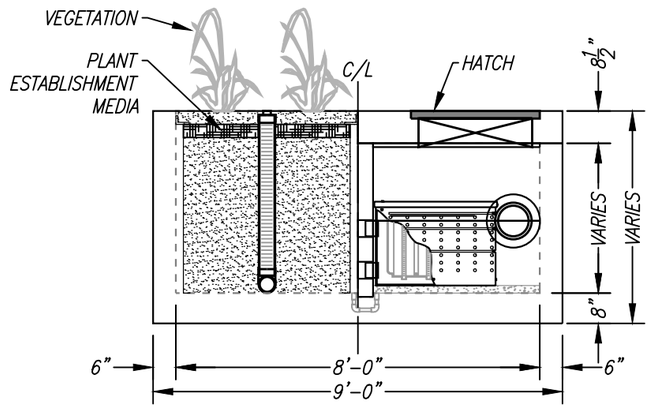
PROJECT No.:	SEQ. No.:	DATE:
14820	22534	10/14/2022
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

SITE SPECIFIC DATA			
PROJECT NUMBER		728547	
PROJECT NAME		Brew Ent. II-Harley Knox	
PROJECT LOCATION		PERRIS, CA	
STRUCTURE ID		BMP-1	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
5962		N/A	
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	52.82	HDPE	8
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	52.32	HDPE	8
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	58.7		
SURFACE LOAD	DIRECT TRAFFIC		
FRAME & COVER	30" X 48"	UNDERGROUND	N/A
NOTES:			

* PRELIMINARY NOT FOR CONSTRUCTION



PLAN VIEW



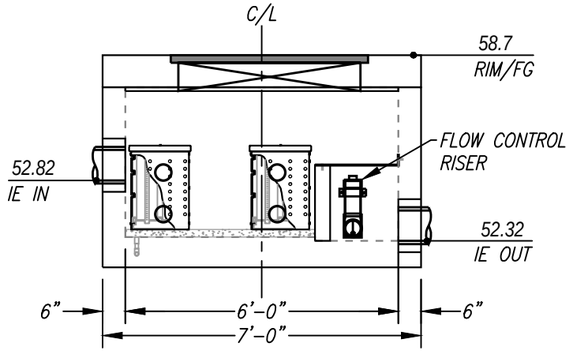
LEFT END VIEW

INSTALLATION NOTES

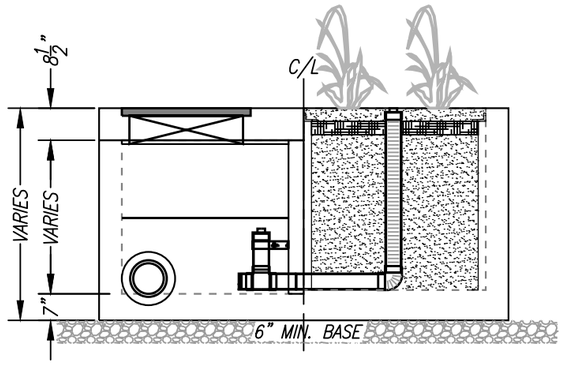
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



ELEVATION VIEW



RIGHT END VIEW

REQUIRED TREATMENT VOLUME (CF)		5962
DRAINDOWN DURATION (HOURS)		45
AVERAGE DISCHARGE RATE PER MWS UNIT(GPM)		26.17
OPERATING HEAD (FT)		3.4
WETLANDMEDIA INFILTRATION RATE (IN/HR)	OR	26
WETLANDMEDIA LOADING RATE (GPM/SF)		0.26

Bio Clean
A Forterra Company

MWS-L-6-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

5/23/19 10:LEF