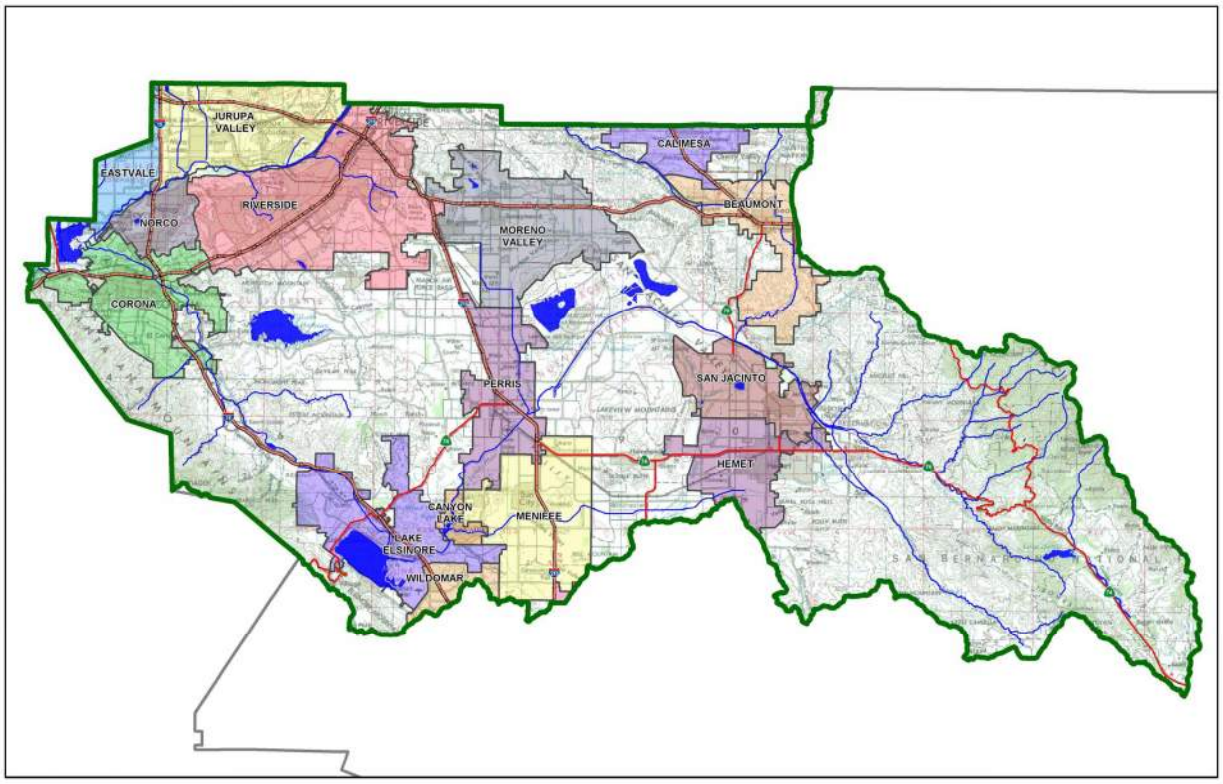
Project Specific Water Quality Management Plan

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

Project Title: Chevron Hydrogen, CNG, & Diesel Fueling Station

Development No: 4063 N. Webster Perris CA

Design Review/Case No: P23-05073



☒ **Preliminary**
☐ **Final**

Original Date Prepared: 10/18/2023

Revision Date(s):

8/16/2024

11/20/2024

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

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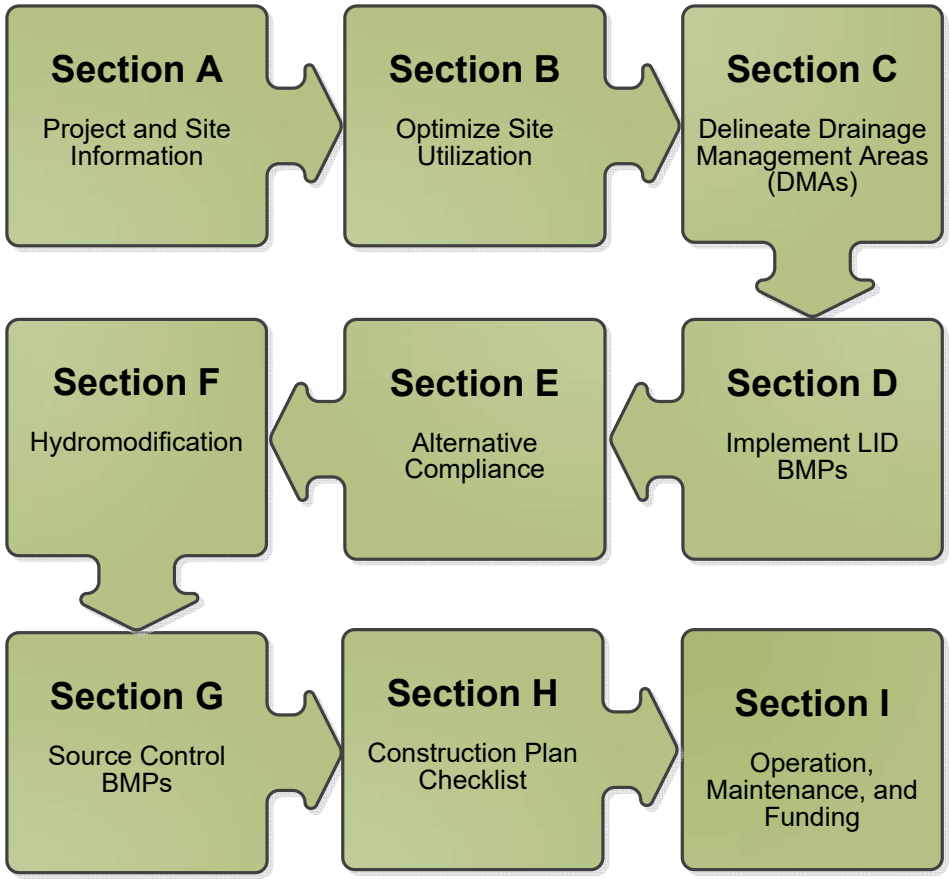
A Brief Introduction

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 Chevron by Stantec for the Chevron Hydrogen Fueling Station project (P23-05073).

This WQMP is intended to comply with the requirements of City of Perris for City Ordinance No. 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 City of Perris Water Quality Ordinance No. 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

9/26/2024
Date

MARWAN ALABBASI
Owner's Printed Name

GENERAL PARTNER
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

8/16/2024
Date

Hector Guzman, PE
Preparer's Printed Name

Senior Engineer
Preparer's Title/Position

Preparer's Licensure:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Riverside }

On September 26, 2024 before me, S.A. Willem, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Marwan Alabbasi
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

S. A. Willem
COMM# 2432893
NOTARY PUBLIC—CALIFORNIA
Riverside County
MY COMM. EXPIRES 12/30/2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____
Signature of Notary Public

Place Notary Seal and/or Stamp Above

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☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian of Conservator
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Signer is Representing: _____

Signer's Name: _____
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☐ Partner – ☐ Limited ☐ General
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☐ Trustee ☐ Guardian of Conservator
☐ Other: _____
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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Commercial
Planning Area:	Perris Valley Commerce Center
Community Name:	Riverside County
Development Name:	Chevron - Perris
PROJECT LOCATION	
Latitude & Longitude (DMS): LAT 33°50'44.57"N; LONG 117°14'34.70"W	
Project Watershed and Sub-Watershed: SANTA ANA WATERSHED	
Gross Acres: 1.06 AC	
APN(s): 302-260-053	
Map Book and Page No.: Book 302 – Page 26	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	General Commercial
Proposed or Potential SIC Code(s)	55419904
Area of Impervious Project Footprint (SF)	0 SF
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	31,425 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)	7,950 SF
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) The published HSG classification is as HSG A, which typically have favorable infiltration rates. However, based on conversations with the City of Perris, we have been advised that soils in this area are not conducive for infiltration practices. For that reason, we have determined that the current soil conditions at the property have low infiltration capacity.	
What is the Water Quality Design Storm Depth for the project?	0.61

A.1 Maps and Site Plans

The project site is located at 4063 North Webster Avenue in Perris California. The site is bounded by North Webster Avenue to the west and Ramona Expressway to the south. The existing site is currently an existing single-family residence with a 1-story house, concrete and asphalt driveway, and dirt lot. The project proposes to construct an expansion fueling station for CNG, H_2 and Diesel dispensers, also including enclosures for fuel equipment and an underground storage tank.

Under existing conditions, the site generally drains from the west side of the property to the southeast corner of the property. The existing site is bounded by CMU block wall to south and no drainage co-mingles with the property to the south.

Under the post-development conditions, all drainage is directed east through surface flow, valley gutters or curb cuts to a proposed Modular Wetland unit (MWS-L-8-8-V). The project will include the construction of several diesel dispensers and the construction of a canopy above. Runoff within the proposed diesel pumps and canopy are initially directed into a Contech CDS unit (an oil/water separator) and then conveyed via storm drain pipe to a Modular Wetland. The modular wetland is a BMP facility designed for both stormwater treatment and bio-infiltration.

The site also contains a second canopy - under which hydrogen and compressed natural gas dispensers are proposed. As these dispensers do not pose any risks of leaks or spills, hydraulic isolation is not required. Thusly, aside from the diesel canopy area, the site is design such that all storm run-off is conveyed on the surface in a west-to-east pattern and enters the biofiltration modular wetland via a catch basin opening. The modular wetland is designed to meets the water quality goals for a Qbmp flow rate.

Any discharge exceeding Qbmp, bypasses the bio-infiltration chamber of the Modular Wetland Unit, is conveyed via pipe flow into an on-site wet well, then pumped released onto North Webster Avenue through a parkway drain.

It is worthwhile to note that there exists an adverse design constraint that prevents direct connection to the existing MDP line F in North Webster Avenue. Although physically deep enough to de-water the site, the HGL of Line F is adversely too high. If the on-site drainage system where to directly connect to Line F, head pressure forces would push storm flows up and out from of the on-site storm drain facilities.

The proposed landscape area on the far east of the property will serve as an at-grade high flow by-pass collection area supporting storage capacity for the wet-well pump system.

No trash enclosure is proposed as the site will serve as an extension to the gas station that exists to the south.

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 2024 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
San Jacinto Reach 2	Not Listed	NONE LISTED	Not a water body classified as RARE.
San Jacinto Reach 1	Not Listed	MUN, WARM, WILD, GWR	Not a water body classified as RARE.
Canyon Lake	Nutrients, Ammonia, Oxygen, Dissolved	MUN, AGR, GWR, REC1, REC2, WARM, WILD	Not a water body classified as RARE.
Lake Elsinore	Ammonia, Nutrients, Organic Enrichment (Low DO), Oxygen dissolve	REC1, REC2, WARM, WILD	Not a water body classified as RARE.

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	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*	☐ Y	☒ N

If yes is answered to any of the questions above, the 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 drainage pattern has been changed to ultimately separate drainage from the proposed site and out onto North Webster Avenue. The site is specifically graded to not allow for stormwater runoff to co-mingle with drainage to the developed improvements to the south.

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

The existing lot is comprised of single-family home and yard which is mostly comprised of dirt and little to no vegetation.

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

Infiltration testing results show that the average design infiltration rate with a factor of safety of 3 is computed as 0.2 inches per hour. Given the low design rate, it is recommended that stormwater system be designed without infiltration. Please see provided geotechnical report with infiltration test results.

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

Impervious areas (31,425 sf) which include concrete pavement and asphalt pavement are proposed in areas designated necessary for vehicular traffic and for areas where fueling equipment and storage is needed.

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

Drainage from site will be routed to areas where water can either flow to self-treating areas (landscape areas) or to onsite BMP devices such as the Modular Wetlands units.

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 A1	CONC/ASPHALT PAVEMENT	31,425	D – drain to BMP
DMA A2	LANDSCAPE	5,270	D – drain to BMP
DMA A3	LANDSCAPE	2,760	B – Self-Retaining

[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)

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

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
DMA A3	Pervious	2,760	0.61	n/a	n/a	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		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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

DMA Name or ID	BMP Name or ID
DMA A1	MODULAR WETLAND LINEAR (MWS-L-8-8-V)
DMA A2	MODULAR WETLAND LINEAR (MWS-L-8-8-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

See attached geotechnical study included in Appendix 3.

Infiltration Feasibility (EXISTING SOIL CONDITIONS NOT SUITABLE FOR INFILTRATION)

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?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
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?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: DMA 1 & DMA 2		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?	X	
Describe here: The average infiltration rate within this property is 0.2 inches per hour and it is recommended that stormwater design be met without use of infiltration.		

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: 0.16 acres

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

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: 0.74 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: 0.79

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: 0.58 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)
0.58 acres	0.18 acres

Toilet Use Feasibility (NO RESTROOM FACILITY WILL SERVICE THIS WORK)

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: N/A

Project Type: N/A

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: N/A

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: N/A

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: N/A

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)
N/A	N/A

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.

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: N/A

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: N/A

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: N/A

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: N/A

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)**
N/A	N/A

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.

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	
A1	☐	☐	☐	☐	☒
A2	☐	☐	☐	☐	☒
A3	☐	☐	☒	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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.

Poor Infiltration Rates deem Infiltration BMPs infeasible.

Storm flows from the diesel canopy area is collected by a pre-treatment oil/water separator. Storm flow will exit the separator unit via a subgrade drainage pipe. And, at less than one acre, the site does not have adequate elevation change for the pipe to discharge into at-grade BIO-RETENTION Facility. Therefore, the subgrade drainpipe outlet into the proposed Modular Wetland. The modular wetland is a Bio-Infiltration/Bio Treatment facility.

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 ID. A2***		
	[A]		[B]	[C]	[A] x [C]			
						Design Storm Depth (in)	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A3	2760	Ornamental Landscape	0.1	0.11	304.9			
	A_T = Σ[A]	***2760***			Σ= [D] 304.9	[E] = 0.61	[F] = 15.5	160

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

[E] is obtained from Exhibit A in the WQMP Guidance Document

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

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: The Site is designed with a flow-based Bio-treatment/Bio-Infiltration BMP. It also includes a self-retaining landscaped area (DMA A3) .

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 Imperviousness Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*BMP ID. A1 – Modular Wetland #1 (MWS-L-6-V)*		
	[A]		[B]	[C]	[A] x [C]				
DMA A1	31425	Concrete/ Asphalt	1	0.89	28031.1				
DMA A2	5270	Ornamental Landscape	0.1	0.1104	582.1	*Design Storm Depth (in)*	*Design Flow Rate (cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = 36695				Σ= 28613.2	0.20	0.1 cfs	n/a	0.1

[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

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 Linear	Total Suspended Solids (TSS)	89%
	Total Phosphorus – Tape (TP)	61%
	Nitrogen (TN)	23%
	Total Copper (TCu)	50%
	Total Dissolved Copper	37%
	Total Zinc (TZn)	66%
	Dissolved Zinc	60%
	Motor Oil	79%

[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	16.25	9.5	52.4%
Volume (Cubic Feet)	2320	4120	55.9%

[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.

The proposed project is located within the HCOC Exempt area as mapped in the Riverside County WAP geodatabase mapping tool, approved April 20, 2017. Please see Appendix 7 of the exhibit of exemption area.

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 and prevention information to new site owners, lessees, or operators. • See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA

		Stormwater Quality Handbooks at www.cabmphandbooks.com • Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Landscape/Outdoor Pesticide Use	• Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. • Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. • Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. • Consider using pest-resistant plants, especially adjacent to hardscape. • To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	• Maintain landscaping using minimum or no pesticides. • See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater • Provide IPM information to new owners, lessees and operators.

Fuel Dispensing Areas		• The property owner shall dry sweep the fueling area routinely. • See the Fact Sheet SD-30, "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

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 #A1	Modular Wetland Unit	Civil – Site Plan	TBD

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.

TO BE COMPLETED AT TIME OF 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: Operation and Maintenance Agreement

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.

TO BE COMPLETED AT TIME OF FINAL WQMP.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

LOCATION MAP

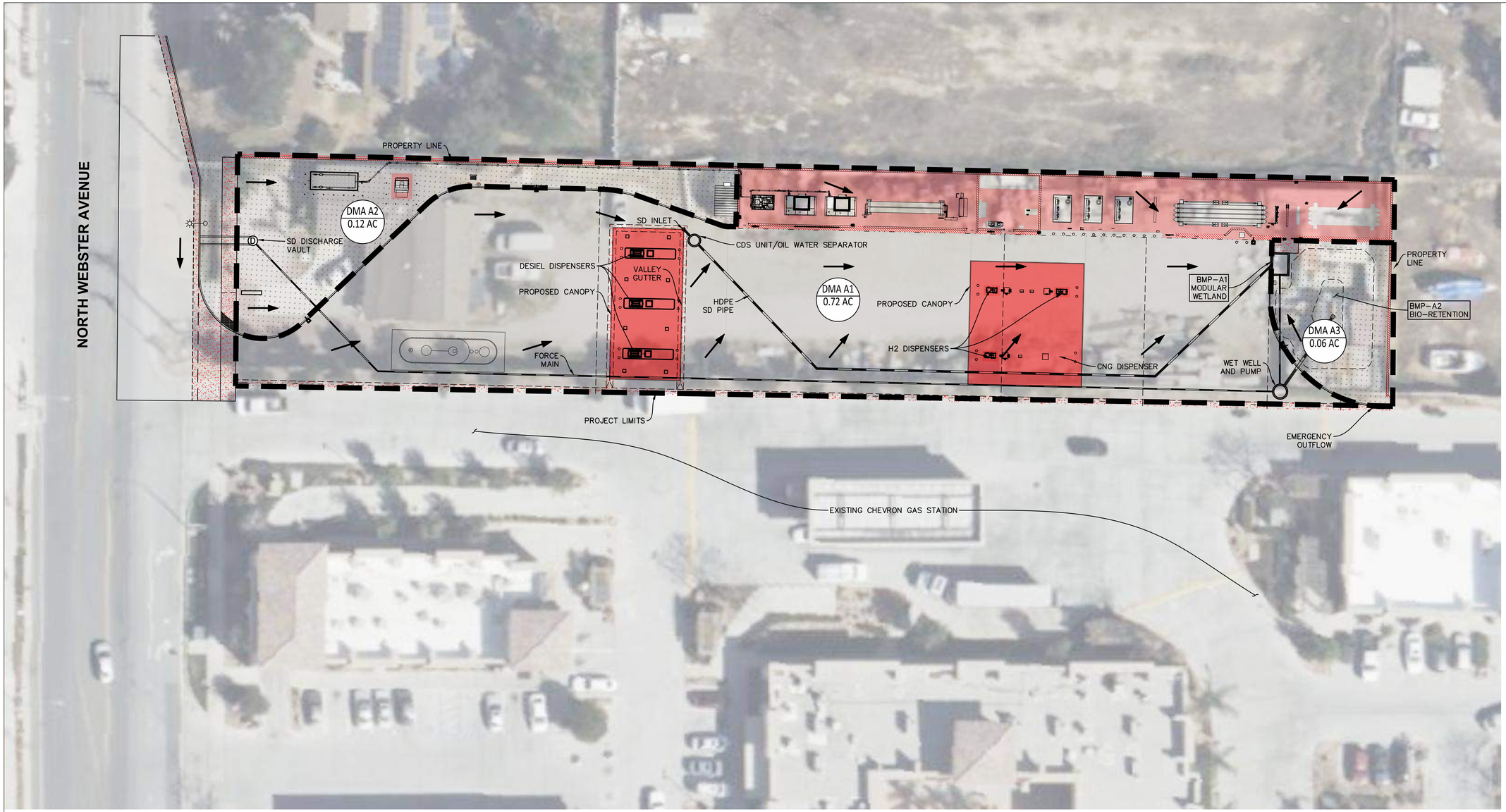
N.T.S

N

N.T.S

Project: CHEVRON PERRIS	
ADDRESS: 4063 N WEBSTER AVE	
Stantec 555 CAPITOL MALL SUITE 650 SACRAMENTO, CA 95814 stantec.com	
Job No.: 2057297530	1 OF 1

Dwg Name: 2057297530-WQMP-APPENDIX-01.dwg 11.19.2024



N

0 20' 40'

LEGEND

- ℄ (APPROX)
- SETBACK
- (N) STRUCTURE
- (N) AC PAVEMENT
- (N) CONCRETE PAVEMENT
- (N) CONCRETE FOUNDATION
- (N) LANDSCAPE ADJUSTMENT
- (N) PAVERS
- (N) WALL
- FLOW DIRECTION
- DMA BOUNDARY

TREATMENT CONTROL MEASURE SUMMARY TABLE

DMA #	BMP #	Location	Treatment Type	LID or Non-LID	Drainage Area (s.f.)	Impervious Area (s.f.)	Pervious Area (s.f.)	% Onsite Area Treated by LID or Non-LID TCM	Flow Rate Required (cfs)	Flow Rate Provided (cfs)	Vault Size	Media Bay Size
A1	A1	Onsite	Proprietary Media Filter System (MFS)	LID	31,425	31,425	0	100.00%	0.1	0.147	8'x8'	3'x8'
A2	A1	Onsite	Proprietary Media Filter System (MFS)	LID	5,270	0	5,270	100.00%	0	n/a	n/a	n/a
A3	A3	Onsite	Self-retaining areas	LID	2,760	0	2,760	100.00%	0	n/a	n/a	n/a
					39,455	31,425	8,030	100.00%				

DISTURBED AREA:	39,455 SF
PERVIOUS AREA:	8,030 SF
IMPERVIOUS AREA:	31,425 SF

MARK	DATE	REVISIONS	INITIAL	MARK	DATE	REVISIONS	INITIAL
0		IS THE CURRENT DRAWING SET REVISION NUMBER					
B	11/19/2024	ISSUED FOR PRELIM APPROVAL	VAD				
A	05/31/24	ISSUED FOR REVIEW					

Chevron

Stantec

Stantec Architecture Inc.
1360 North McDowell Blvd. Suite 250
Petaluma, CA 94954
TEL: 707.765.1660
www.stantec.com

4063 N WEBSTER AVE.

PERRIS, CA 92571

SERVICE STATION #

DMA PLAN
CHEVRON FUELING FACILITY
P23-05073

MILESTONES

PROJECT PHASE	DATE	INITIALS
ISSUED FOR PLANNING	–	–
ISSUED FOR PERMIT	–	–
ISSUED FOR BID	–	–
ISSUED FOR CONSTRUCTION	–	–

SS#

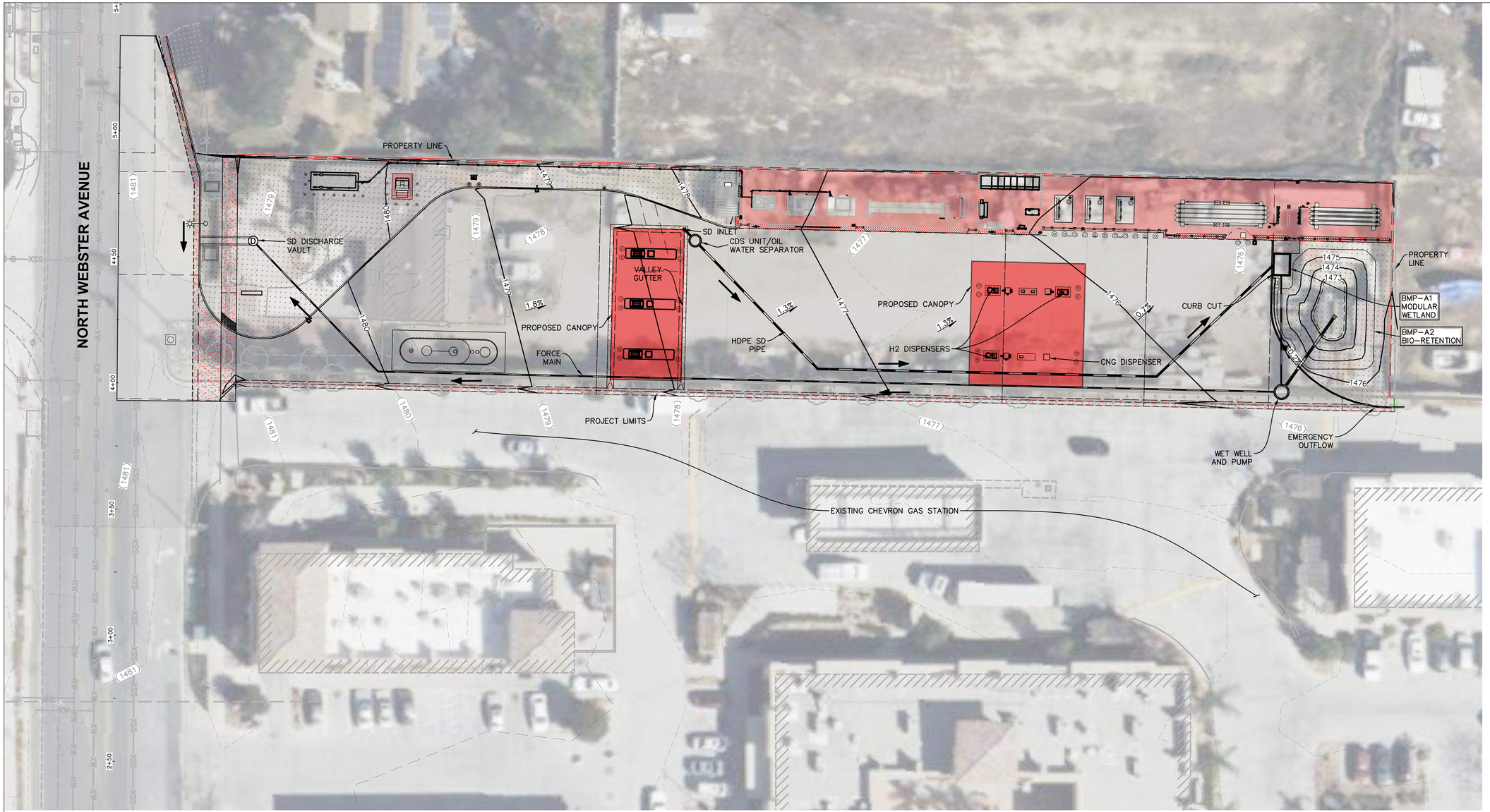
JOB# 2057297530

SCALE: PER PLAN

SHEET

EXHIBIT A

DWG: 2057297530-DMA PLAN.dwg DATE: Nov 20, 2024 - 10:02:29am



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0 20' 40'

LEGEND

- ℄ (APPROX)
- SETBACK
- (N) H_2 PIPING
- (N) STRUCTURE
- (N) AC PAVEMENT
- (N) CONCRETE PAVEMENT
- (N) CONCRETE FOUNDATION
- (N) LANDSCAPE ADJUSTMENT
- (N) PAVERS
- (N) WALL
- FLOW DIRECTION

B IS THE CURRENT DRAWING SET REVISION NUMBER

MARK	DATE	REVISIONS	INITIAL	MARK	DATE	REVISIONS	INITIAL
B	11/20/2024	ISSUED FOR PRELIM APPROVAL	VAD				
A	05/31/24	ISSUED FOR REVIEW					

Chevron

4063 N WEBSTER AVE.

PERRIS, CA 92571

SERVICE STATION #

Stantec
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Petaluma, CA 94954
TEL. 707.765.1660
www.stantec.com

POST-CONSTRUCTION BMP SITE PLAN

CHEVRON FUELING FACILITY
P23-05073

MILESTONES

PROJECT PHASE	DATE	INITIALS
ISSUED FOR PLANNING	–	–
ISSUED FOR PERMIT	–	–
ISSUED FOR BID	–	–
ISSUED FOR CONSTRUCTION	–	–

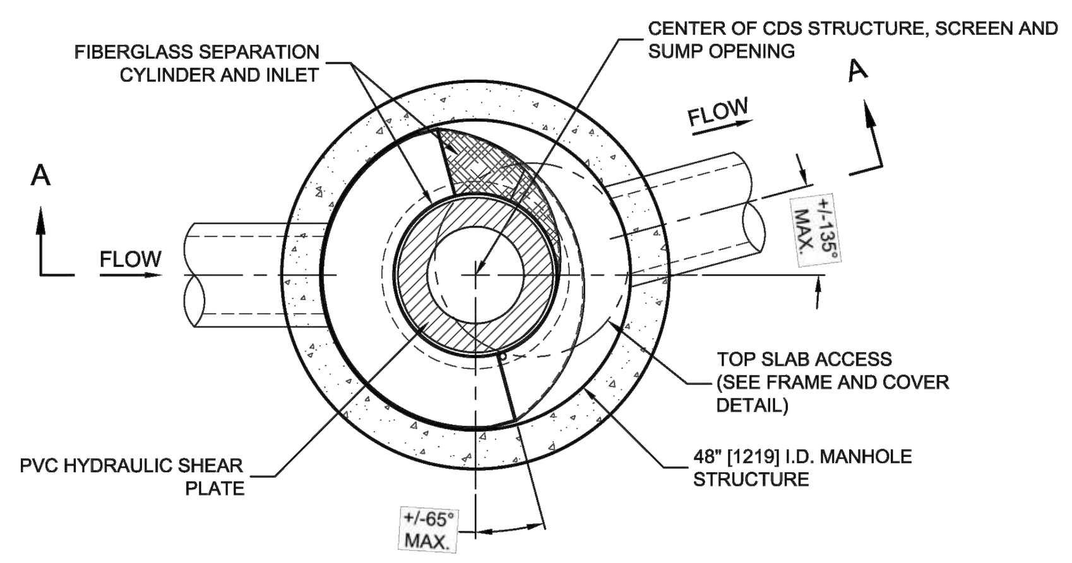
SS#

JOB# 2057297530

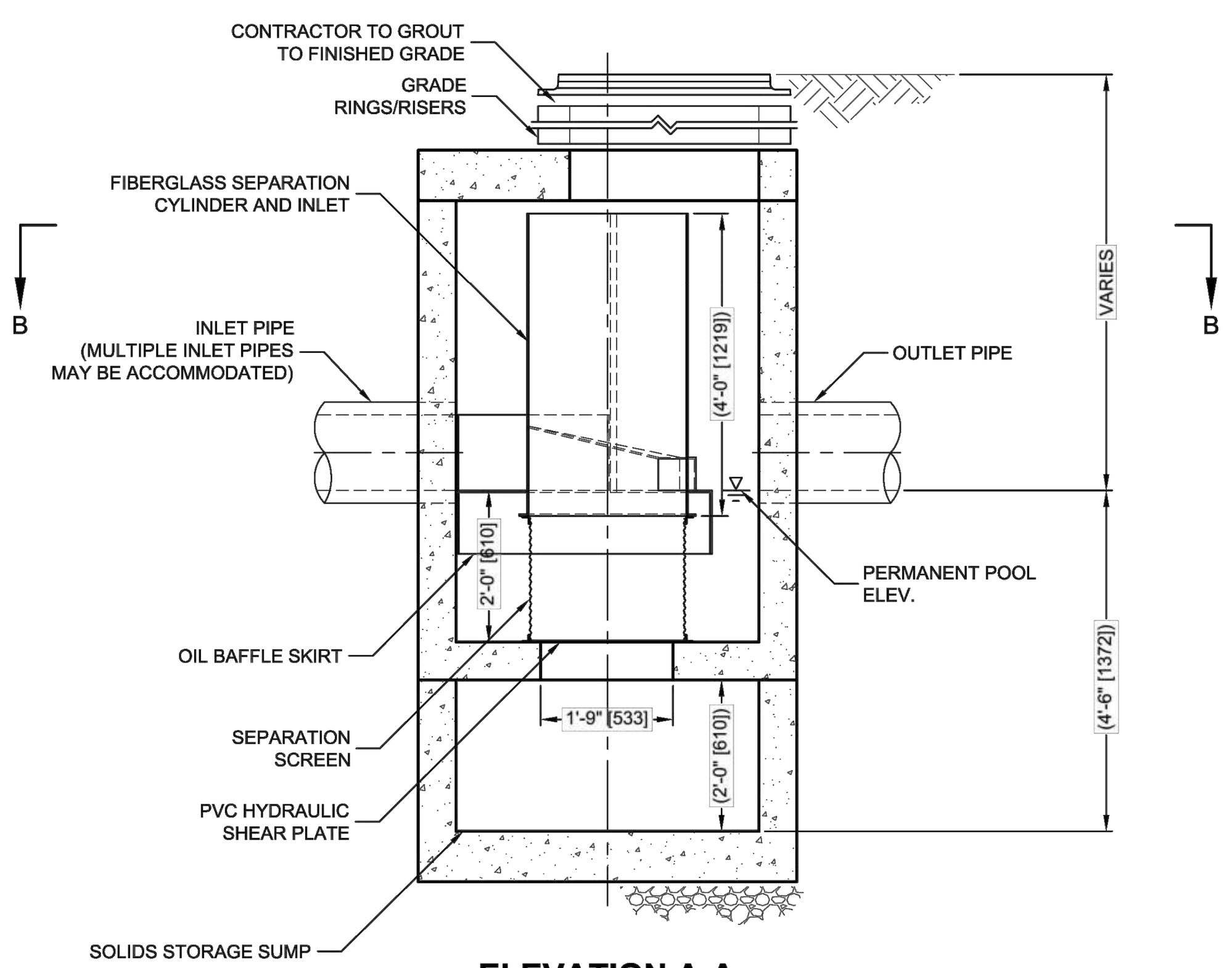
SCALE: PER PLAN

SHEET

EXHIBIT B



PLAN VIEW B-B
N.T.S.

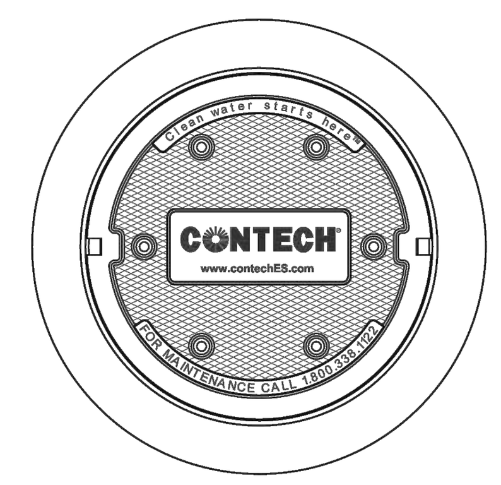


ELEVATION A-A
N.T.S.

CDS2015-4-C DESIGN NOTES

THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DESIGN TO BE PROVIDED WITH CONSTRUCTION DOCUMENTS

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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

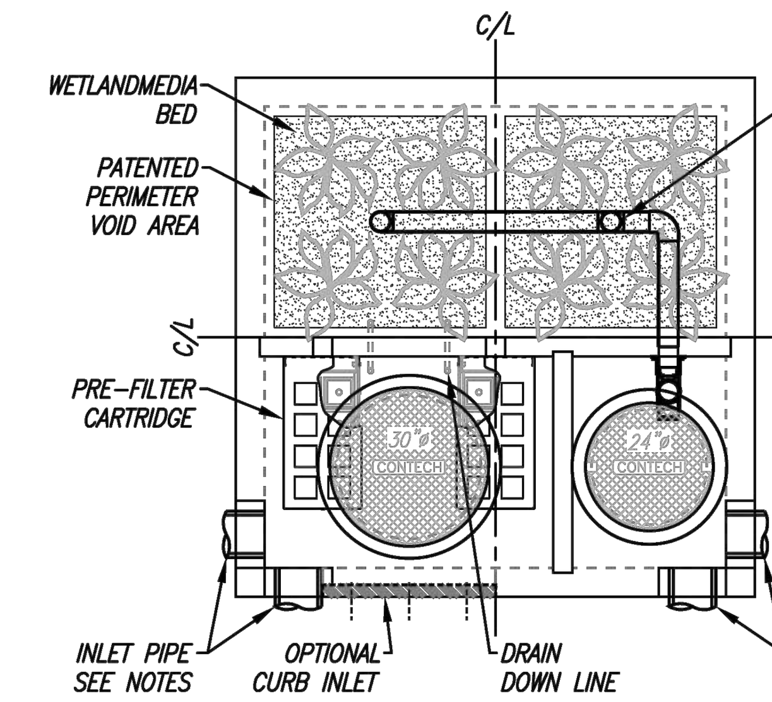
CDS2015-4-C
INLINE CDS
STANDARD DETAIL

SITE SPECIFIC DATA

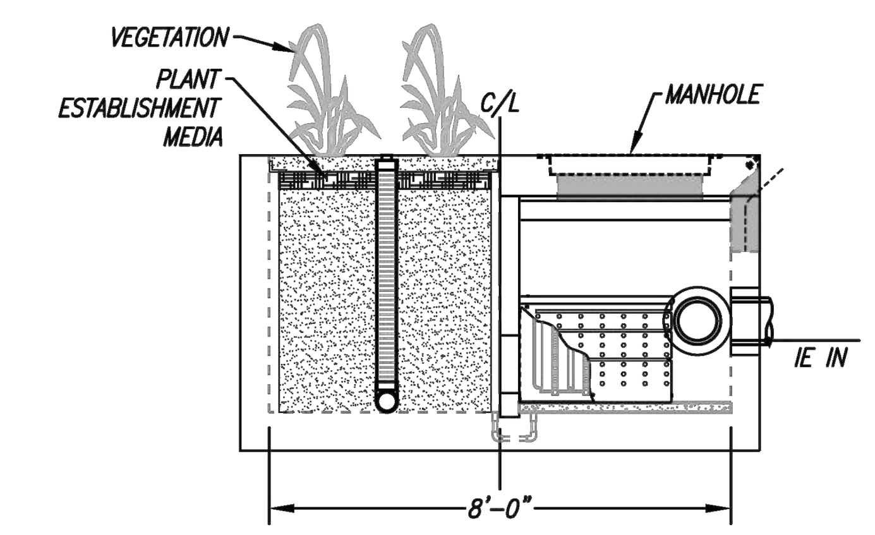
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.100
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			______ (CF
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY ONLY - NOT FOR CONSTRUCTION

SITE SPECIFIC DESIGN TO BE PROVIDED WITH CONSTRUCTION DOCUMENTS

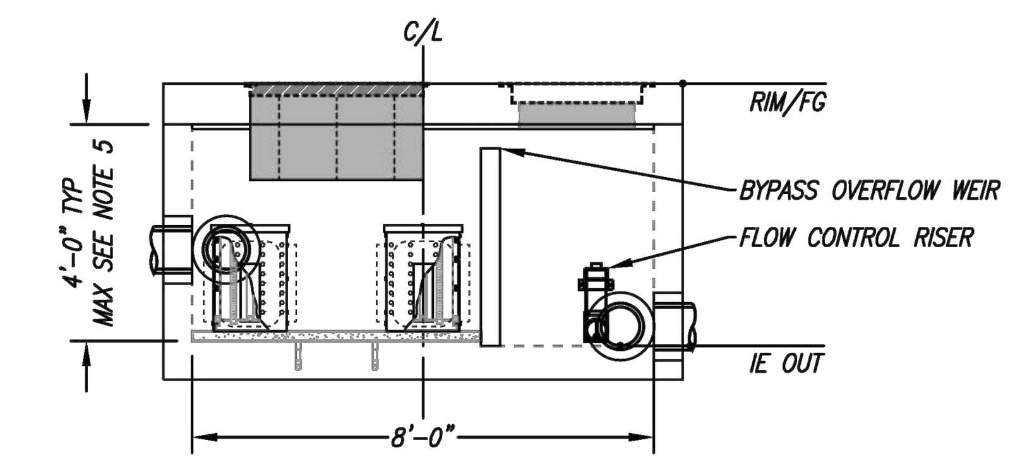


PLAN VIEW

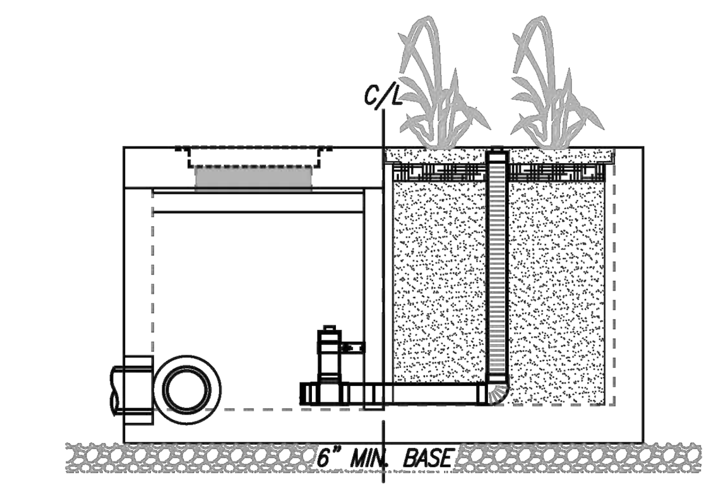


LEFT END VIEW

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 MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S 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 FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. 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 WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
4. CONTRACTOR RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE.
5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.



ELEVATION VIEW

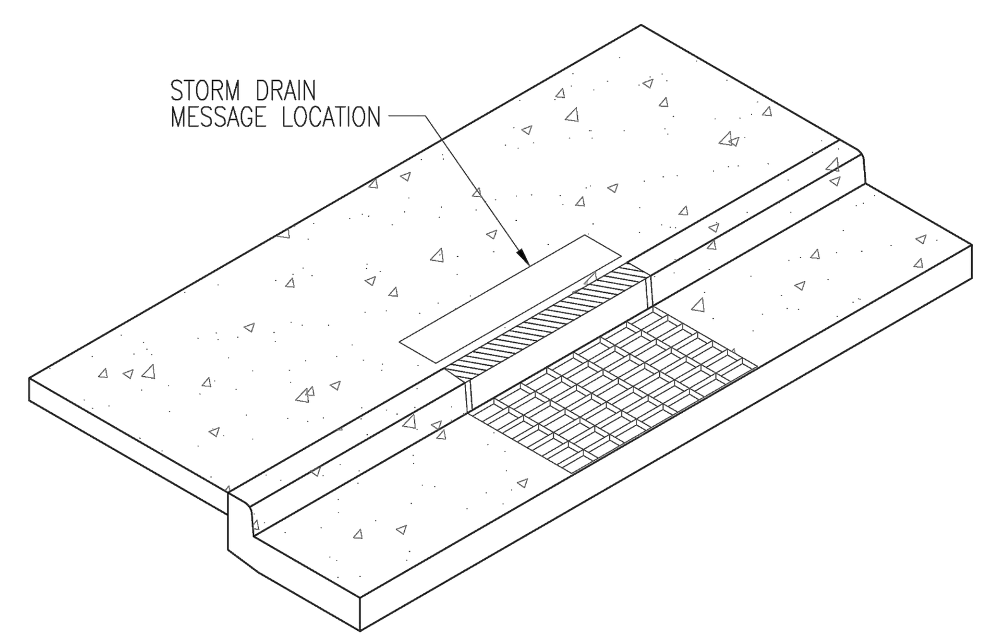


RIGHT END VIEW

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com

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



NOTES:
1. STORM DRAIN MESSAGE SHALL BE APPLIED IN SUCH A WAY AS TO PROVIDE A CLEAR, LEGIBLE IMAGE.
2. STORM DRAIN MESSAGE SHALL BE PERMANENTLY APPLIED DURING THE CONSTRUCTION OF THE CURB AND GUTTER USING A METHOD APPROVED BY THE LOCAL AGENCY.
3. FOR AREA DRAIN INLETS, STORM DRAIN MESSAGE SHALL BE PLACED ADJACENT AND PARALLEL TO THE LONG AXIS OF THE DRAIN.
4. LETTERS SHALL BE 1–1/2" IN HEIGHT. DIMENSIONS OF STORM DRAIN MESSAGE SHALL NOT EXCEED 12"x33".
5. IF THE MESSAGE IS STAMPED IN CONCRETE, THE DEPTH SHOULD BE APPROXIMATELY 0.25".
6. IF AN ALTERNATIVE STORM DRAIN MESSAGE IS PROPOSED, IT SHALL BE APPROVED BY THE LOCAL AGENCY.

B IS THE CURRENT DRAWING SET REVISION NUMBER

MARK	DATE	REVISIONS	INITIAL	MARK	DATE	REVISIONS	INITIAL
B	11/20/2024	ISSUED FOR PRELIM APPROVAL	VAD				
A	05/31/24	ISSUED FOR REVIEW					

Chevron

Stantec
Stantec Architecture Inc.
1383 North McDowell Blvd. Suite 250
Petaluma, CA 94954
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www.stantec.com

4063 N WEBSTER AVE.
PERRIS, CA 92571
SERVICE STATION #

POST-CONSTRUCTION BMP DETAILS

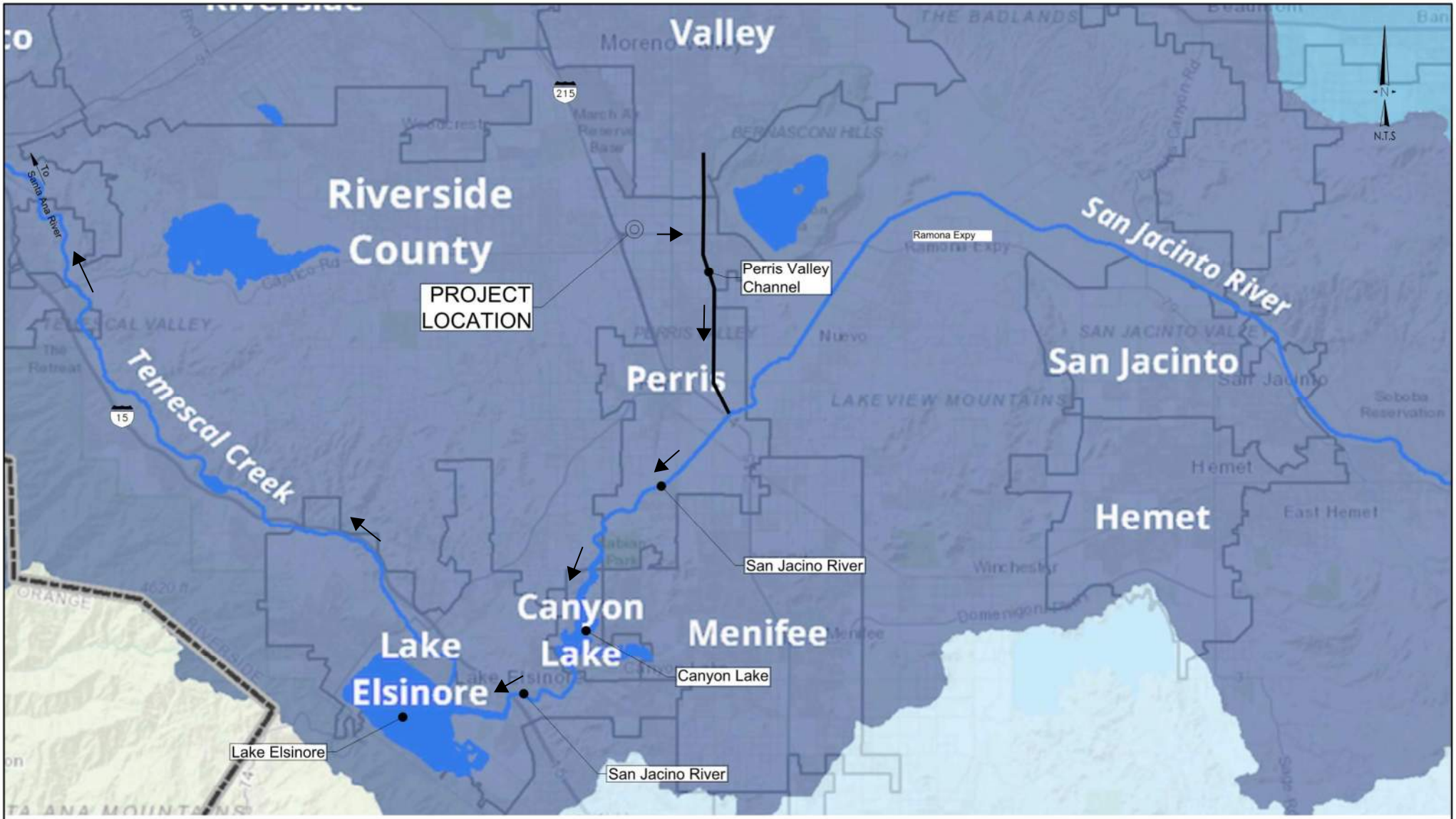
CHEVRON FUELING FACILITY
P23-05073

MILESTONES

PROJECT PHASE	DATE	INITIALS
ISSUED FOR PLANNING	–	–
ISSUED FOR PERMIT	–	–
ISSUED FOR BID	–	–
ISSUED FOR CONSTRUCTION	–	–

SS#
JOB# 2057297530
SCALE: PER PLAN

SHEET
EXHIBIT C



Stantec

RECEIVING WATERS EXHIBIT
SANTA ANA REGIONAL WATERSHED

Dwg Name: 205729753D--receiving_waters.dwg 11.19.2024

Appendix 2: Construction Plans

Grading and Drainage Plans

ABBREVIATIONS

& = AND
L = ANGLE
@ = AT
= CENTERLINE
ø = DIAMETER OF ROUND
= POUND OR NUMBER
(E) = EXISTING
(R) = RELOCATED
(N) = NEW

A.B. = ANCHOR BOLT
A.F.F. = ABOVE FINISH FLOOR
AGGR. = AGGREGATE
AL. = ALUMINUM
APPROX. = APPROXIMATE
ARCH. = ARCHITECTURAL
ASPH. = ASPHALT

BC = BOTTOM OF CURB
BD. = BOARD
BITUM. = BITUMINOUS
BLDG. = BUILDING
BLKG. = BLOCKING
BM. = BEAM
B.O. = BOTTOM OF
BOT. = BOTTOM
BW = BACK OF WALK

CAB. = CABINET
CEM. = CEMENT
CER. = CERAMIC
C.I. = CAST IRON
CLG. = CEILING
CLR./CL. = CLEAR
COL. = COLUMN
CONC. = CONCRETE
CONSTR. = CONSTRUCTION
CONT. = CONTINUOUS
CTSK. = COUNTERSUNK
CNTR. = COUNTER
CTR. = CENTER

DEPT. = DEPARTMENT
DET. = DETAIL
DIA. = DIAMETER
DIM. = DIMENSION
DISP. = DISPENSER
DN. = DOWN
DR. = DOOR
D.S. = DOWNSPOUT
DWG. = DRAWING

E = EAST
EA. = EACH
EL. = ELEVATION
ELEC. = ELECTRICAL
EQ. = EQUAL
EXP. = EXPANSION
EXT. = EXTERIOR

FE = FIRE EXTINGUISHER
F.F = FLOOR FINISH
FDN. = FOUNDATION
FG = FINISH GRADE
FIN. = FINISH
FL. = FLOOR
FLASH'G = FLASHING
FLUOR. = FLUORESCENT
F.O. = FACE OF
F.O.C. = FACE OF CONCRETE
F.O.F. = FACE OF FINISH
F.O.S. = FACE OF STUDS
F.R.P. = FIBERGLASS REINFORCED PANEL
FS = FINISHED SURFACE
FT. = FOOT OR FEET
FTG. = FOOTING
FURR. = FURRING
FUT. = FUTURE

G.A. = GAUGE
GALV. = GALVANIZED
GL. = GLASS
GR. = GRADE
GB = GRADE BREAK
GSM = GALVANIZED SHEET METAL
GYP. = GYPSUM
GYP.BD. = GYPSUM BOARD

H.B. = HOSE BIBB
HDWE. = HARDWARE
H.M. = HOLLOW METAL
HORIZ. = HORIZONTAL
HR. = HOUR
HGT. = HEIGHT

IE = INVERT ELEVATION
I.D. = INSIDE DIAMETER
INSUL. = INSULATION
INT. = INTERIOR

JT. = JOINT

LAM. = LAMINATE
LAV. = LAVATORY
LIP = EDGE OF SWALE OR GUTTER

MAX. = MAXIMUM
MECH. = MECHANICAL
MEMB. = MEMBRANE
MFR. = MANUFACTURER
MIN. = MINIMUM
MISC. = MISCELANEOUS
M.O. = MASONRY OPENING
MTD. = MOUNTED
MUL. = MULLION

N. = NORTH
N.I.C. = NOT IN CONTRACT
NO. OR # = NUMBER
NOM. = NOMINAL
N.T.S. = NOT TO SCALE

O.C. = ON CENTER
O.D. = OUTSIDE DIAMETER
OPNG. = OPENING
OPP. = OPPOSITE

PB = LEVEL PAVEMENT AT DISPENSER PIT BOX
PL. = PLATE
P.LAM. = PLASTIC LAMINATE
PLYWD. = PLYWOOD
P.O.C. = POINT OF CURVATURE
P.O.S. = POINT OF SALE

R OR RAD. = RADIUS
R.D. = ROOF DRAIN
REF. = REFERENCE
REINF. = REINFORCED
REQ'D = REQUIRED
RM. = ROOM
R.O. = ROUGH OPENING
R.O.W. = RIGHT OF WAY

SAD = SEE ARCHITECTURAL DRAWINGS
SCHED. = SCHEDULE
SECT. = SECTION
SHT. = SHEET
SIM. = SIMILAR
SPEC. = SPECIFICATION
SQ. = SQUARE
SSD = SEE STRUCTURAL DRAWINGS
S.ST. = STAINLESS STEEL
STD. = STANDARD
STL. = STEEL
STOR. = STORAGE
STRL. = STRUCTURAL
SYM. = SYMMETRICAL

TC = TOP OF CURB
T.F.S. = TOP OF FINISHED SLAB
TG = TOP OF GRATE
T.& G. = TONGUE & GROOVE
THK. = THICK
TI = TOP OF ISLAND
T.O. = TOP OF
TP = TOP OF PAVEMENT
TS = TOP OF SLAB
TW = TOP OF WALK
TW = TOP OF WALL
TYP. = TYPICAL

UNF. = UNFINISHED
U.O.N. = UNLESS OTHERWISE NOTED

VERT = VERTICAL

W. = WEST
W/ = WITH
W.C. = WATER CLOSET
WD. = WOOD
W/O = WITHOUT
WP. = WATERPROOF
WSCT. = WAINSCOT
WT. = WEIGHT

Chevron

DRAWING INDEX

GENERAL NOTES

1. IN THE EVENT OF DISCREPANCIES BETWEEN THE DRAWINGS, SPECIFICATIONS, OR SCOPE OF WORK SUMMARY IN THIS PACKAGE, NOTIFY CHEVRON REP. IMMEDIATELY.
2. THE CONTRACTOR IS RESPONSIBLE TO SEE THAT WORK IN FIELD IS DONE IN ACCORDANCE WITH ALL CURRENT APPLICABLE NATIONAL, STATE & LOCAL CODES, ORDINANCES & REQUIREMENTS BY GOVERNING AGENCIES. WHETHER OR NOT SAID CODES, ORDINANCES, REQUIREMENTS, ETC. ARE SPECIFICALLY SHOWN ON DRAWINGS AND/OR CALLED FOR IN SPECIFICATIONS.
3. THE CONTRACTOR SHALL PROTECT ALL EXISTING ITEMS AND FACILITIES TO REMAIN THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL REPAIR AND/OR REPLACE, AT CONTRACTOR'S EXPENSE, ANY EXISTING ITEMS AND FACILITIES TO REMAIN THAT ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS, TO THE SATISFACTION OF THE CHEVRON REP.
4. UNLESS DELIVERY IS BY CHEVRON TO THE JOB SITE, CONTRACTOR SHALL DELIVER SUCH EQUIPMENT, DAMAGE-FREE TO THE JOB SITE.
5. PRIOR TO EXCAVATION, DETERMINE AND VERIFY LOCATION OF UTILITY SERVICES IN ALL AREAS TO BE EXCAVATED.
6. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT LAWS, CODES, REGULATIONS, BUILDING CODES, GOVERNING AGENCIES & MANUFACTURER SPECIFICATIONS, UNLESS GREATER REQUIREMENTS ARE INDICATED, AND/OR ARE NECESSARY FOR THE SAFETY OF THE PROJECT.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING JURISDICTIONS AS REQUIRED FOR INSPECTIONS.
8. THE CONTRACTOR SHALL PROVIDE THE CHEVRON REPRESENTATIVE WITH A CONSTRUCTION SCHEDULE PRIOR TO STARTING THE WORK, A QUALIFIED JOB SUPERINTENDENT THROUGHOUT THE WORK, PHOTOS SHOWING PIPING AND ELECTRICAL TRENCHES PRIOR TO BACKFILL, AND RECORD DRAWINGS OF ALL UNDERGROUND CONSTRUCTION.
9. THE CONTRACTOR SHALL PROVIDE BARRICADES AND SAFETY SIGNS PER OSHA REQUIREMENTS.
10. THE CONTRACTOR IS RESPONSIBLE FOR OVERALL CONSTRUCTION SITE CLEANLINESS, INCLUDING PROVISION OF A DEBRIS BOX WITH WEEKLY SERVICING, REMOVAL OF ALL CONTRACTOR/SUBCONTRACTOR REFUSE AND DEBRIS, AND SWEEPING OF THE ENTIRE YARD AREA AT THE COMPLETION OF THE WORK
11. UNLESS STATED OTHERWISE IN THE SCOPE OF WORK SUMMARY, ALL OTHER PROCEDURES, TESTING, MATERIALS AND EQUIPMENT SHOWN ON THE PLANS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
12. DRAWINGS SHOULD NOT BE SCALED. N.T.S. INDICATES "NOT TO SCALE" AND THE LISTED DIMENSION SHALL GOVERN.
13. EACH CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF DAMAGE TO THE WORK OF OTHER TRADES CAUSED BY HIS OPERATIONS. THE NATURE OF SUCH REPAIR WORK MUST RECEIVE THE PRIOR APPROVAL OF THE CHEVRON REP.
14. CONSTRUCTION MATERIAL, ASSEMBLIES AND PROCEDURES ARE TO LOCALLY ADOPTED BUILDING CODES AND SUPPLEMENTARY ORDINANCES. WHEN A CONFLICT OCCURS BETWEEN SUCH LOCAL CODE AND INFORMATION SHOWN ON THE PLANS, CONSULT CHEVRON REP. FOR RESOLUTION PRIOR TO COMMENCING WORK.
15. THE CONTRACTOR SHALL NOTIFY CHEVRON REP. IF SITE CONDITIONS OR DIMENSIONS DISAGREE WITH INFORMATION SHOWN ON THE DRAWINGS. WORK IS NOT TO PROCEED UNTIL SUCH DIFFERENCES ARE RESOLVED.
16. ALL EXISTING STRUCTURES, WALLS, TRIM, FASCIA, DOORS, DOWNSPOUTS, ETC., ARE TO BE REPAIRED AND REPAINTED AS NOTED.
17. SEPARATE CONTRACTS FOR SUCH WORK AS PAVING, LANDSCAPING, STEEL FABRICATOR, SHOP FABRICATED COMPONENTS, AND SIGN INSTALLATION MAY BE AWARDED BY CHEVRON. IN ADDITION CERTAIN SPECIALTY ITEMS SUCH AS LIGHTING FIXTURES, SWITCHGEAR, HYDROGEN STATION & STORAGE MODULES AND DISPENSERS, ETC. ARE PURCHASED DIRECTLY BY CHEVRON FOR DELIVERY TO THE CONTRACTOR, WHO WILL BE RESPONSIBLE FOR THEIR INSTALLATION. REFER TO THE SCOPE OF WORK FOR A LISTING OF SUCH CONTRACTS AND EQUIPMENT. THE CONTRACTOR SHALL COOPERATE WITH AND COORDINATE THE WORK OF SEPARATE CONTRACTORS.
18. DO NOT USE THE BUILDING PERMIT SET FOR CONSTRUCTION OR FIELD REFERENCE. THE PERMIT SET GENERALLY LACKS CERTAIN DRAWINGS AND SPECIFICATIONS, WHICH ARE IN THE BID AND CONSTRUCTION SETS IN ADDITION TO REVISIONS MADE AFTER THE PERMIT PROCESS. FOR CONSTRUCTION AND FIELD REFERENCE, CONTRACTOR SHALL USE ONLY THE SET, WHICH IS CLEARLY SIGNED AND DATED "ISSUED FOR CONSTRUCTION". THE APPROVED PERMIT SET SHALL BE KEPT ON SITE AND REFERENCED FOR PROJECT SPECIFIC MARK-UPS AND/ OR REQUIREMENTS WHICH MAY HAVE BEEN NOTED BY LOCAL AGENCIES DURING PLAN CHECK.

PROJECT DATA

PROJECT ADDRESS:	4063 N WEBSTER AVE PERRIS, CA 92571
OWNER'S NAME:	CHEVRON PRODUCTS CO. CARE OF RENEWABLES STATION OPERATIONS MANAGER (925) 842-1682
OWNER'S ADDRESS:	6001 BOLLINGER CANYON RD SAN RAMON, CA 94583
SITE GROSS SQUARE FOOTAGE:	~171,000 FT^2 (~3.90 AC)
BUILDING SQUARE FOOTAGE:	~4,500 FT^2
ZONING DISTRICT:	PVCC COMMERCIAL
NATURE OF BUSINESS:	SELF SERVE DIESEL, CNG & HYDROGEN SALES
ASSESSOR'S PARCEL NO.:	302-260-053
CALIFORNIA CODES:	• 2022 CALIFORNIA FIRE CODE (INTERNATIONAL FIRE CODE AND UNIFORM FIRE CODE) • 2022 CALIFORNIA ELECTRICAL CODE • 2022 CALIFORNIA BUILDING CODE (INTERNATIONAL BUILDING CODE) • 2022 CALIFORNIA MECHANICAL CODE (INTERNATIONAL MECHANICAL CODE) • CALIFORNIA UNIFIED PROGRAM AGENCY (CAL/EPA CERTIFIED CUPA) • 2021 INTERNATIONAL FUEL GAS CODE • 2022 CALIFORNIA PLUMBING CODE (CPC), • 2022 CALIFORNIA ENERGY CODE (CEnC) • 2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGReen)
NATIONAL HYDROGEN SPECIFIC CODES:	• 2018 NFPA 1 FIRE CODE • 2020 NFPA 2 HYDROGEN TECHNOLOGIES CODE • 2018 NFPA 30A MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES • 2020 NFPA 55 COMPRESSED GASES AND CRYOGENIC FLUIDS CODE • ASME B31.3 PROCESS PIPING CODE • ASME 31.12 HYDROGEN PIPING & PIPELINES • ASME BOILER AND PRESSURE VESSEL CODE SEC VIII • CGA G-5 HYDROGEN • CGA G-5.4 STANDARD FOR HYDROGEN PIPING SYSTEMS AT CONSUMER LOCATIONS • CGA G-5.5 HYDROGEN VENT SYSTEM • CGA G-5.6 HYDROGEN PIPELINE SYSTEMS • CGA G-5.8 HIGH PRESSURE HYDROGEN PIPING SYSTEMS AT CONSUMER LOCATIONS
FEDERAL REGULATIONS:	• OSHA REGULATIONS 29 CFR 1920 SUBPART H • DOT REGULATIONS INCLUDING 40 CFR PART 68 RISK MANAGEMENT PLAN (AS APPLICABLE)

THIS PROJECT HAS BEEN DESIGNED IN SUBSTANTIAL CONFORMANCE WITH THE ACCESSIBILITY PROVISIONS OF CHAPTER 11B OF THE CALIFORNIA BUILDING CODE, LOCAL JURISDICTION, AND THE AMERICANS WITH DISABILITIES ACT (ADA).

PROJECT TEAM

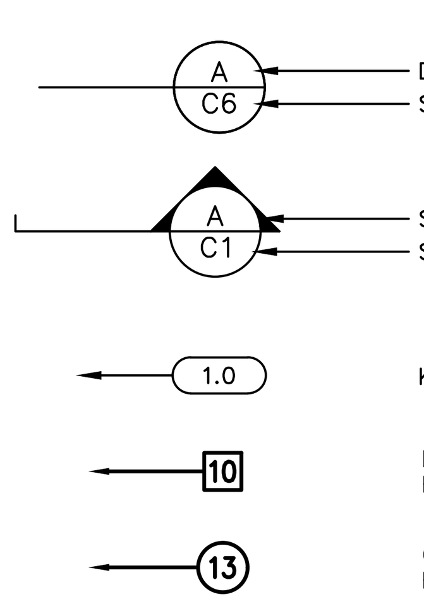
PROJECT MANAGER:	GARY GRELLI STANTEC WALNUT CREEK, CA	(661) 333-3731
H2 FUEL DESIGN:	JOE VALASCO STANTEC LOS ANGELES, CA	(925) 627-4508
ELECTRICAL ENGINEER:	ALINA NOVIKOVA STANTEC WEST WALL TOWNSHIP, NJ	(858) 622-2762
CIVIL ENGINEER:	KEVAN McLAUGHLAN STANTEC IRVINE, CA	(949) 923-6141
LANDSCAPE ARCHITECT:	MAISHA RUTH STANTEC PETALUMA, CA	(707) 658-4707
CHEVRON PROJECT MANAGER:	SCOTT NOVAK 1500 LOUISIANA STREET HOUSTON, TX	(510) 512-0182
PLANNING CONSULTANT:	ERIC SNELLING STANTEC SANTA MARIA, CA	(805) 250-2857

PROJECT DESCRIPTION

CHEVRON IS PROPOSING THE FOLLOWING:

- INSTALL NEW CNG COMPOUND WITH CONCRETE BLOCK WALL FOR SECURITY AND EQUIPMENT SPACING.
- INSTALL H2 TRUCK ACCESS TO NEW OFFLOADING AREA.
- NEW H2 EQUIPMENT COMPOUND WITH CONCRETE BLOCK WALL FOR SECURITY AND EQUIPMENT SPACING.
- INSTALL NEW FUEL CANOPY WITH THREE ISLANDS FOR CNG AND DIESEL DISPENSERS
- INSTALL NEW FUEL CANOPY WITH THREE ISLANDS FOR CNG AND H2 DISPENSERS
- INSTALL NEW ELECTRICAL SERVICE
- INSTALL NEW PAVING AT EXISTING NORTH LOT
- WIDEN EXISTING DRIVEWAY ENTRANCE ON THE WEST END OF PROPERTY.
- RELOCATE EXISTING POWER POLE & GUYWIRES
- INSTALL HALF-STREET IMPROVEMENTS AS SHOWBN.

LEGEND



DETAIL NUMBER
SHEET NUMBER

SECTION NUMBER
SHEET NUMBER

KEY NOTE

DEMOLITION NOTE
REFERENCE NUMBER

CONSTRUCTION NOTE
REFERENCE NUMBER

IMPORTANT NOTICE

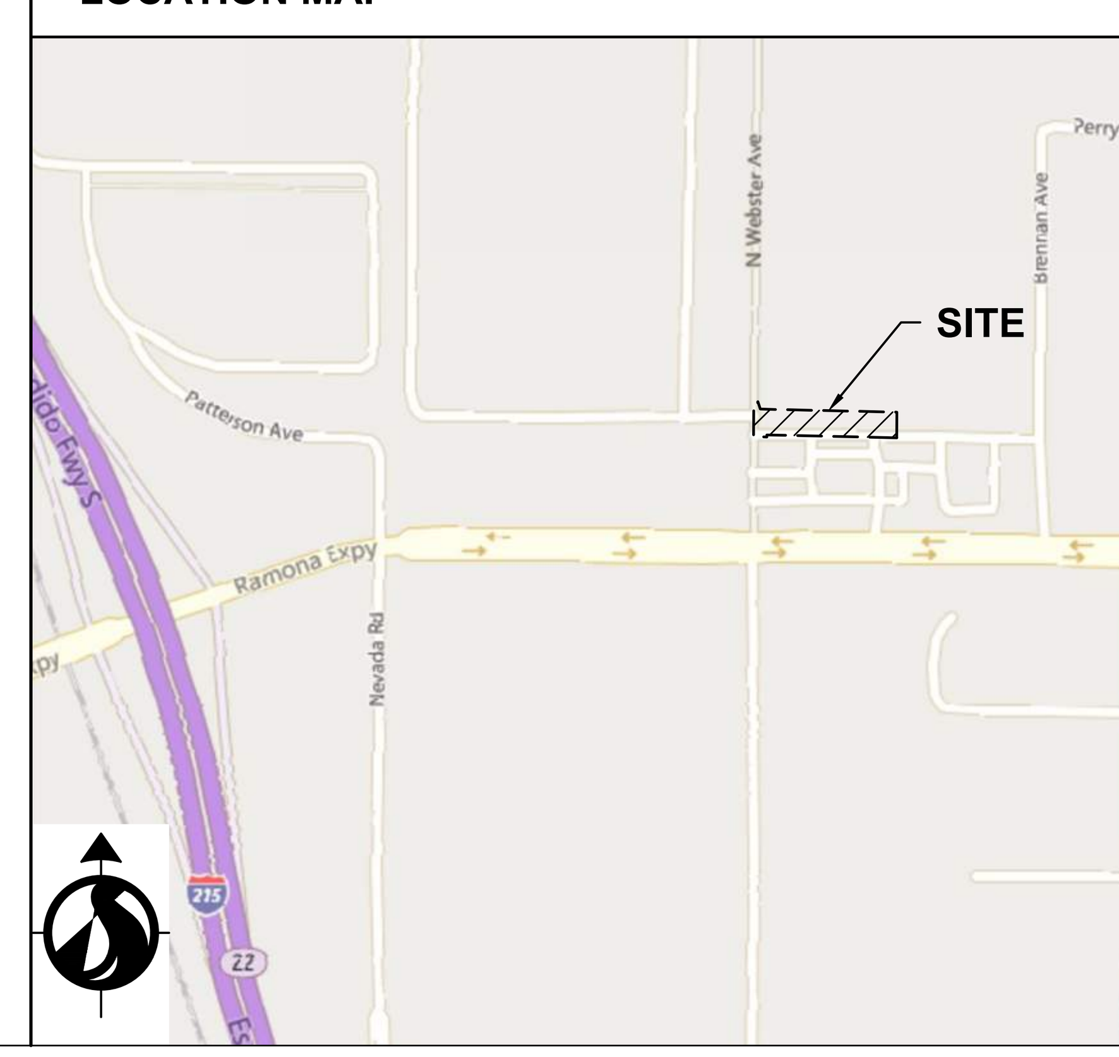
SECTION 4216/4217 OF THE GOVERNMENT CODE REQUIRES A DIG ALERT IDENTIFICATION NUMBER TO BE ISSUED BEFORE A "PERMIT TO EXCAVATE" WILL BE VALID.

TOLL FREE 811

TWO WORKING DAYS BEFORE YOU DIG.

DIGALERT

LOCATION MAP



E IS THE CURRENT DRAWING SET REVISION NUMBER

MARK	DATE	REVISIONS	INITIAL	MARK	DATE	REVISIONS	INITIAL
D	07/17/24	ISSUED FOR INTERNAL REVIEW	BGA				
C	07/10/24	ISSUED FOR 60% MODEL REVIEW	BGA				
B	05/06/24	REISSUED FOR PLANNING REVIEW	BGA				
A	10/27/23	ISSUED FOR PLANNING REVIEW	BGA	E	08/19/24	ISSUED FOR PWQMP	BGA

Chevron

4063 N WEBSTER AVE

PERRIS, CA

SERVICE STATION #308922

Stantec
Stantec
601 SW Second Avenue Suite 1400
Portland OR 97204-3128
(503) 226-7377
www.stantec.com

CIVIL COVER SHEET

MILESTONES

PROJECT PHASE	DATE	INITIALS
ISSUED FOR PLANNING	10/27/23	BGA
ISSUED FOR PERMIT		
ISSUED FOR BID		
ISSUED FOR CONSTRUCTION		

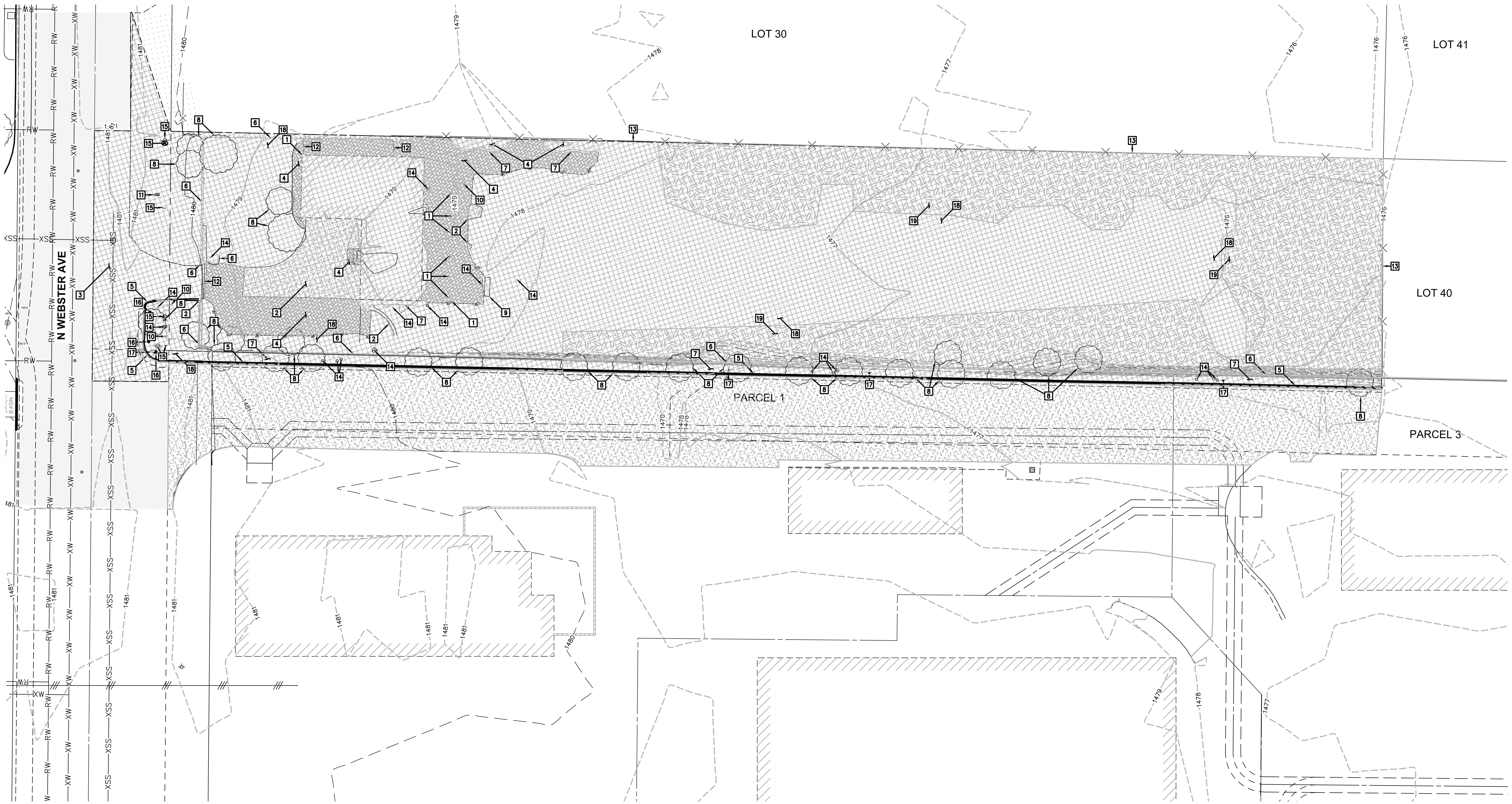
SS# 308922

JOB# 2057297530

SCALE: AS NOTED

SHEET

C1



N

0 20' 40'

LEGEND

1644	(E) 1' CONTOUR
1645	(E) 5' CONTOUR
	(E) ℄
	(E) EASEMENT
	(E) SETBACK
XW	(E)) WATER
RW	(E) RECLAIMED WATER
XSS	(E) SANITARY SEWER
	(E) STORMWATER
	DEMOLITION AREA
	(E) LANDSCAPE
	(E) DIRT
	(E) CONCRETE
	(E) AC PAVEMENT
	(E) PAVERS
	(E) BRICK
	(E) YARD DEBRIS
	(E) WALL

EXISTING CONDITIONS & DEMOLITION PLAN

SCALE: 1"=20'

DEMOLITION NOTES

- P PROTECT
- 1 DEMOLISH (E) BUILDING, OVERHANGS & COLUMNS
- 2 DEMOLISH (E) CONCRETE PAVEMENT
- 3 DEMOLISH (E) AC PAVEMENT
- 4 DEMOLISH (E) BRICK PAVEMENT
- 5 DEMOLISH (E) CURB AND GUTTER
- 6 DEMOLISH (E) CONCRETE WALL
- 7 DEMOLISH (E) PLANTER
- 8 REMOVE (E) TREE
- 9 REMOVE (E) ABOVE GROUND TANK
- 10 REMOVE (E) COMMUNICATION VAULT

DEMOLITION NOTES

- 11 REMOVE (E) MAILBOX
- 12 DEMOLISH (E) METAL GATE/FENCE
- 13 DEMOLISH (E) FENCE (LOCATION APPROX)
- 14 REMOVE/RELOCATE (E) UTILITY RISERS/VAULTS/BOXES/WATER METERS/VALVES/MANHOLES/CLEANO UTS
- 15 REMOVE/RELOCATE (E) UTILITY POLES/RISERS/GUYWIRES
- 16 REMOVE (E) BOLLARDS
- 17 REMOVE (E) SIGNS
- 18 CLEAR & GRUB DIRT/LANDSCAPE AREAS
- 19 CLEAR ALL YARD DEBRIS

E IS THE CURRENT DRAWING SET REVISION NUMBER

MARK	DATE	REVISIONS	INITIAL	MARK	DATE	REVISIONS	INITIAL
D	07/17/24	ISSUED FOR INTERNAL REVIEW	BGA				
C	07/10/24	ISSUED FOR 60% MODEL REVIEW	BGA				
B	05/06/24	REISSUED FOR PLANNING REVIEW	BGA				
A	10/27/23	ISSUED FOR PLANNING REVIEW	BGA	E	08/19/24	ISSUED FOR PWQMP	BGA

4063 N WEBSTER AVE

PERRIS, CA

SERVICE STATION #308922

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Portland OR 97204-3128
(503) 226-7377
www.stantec.com

EXISTING CONDITIONS & DEMOLITION PLAN

MILESTONES

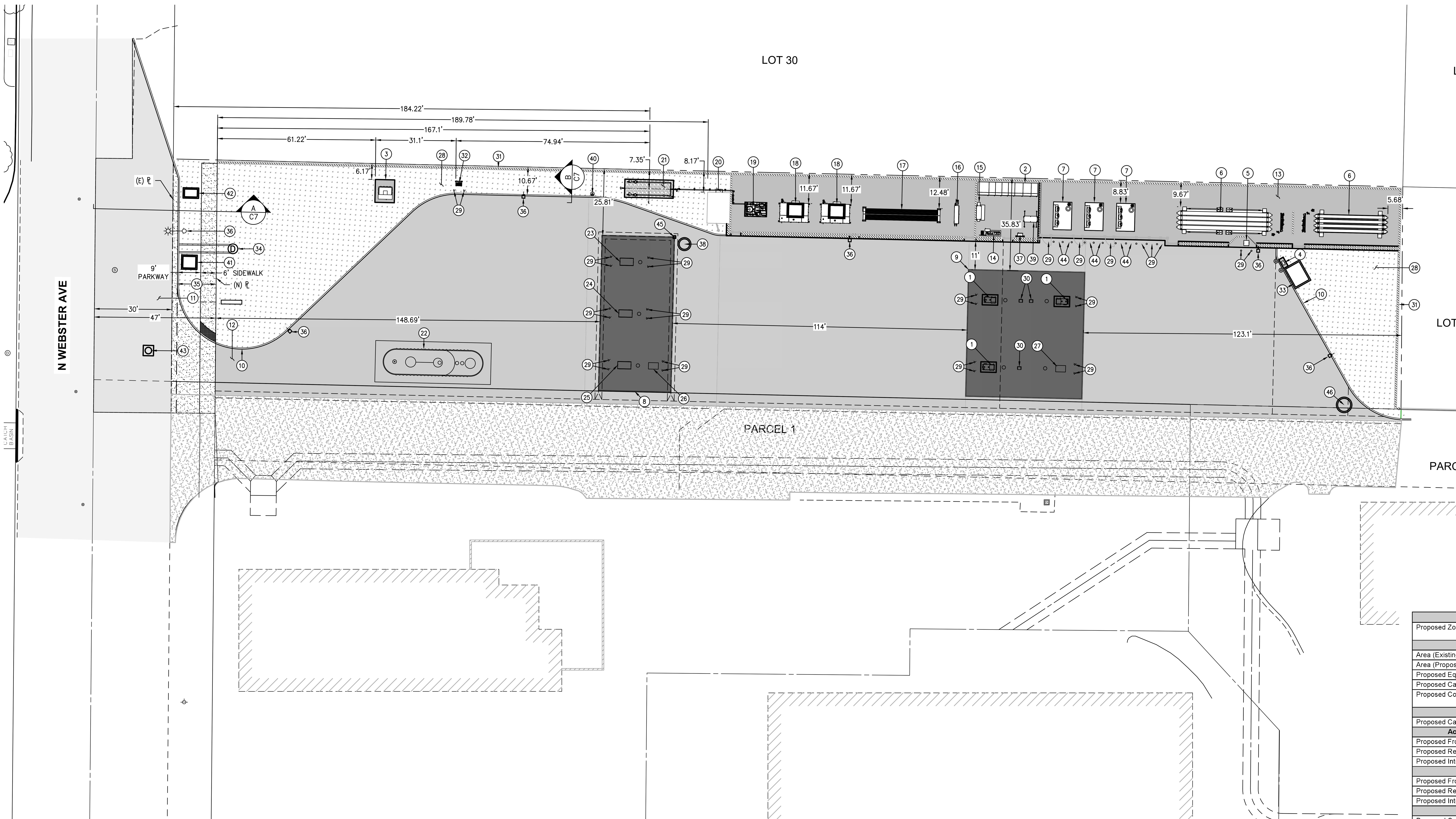
PROJECT PHASE	DATE	INITIALS
ISSUED FOR PLANNING	10/27/23	BGA
ISSUED FOR PERMIT		
ISSUED FOR BID		
ISSUED FOR CONSTRUCTION		

SS# 308922

JOB# 2057297530

SCALE: AS NOTED

SHEET C4



N

0 20' 40'

LEGEND

- (E) ℄
- (E) EASEMENT
- (E) SETBACK
- (E) LANDSCAPE
- (E) CONCRETE
- (E) AC PAVEMENT
- (N) GRADE BREAK
- (N) STORMWATER MH
- (N) STRUCTURE
- (N) AC PAVEMENT
- (N) CONCRETE PAVEMENT
- (N) CONCRETE FOUNDATION
- (N) LANDSCAPE ADJUSTMENT(2)
- (N) WALL

Project Site Zoning		PVCCSP Standard	Consistent
Proposed Zoning	PVCC Commercial	PVCC Residential	Specific Plan Amendment Required
Project Site Area		**PVCCSP Standard**	**Consistent**
Area (Existing) (s.f.)	40,915	-	-
Area (Proposed) (s.f.)	39,453	-	
Proposed Equipment Area (s.f.)	6,291	-	-
Proposed Canopy Area (s.f.)	3,890	-	-
Proposed Coverage Total (%)	26	50 percent maximum	☑
Height		**PVCCSP Standard**	**Consistent**
Proposed Canopy Height	20 feet	45 feet maximum	☑
Accessory Structure Setbacks		**PVCCSP Standard**	**Consistent**
Proposed Front (Webster Ave)	~190 feet	15 feet	☑
Proposed Rear Side (east)	~1 foot	10 feet	☑
Proposed Interior (north)	~1 foot	10 feet	☑
Canopy Setbacks		**PVCCSP Standard**	**Consistent**
Proposed Front (Webster Ave)	~149 feet	15 feet	☑
Proposed Rear Side (east)	~123 feet	10 feet	☑
Proposed Interior (north)	~26 feet	10 feet	☑
Landscaping		**PVCCSP Standard**	**Consistent**
Proposed Coverage (s.f.)	7,090	-	-
Proposed Coverage (%)	18	10 percent minimum	☑

CONSTRUCTION NOTES

1. (N) H_2 DISPENSERS(1)
2. (N) MAIN ELECTRICAL SWITCHGEAR(1)
3. (N) UTILITY TRANSFORMER(1)
4. (N) HMI(1)
5. (N) SUPPLY CABINET – VALVE PANEL(1)
6. (N) H_2 STORAGE(1)
7. (N) STATION MODULE(1)
8. (N) CANOPY (MODIFIED CHEVRON SG-3)(1)
9. (N) CANOPY (MODIFIED CHEVRON T4)(1)
10. (N) CURB PER SECTION B ON SHEET C9
11. (N) AC PAVING PER DETAIL 1 ON SHEET C9
12. (N) CONCRETE PAVING PER DETAIL 2 ON SHEET C9
13. (N) CONCRETE FOUNDATION(1)

CONSTRUCTION NOTES

14. (N) AIR COMPRESSOR(1)
15. (N) CNG MOTOR STARTER PANEL(1)
16. (N) CNG VALVE PANEL(1)
17. (N) CNG STORAGE(1)
18. (N) CNG DUPLEX COMPRESSOR(1)
19. (N) CNG GAS DRYER(1)
20. (N) DIESEL FUELING ELECTRICAL EQUIPMENT BUILDING(1)
21. (N) GAS MSA(1)
22. (N) DIESEL UNDERGROUND STORAGE TANKS(1)
23. (N) DIESEL DISPENSER(1) (SINGLE SIDED DISPENSER, MASTER SOUTH SIDE ONLY)
24. (N) DIESEL DISPENSER(1) (DUAL SIDED DISPENSER, SATELLITE NORTH & MASTER SOUTH SIDE)

CONSTRUCTION NOTES

25. (N) DIESEL DISPENSER(1) (SINGLE SIDED DISPENSER, SATELLITE NORTH SIDE ONLY)
26. (N) CNG DISPENSER(1) (DUAL SIDED DISPENSER, FUELING HOSE SOUTH SIDE ONLY)
27. (N) CNG DISPENSER(1) (DUAL SIDED DISPENSER, FUELING HOSE ON NORTH & SOUTH)
28. (N) LANDSCAPE ADJUSTMENT(2)
29. (N) BOLLARD (TYP)(1)
30. (N) POINT OF SALES(1)
31. (N) WALL(1)
32. (N) VENT RISER(1)
33. (N) CONTECH MODULAR WETLANDS STORMWATER BIORETENTION (MWS-L-8-8-V) (SEE SHEET C9)
34. (N) STANDARD 48" MANHOLE
35. (N) PARKWAY & SIDEWALK PER PVCC FIG 5.0-1 & SECTION A ON SHEET C9

CONSTRUCTION NOTES

36. (N) STEET LIGHT (SEE SHEET E1)
37. (N) EMERGENCY SHUT-DOWN PANEL(1)
38. (N) CONTECH CD2015-4-C OIL/WATER SEPARATOR (SEE SHEET C9)
39. (N) NETWORK CABINET(1)
40. (N) EMERGENCY DIESEL SHUT-OFF(1)
41. (N) ELECTRICAL EQUIPMENT(1)
42. (N) ELECTRICAL EQUIPMENT(1)
43. (N) ELECTRICAL EQUIPMENT(1)
44. (N) REMOVABLE BOLLARDS(1)
45. (N) STANDARD CATCH BASIN
46. (N) WET WELL & PUMP

(1) SEE ELECTRICAL & MECHANICAL SHEETS FOR DESIGN
(2) SEE LANDSCAPING SHEETS FOR DESIGN

E IS THE CURRENT DRAWING SET REVISION NUMBER

MARK	DATE	REVISIONS	INITIAL	MARK	DATE	REVISIONS	INITIAL
D	07/17/24	ISSUED FOR INTERNAL REVIEW	BGA				
C	07/10/24	ISSUED FOR 60% MODEL REVIEW	BGA				
B	05/06/24	REISSUED FOR PLANNING REVIEW	BGA				
A	10/27/23	ISSUED FOR PLANNING REVIEW	BGA	E	08/19/24	ISSUED FOR PWQMP	BGA

4063 N WEBSTER AVE
PERRIS, CA
SERVICE STATION #308922

Stantec
601 SW Second Avenue Suite 1400
Portland OR 97204-3128
(503) 226-7377
www.stantec.com

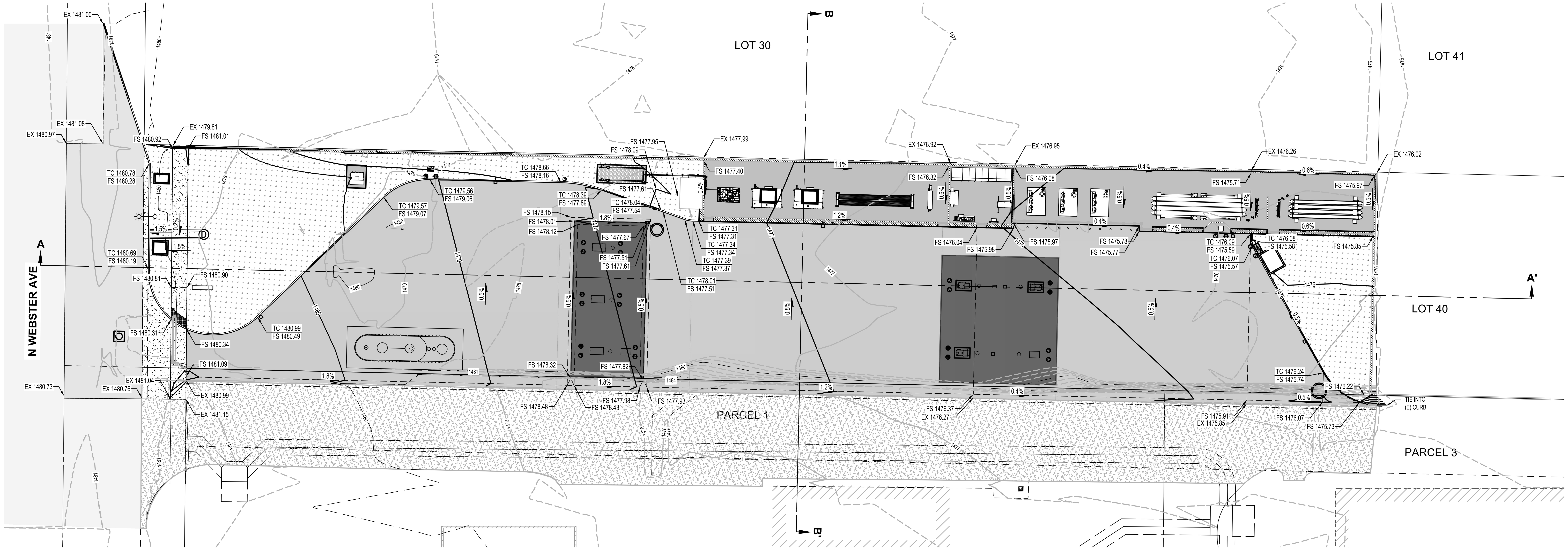
SITE PLAN

MILESTONES

PROJECT PHASE	DATE	INITIALS
ISSUED FOR PLANNING	10/27/23	BGA
ISSUED FOR PERMIT		
ISSUED FOR BID		
ISSUED FOR CONSTRUCTION		

SS# 308922
JOB# 2057297530
SCALE: AS NOTED

SHEET C5

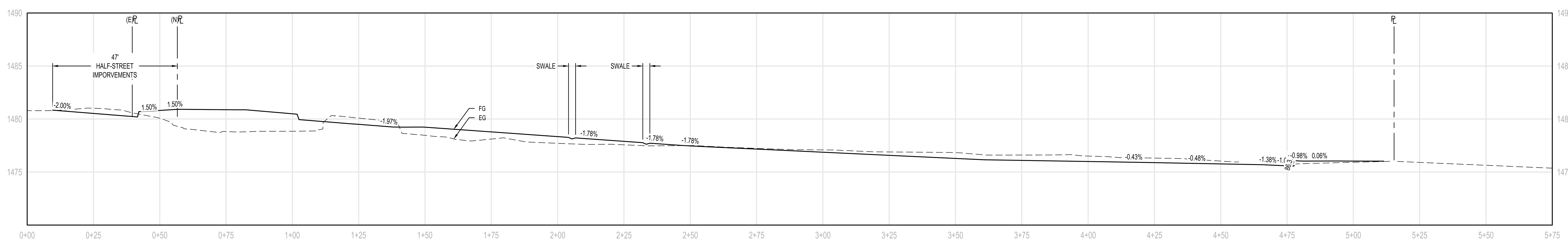


LEGEND

—1644—	(E) 1' CONTOUR
—1645—	(E) 5' CONTOUR
—107—	(N) 1' CONTOUR
—105—	(N) 5' CONTOUR
	(E) ℄
	(E) EASEMENT
	(E) SETBACK
	(E) LANDSCAPE
	(E) CONCRETE
	(E) AC PAVEMENT
	(N) GRADE BREAK
	(N) STRUCTURE
	(N) AC PAVEMENT
	(N) CONCRETE PAVEMENT
	(N) CONCRETE FOUNDATION
	(N) CONCRETE
	(N) LANDSCAPE ADJUSTMENT
	(N) WALL

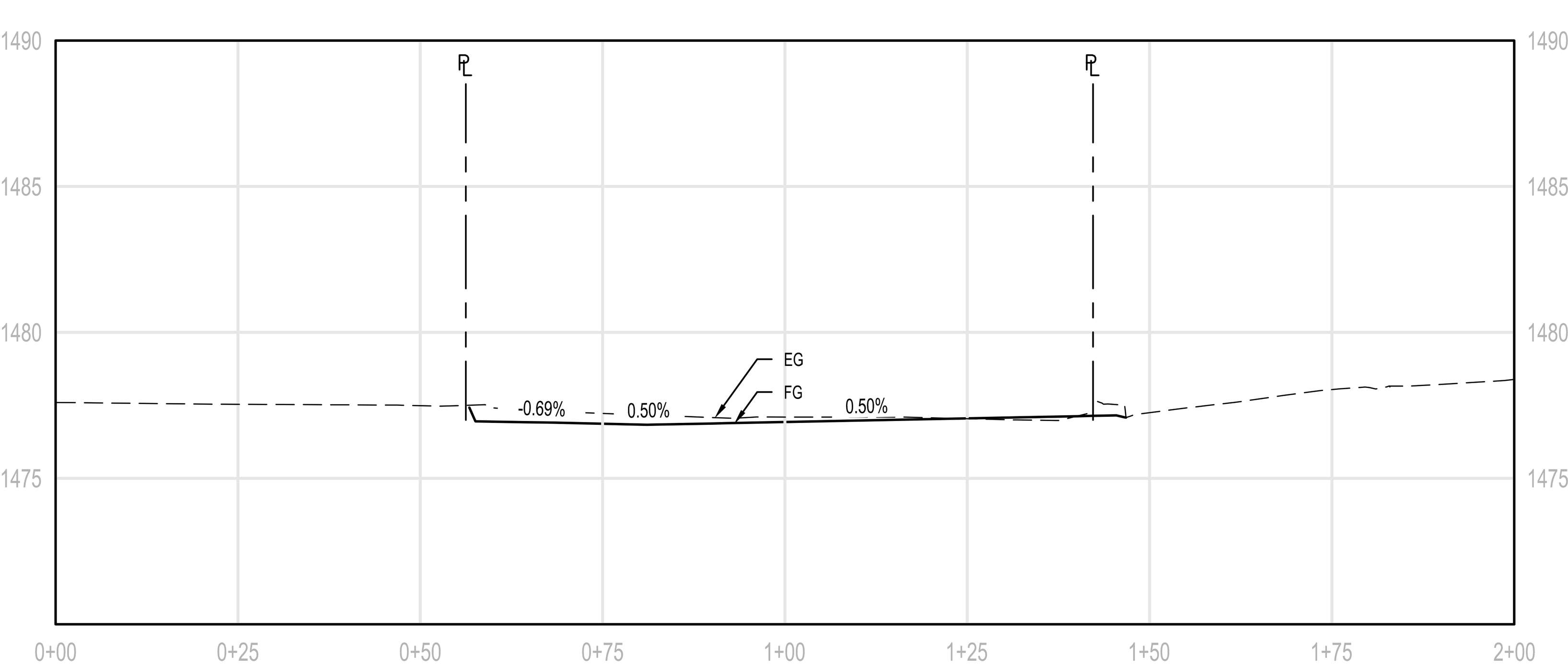
OVERALL GRADING PLAN

SCALE: 1"=20'



GRADING SECTION A-A'

SCALE: H:1"=20' V:1"=5'



GRADING SECTION B-B'

SCALE: H:1"=20' V:1"=5'

E IS THE CURRENT DRAWING SET REVISION NUMBER

MARK	DATE	REVISIONS	INITIAL	MARK	DATE	REVISIONS	INITIAL
D	07/17/24	ISSUED FOR INTERNAL REVIEW	BGA				
C	07/10/24	ISSUED FOR 60% MODEL REVIEW	BGA				
B	05/06/24	REISSUED FOR PLANNING REVIEW	BGA				
A	10/27/23	ISSUED FOR PLANNING REVIEW	BGA	E	08/19/24	ISSUED FOR PWQMP	BGA

Chevron

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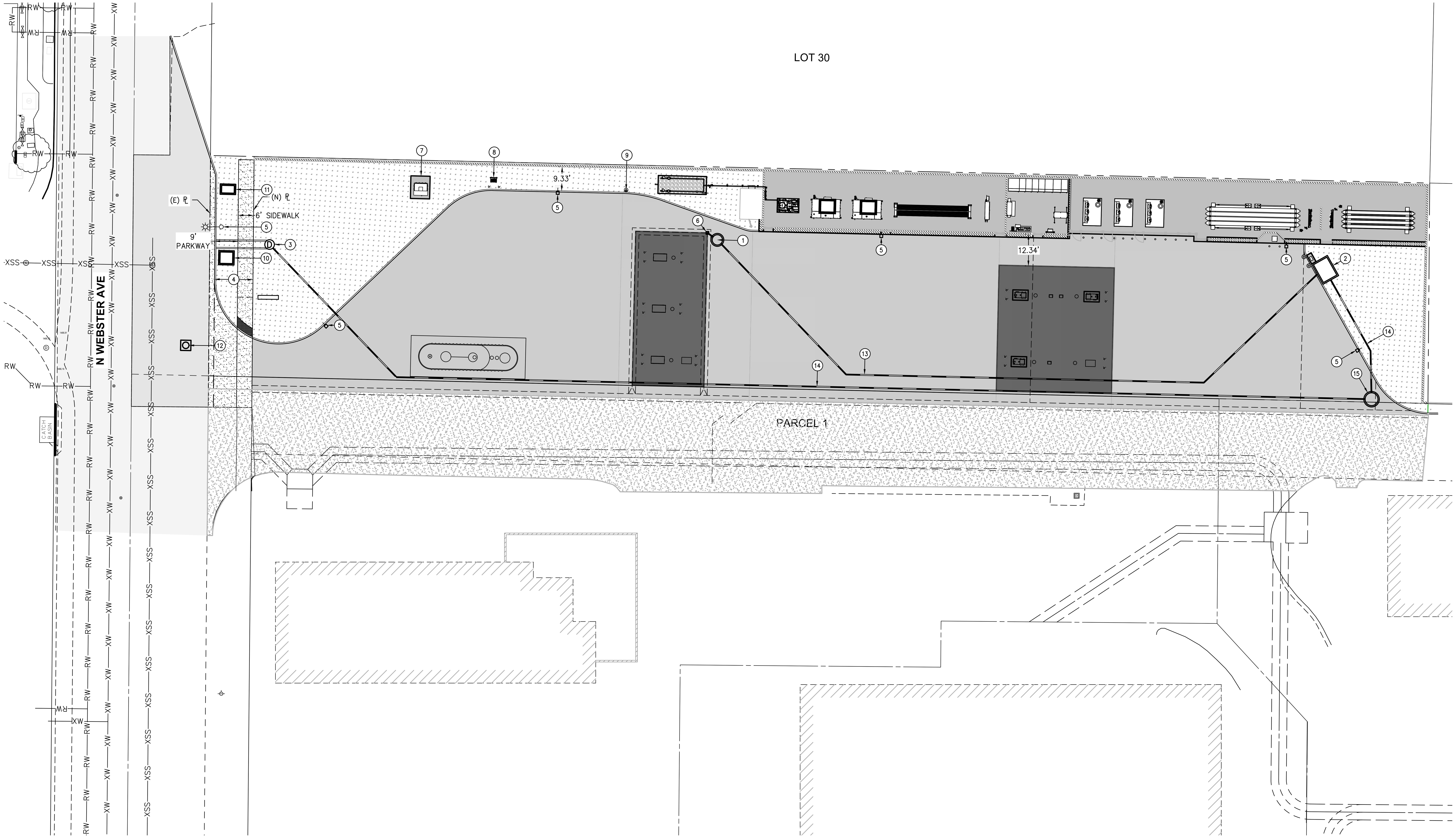
OVERALL GRADING PLAN

MILESTONES

PROJECT PHASE	DATE	INITIALS
ISSUED FOR PLANNING	10/27/23	BGA
ISSUED FOR PERMIT		
ISSUED FOR BID		
ISSUED FOR CONSTRUCTION		

SS# 308922
JOB# 2057297530
SCALE: AS NOTED
SHEET C6



LEGEND

- (E) ℞
- (E) EASEMENT
- (E) SETBACK
- (E) LANDSCAPE
- (E) CONCRETE
- (E) AC PAVEMENT
- (N) GRADE BREAK
- (E) WATER
- (E) RECLAIMED WATER
- (E) SANITARY SEWER
- (E) STORMWATER
- (N) STORMWATER & MH
- (N) STRUCTURE
- (N) AC PAVEMENT
- (N) CONCRETE PAVEMENT
- (N) CONCRETE FOUNDATION
- (N) LANDSCAPE ADJUSTMENT
- (N) WALL

UTILITY NOTES

1. (N) CONTECH CD2015-4-C OIL/WATER SEPARATOR (SEE SHEET C9)
2. (N) CONTECH MODULAR WETLANDS STORMWATER BIORETENTION (MWS-L-8-8-V) (SEE SHEET C9)
3. (N) STANDARD 48" MANHOLE
4. (N) PARKWAY & SIDEWALK PER PVCC FIG 5.0-1
5. (N) STEET LIGHT (SEE SHEET E1)
6. (N) STANDARD CATCH BASIN
7. (N) TRANSFORMER(1)
8. (N) VENT RISER(1)
9. (N) EMERGENCY DIESEL SHUT-OFF(1)
10. (N) ELECTRICAL EQUIPMENT(1)
11. (N) ELECTRICAL EQUIPMENT(1)
12. (N) ELECTRICAL EQUIPMENT(1)
13. (N) HDPE SD PIPE
14. (N) FORCE MAIN
15. (N) WET WELL & PUMP

(1) SEE ELECTRICAL & MECHANICAL SHEETS FOR DESIGN

COMPOSITE UTILITY PLAN

SCALE: 1"=20'

E IS THE CURRENT DRAWING SET REVISION NUMBER

MARK	DATE	REVISIONS	INITIAL	MARK	DATE	REVISIONS	INITIAL
D	07/17/24	ISSUED FOR INTERNAL REVIEW	BGA				
C	07/10/24	ISSUED FOR 60% MODEL REVIEW	BGA				
B	05/06/24	REISSUED FOR PLANNING REVIEW	BGA				
A	10/27/23	ISSUED FOR PLANNING REVIEW	BGA	E	08/19/24	ISSUED FOR PWQMP	BGA

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COMPOSITE UTILITY PLAN

MILESTONES

PROJECT PHASE	DATE	INITIALS
ISSUED FOR PLANNING	10/27/23	BGA
ISSUED FOR PERMIT		
ISSUED FOR BID		
ISSUED FOR CONSTRUCTION		

SS# 308922
JOB# 2057297530
SCALE: AS NOTED
SHEET C7

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Chevron Perris H2
Geotechnical Investigation Report

Prepared for:
Chevron Products Company
6001 Bollinger Canyon Road, Suite L1000
San Ramon, California 94583

Prepared by:
Stantec Consulting Services Inc.
735 East Carnegie Drive, Suite 280
San Bernardino, CA 92408

Project No. 2057297530

May 1, 2024

Stantec Consulting Services Inc.
735 East Carnegie Drive, Suite 280
San Bernardino, California 92408

May 1, 2024

Ms. Alexandra Wines
Chevron Products Company
6001 Bollinger Canyon Road, Suite L1000
San Ramon, California 94583

RE: **GEOTECHNICAL INVESTIGATION REPORT**
Chevron Perris - H2 Addition
4063 North Webster Avenue
Perris, California 92571

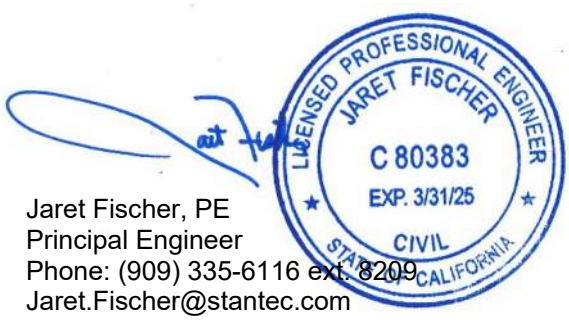
Dear Ms. Wines:

This letter transmits Stantec's geotechnical investigation report for the hydrogen, compressed natural gas (CNG), and diesel fueling addition to the Chevron franchise owned retail gasoline facility located in Perris, California. The purpose of this report is to evaluate the subsurface conditions and provide geotechnical recommendations for the proposed development.

We appreciate the opportunity to work with you on this project. If you have any questions, please call us at the numbers below.

Respectfully submitted,

STANTEC CONSULTING SERVICES INC.



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Principal, Senior Geotechnical Engineer
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Table of Contents

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CHEVRON PERRIS H2
GEOTECHNICAL INVESTIGATION REPORT

Introduction
May 1, 2024

1. INTRODUCTION

This report presents the results of Stantec's geotechnical investigation for the hydrogen fuel addition to Chevron retail facility in Perris, California. The project location is shown on the Site Location Map, Figure 1 and the approximate area of the proposed development is shown on the Site Vicinity Map, Figure 2.

1.1 PROPOSED DEVELOPMENT

We understand that the proposed hydrogen fueling addition at the Chevron retail facility will include construction of equipment pads, above ground hydrogen and CNG storage tanks, a diesel underground storage tank (UST), new CNG/diesel and hydrogen fueling canopies. The proposed hydrogen storage and equipment area is approximately 1,650 square feet (sf), the CNG storage and equipment area is approximately 2,200 sf, and the site is approximately 1-acre in size and is currently at the proposed rough grade elevation. The proposed hydrogen and CNG/diesel fueling canopies are approximately 1,500 sf and 1,540 sf, respectively. The area of the proposed site improvements is shown on the Subsurface Exploration Map, Figure 3.

1.2 PURPOSE AND SCOPE OF WORK

1.2.1 Purpose

The purpose of this report is to evaluate the subsurface conditions at the site and provide geotechnical recommendations for design and construction of the proposed project. This report has been prepared in general accordance with accepted geotechnical engineering principles and in general conformance with the approved proposal.

1.2.2 Scope of Work

Our scope of work consisted of the following:

- Review available subsurface information for the site and nearby locations,
- Perform a site reconnaissance to evaluate general geotechnical and site conditions,
- Perform a field subsurface exploration program consisting of drilling five hollow stem auger borings, converting two of them to percolation wells, and conducting percolation testing,
- Perform geotechnical laboratory tests on selected samples,
- Perform geotechnical engineering analyses, and
- Preparation of this geotechnical investigation report for the proposed project.

2. FIELD INVESTIGATION

2.1 PRE-DRILLING PROCEDURES

DigAlert (Underground Service Alert of Southern California) was notified before commencing subsurface exploration activities to identify underground utilities that could conflict with the proposed boring. In addition, a private utility locator was retained, and the upper five feet were hand augered to clear the boring location for potential conflict with underground utilities.

2.2 DRILLING OPERATIONS

The four soil borings (B1, B2, B3, P1, and P2) were drilled using a Simco 2800 drill rig equipped with hollow-stem augers on April 5, 2024, by 2R Drilling (2R). Soil borings were advanced to depths ranging from 5 feet below the existing ground surface (bgs) to approximately 51.5 feet bgs, and their approximate locations are shown on the Subsurface Exploration Map, Figure 3. The borings were logged by a Stantec field geologist, who also collected samples of the materials encountered for examination and laboratory testing.

2.3 SAMPLING

Relatively undisturbed samples were obtained using a modified California (CAL) sampler, which is a ring-lined split tube sampler with a 3-inch outer diameter and 2½-inch inner diameter. CAL sampling followed ASTM D3550 (Standard Practice for Ring-Lined Barrel Sampling of Soils) procedures. Disturbed samples were obtained using a Standard Penetration Test (SPT) sampler, which is a split tube sampler with a 2-inch outer diameter and 1⅜-inch inner diameter. SPTs were performed in general accordance with ASTM D1586 (Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils), and D6066 (Standard Practice for Determining the Normalized Penetration Resistance of Sands for Evaluation of Liquefaction Potential). Disturbed bulk samples were also obtained from the drill cuttings.

The CAL and SPT samplers were driven with a 140-pound weight dropping 30 inches. The number of blows per 6-inch increment is noted on the boring logs. 2R provided a report (2R, 2023) which indicates the average hammer energy efficiency on the drill rig used at the project was 84%.

Samples were classified in the field using the Unified Soil Classification System (USCS), in accordance with ASTM D2488 (Standard Practice for Description and Identification of Soils [Visual-Manual Method]) procedures. The laboratory testing confirmed or modified field classifications as necessary for presentation on the boring logs. Soil samples were removed from the samplers, placed in appropriate containers, and transported in accordance with ASTM D4220 (Standard Practice for Preserving and Transporting Soil Samples). Upon completion, borings were backfilled with soil cuttings. The boring logs are included in Appendix A.

3. LABORATORY TESTING

The following laboratory tests were performed in general accordance with ASTM and California Test procedures:

Table 1. Summary of Laboratory Tests

Type of Test	ASTM Designation	Number Performed
Gradation Analysis	ASTM D4200	6
Direct Shear	ASTM D3080	5
R-Value	ASTM D2844	1
Chemical Tests for Corrosion Potential	CA DOT test methods	2

The laboratory test results are presented in Appendix B.

4. GEOLOGIC SETTING AND SITE CONDITIONS

4.1 REGIONAL GEOLOGY

The Site is located in the northern portion of the Peninsular Range Geomorphic Province in the southwestern part of California. The region is separated by northwest trending valleys, subparallel to faults branching from the San Andreas Fault. The regional topography consists of northwest trending mountain ranges and valleys. The Site resides in the portion of the province drained by the Perris Valley Storm Drain which flows into the San Jacinto River.

Geologic mapping presented in the Geologic Map of the Perris quadrangles, Riverside County, California (Dibblee, 2003) indicates the site is underlain by Quaternary alluvial (Qa) deposits. Literature from Dibblee indicates the alluvial deposits consist of sand and clay of valley areas.

4.2 SURFACE CONDITIONS

The project site is approximately 1-acre in size and is occupied by an existing single-family residence on the western quarter of the property and vacant land with what appears to be a construction company's storage yard on the eastern three quarters of the property. The project site is bound by N. Webster Avenue followed by a Ferguson Plumbing Supply warehouse building to the west, an existing retail development that includes a Chevron retail gasoline facility and three retail office buildings to the south, and single family residential properties to the east and north.

The site is generally flat and slopes from west to east. Based on Google Earth®, the ground surface of the site is at an approximate elevation of 1,475 to 1,481 feet (WGS84 Datum).

4.3 SUBSURFACE CONDITIONS

The materials encountered in our borings consist of artificial fill (af) followed by Quaternary alluvial (Qa) deposits. A brief description of the subsurface conditions is provided in this section. Detailed descriptions of the subsurface conditions are provided in the boring logs included in Appendix A.

Artificial Fill (af) – artificial fill deposits were encountered from the ground surface in in all soil borings and extends to a depth of approximately 1-foot bgs. The artificial fill deposits encountered at this location primarily consist of sand with variable amounts of silt and gravel (SM USCS soil type). The sandy deposits encountered were loose to medium dense, and generally dry to moist.

Quaternary Alluvial Deposits (Qa) – Alluvial deposits were encountered beneath the artificial fill in all soil borings and extend to depths of at least 51.5 feet bgs. The alluvial deposits encountered at this location primarily consist of sand with variable amounts of silt (SW, SW-SM, SM and SC USCS soil type) and silt with variable amounts of sand (ML). The sandy deposits encountered were loose to very dense, and generally dry to moist. The low plasticity silt deposits were soft to hard, and generally dry to moist.

Groundwater – Groundwater was not encountered during this investigation to a maximum depth of 51.5 feet. Based on groundwater monitoring data collected at an offsite location approximately one mile east of the site, the depth to groundwater is approximately 79 to 80 feet (Delta, 2009). Historical high depth to groundwater in the site vicinity is not available from the California Geological Survey. Groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage.

Table 6. Recommended Concrete Pavement Sections

Traffic Type	Pavement Thickness (inches)	Aggregate Base (inches)
Automobile Parking and Driveways (TC = A)	6	6
Heavy Truck Traffic and Fire Lane Areas (TC = C)	8	6

The project civil engineer should confirm whether the assumed ADTT is appropriate for the anticipated traffic level. Concrete compressive strength for pavement should be at least 3,700 psi. Minimum reinforcement should consist of #3 bars on 24-inch centers. Crack control joints should be placed in accordance with the American Concrete Institute (ACI) guidelines.

Prior to placing concrete, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned to slightly above the optimum moisture content, and recompacted to a dry density of at least 90% of the laboratory maximum.

7.6 PERCOLATION TESTING

Percolation testing was performed in two borings (P1 and P2) in general accordance with the guidelines described in Riverside County – Low Impact Development BMP Design Handbook (RCBMPDH, 2011).

Based on the laboratory sieve test results, the natural soils located at the bottom of the percolation well soil borings consist of sand (USCS: SM) with variable amounts of silt. The sands were to brown, moist, and medium dense.

The percolation tests were performed in an eight-inch diameter, 5.2 feet deep boring. Pre-soaking was performed the day prior to percolation testing. The stabilized percolation rate from the final tests was measured as 1.2 to 14.4 inches per hour or 4 to 50 minutes per inch which corresponds to a low to moderate percolation rate (un-factored). The percolation test data is presented in Appendix D.

Riverside County requirements for infiltration include converting the percolation rate to an infiltration rate (I_t) and a safety factor. Once the infiltration rate was calculated and a factor of safety of 3 is applied, the average design infiltration rate is 0.2 inches per hour. Given the low design rate, Stantec recommends designing the stormwater system without infiltration.

Soil percolation rates from in situ tests can vary significantly from one location to another due to heterogeneous characteristics of subsurface conditions. The test results from these borings should be considered a screening level value and additional testing should be performed if an on-site disposal system is to be constructed for the project. Soil compaction can decrease infiltration rates significantly. Final percolation testing should be performed in as graded conditions so that effects from soil compaction are incorporated in the test results.

7.7 POST INVESTIGATION SERVICES

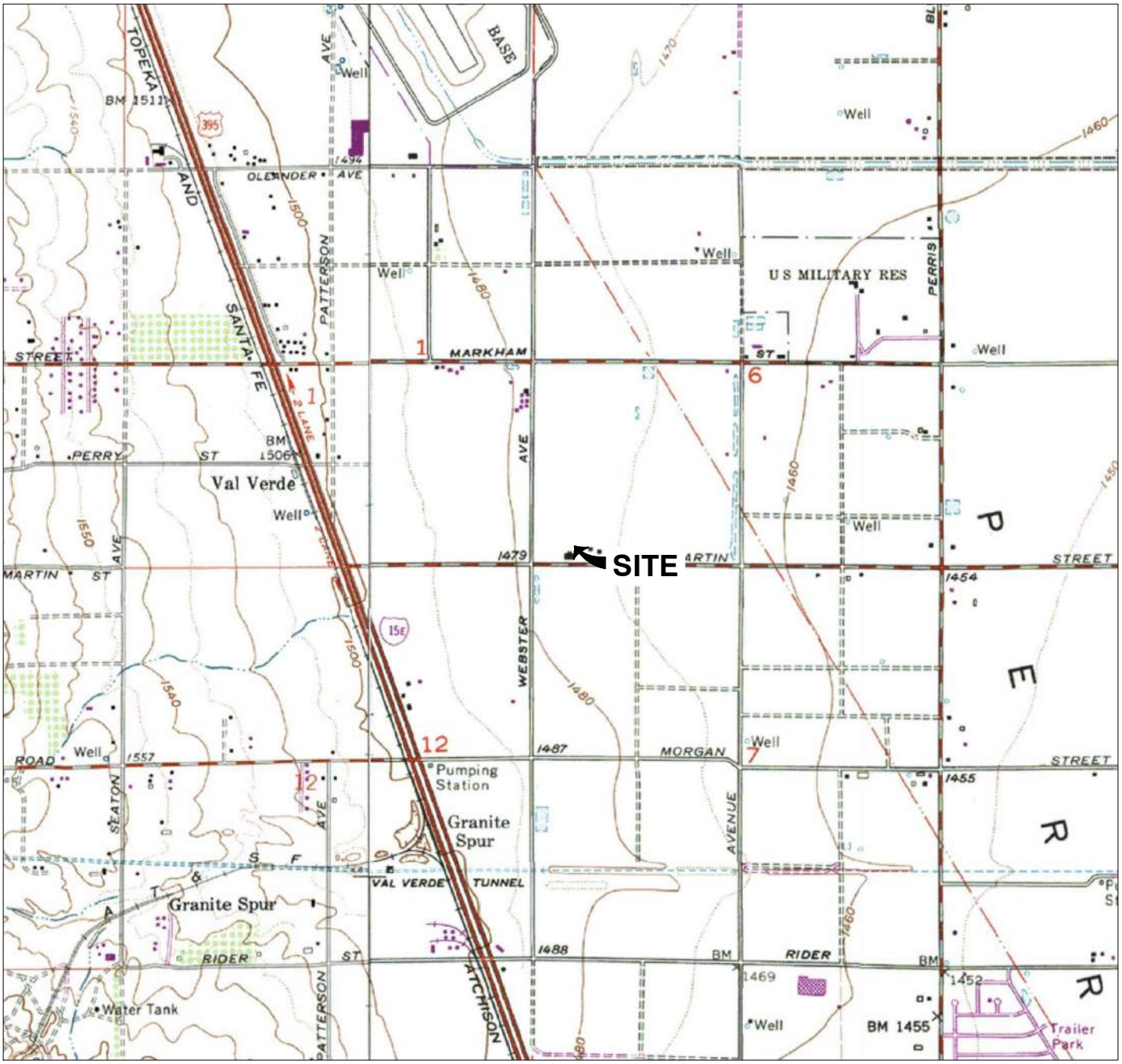
Post investigation services are an important and necessary continuation of this investigation, and it is recommended that Stantec be retained as the Geotechnical Engineer to perform such services. Final project grading and foundation plans, foundation details and specifications should be reviewed by Stantec prior to construction to ascertain that the intent of the recommendations presented herein have been applied to the design. Following review of plans and specifications, observation during construction should be performed to correlate the findings of this exploration with the actual subsurface conditions exposed.

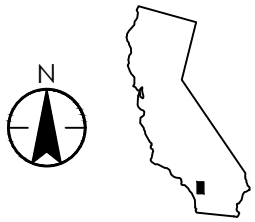
8. CLOSURE

Our conclusions, recommendations, and discussions presented herein are based upon an evaluation and interpretation of the findings from the field and laboratory programs, with interpolation and extrapolation of subsurface conditions between and beyond the exploration locations. This report contains information that is valid as of the report's date and to the extent directly known to Stantec. However, conditions can change with the passage of time or construction subsequent to this report's preparation that may invalidate, either partially or wholly, the conclusions and recommendations presented herein.

Inherent in most projects performed in the heterogeneous subsurface environment, continuing subsurface explorations and analyses may reveal conditions that are different than those described in this report. The findings and recommendations contained in this report were developed in accordance with generally accepted, current professional principles and practice ordinarily exercised, under similar circumstances, by geotechnical engineers and engineering geologists practicing in this locality. No other warranty, express or implied, is made.

FIGURES





1 1/2 0 1

SCALE IN MILE

1000 0 1000 2000 3000 4000 5000 6000 7000

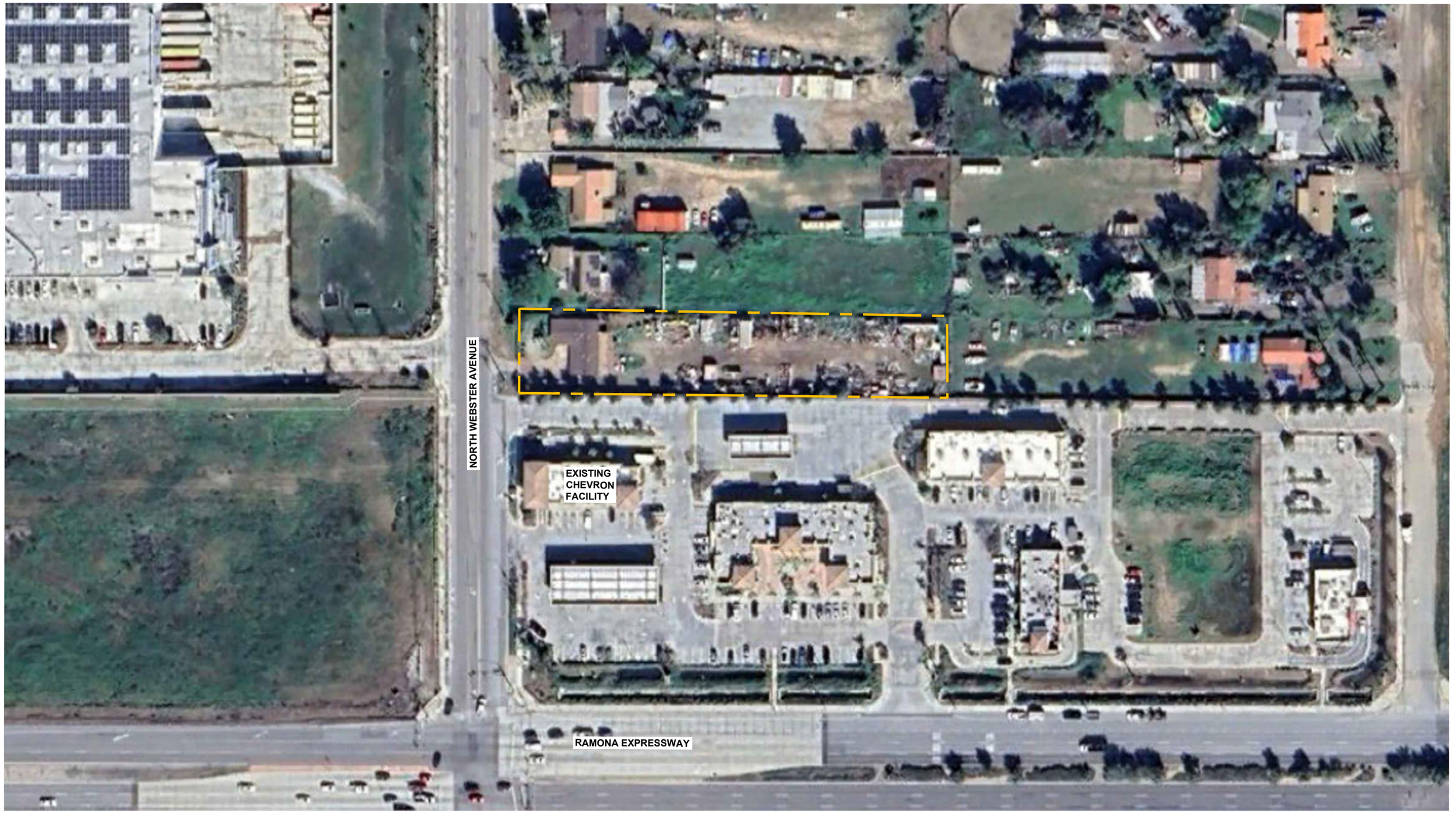
SCALE IN FEET

REFERENCE: USGS 7.5 X 15 MINUTE QUADRANGLE; PERRIS, 1979

Stantec
735 E CARNEGIE DRIVE, SUITE 280
SAN BERNARDINO, CA 92408
PHONE:(909) 335-6116 FAX:(909) 335-6120

FOR:			FIGURE:
CHEVRON H2 4063 NORTH WEBSTER AVENUE PERRIS, CALIFORNIA 92571		SITE LOCATION MAP	1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
2057297530	JEF	JEF	JEF	5/2/24



EXPLANATION

APPROXIMATE LOCATION OF PROPERTY BOUNDARY

N

0 100 200

APPROXIMATE SCALE (FEET)

Stantec

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SAN BERNARDINO, CA 92408
PHONE: (909) 335-6116 FAX: (909) 335-6120

FOR:
CHEVRON H2
4063 NORTH WEBSTER AVENUE
PERRIS, CALIFORNIA 92571

SITE VICINITY MAP

FIGURE: 2

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
2057297530	JEF	JEF	JEF	5/2/24

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EXPLANATION

- P2 — APPROXIMATE LOCATION OF PERCOLATION TESTS
- B3 — APPROXIMATE LOCATION OF GEOTECHNICAL SOIL BORING LOCATIONS
- PROPOSED SITE IMPROVEMENTS
- APPROXIMATE SITE BOUNDARY

N

0 40 80

APPROXIMATE SCALE (FEET)

Stantec
735 E CARNEGIE DRIVE, SUITE 280
SAN BERNARDINO, CA 92408
PHONE:(909) 335-6116 FAX:(909) 335-6120

FOR:				FIGURE:
CHEVRON H2 4063 NORTH WEBSTER AVENUE PERRIS, CALIFORNIA 92571		SUBSURFACE EXPLORATION MAP		3
JOB NUMBER: 2057297530	DRAWN BY: JEF	CHECKED BY: JEF	APPROVED BY: JEF	DATE: 5/2/24

FILEPATH:V:\1858\business_development\chevron\hydrogen_fuel_program\perris_h2_fueling\figures\chevron_perris_hydrogen_addition_figures.dwg modified by JFischer on May 03, 2024 at 20:49

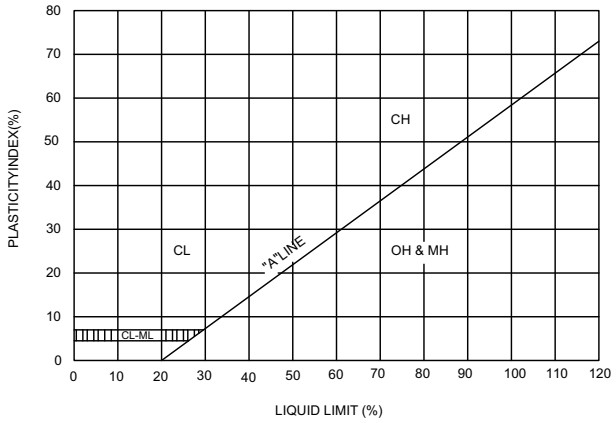
APPENDIX A
BORING LOGS

UNIFIED SOIL CLASSIFICATION (ASTM D-2487)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	*CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		*GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	*CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		*SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

* Dual symbols required for fines content between 5% and 12%

PLASTICITY CHART



SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Rock Core
- Shelby Tube
- No Recovery
- Grab Sample

ADDITIONAL TESTS

COR	-	CHEMICAL ANALYSIS (CORROSIVITY)	PI	-	PLASTICITY INDEX
CD	-	CONSOLIDATED DRAINED TRIAXIAL	EI	-	EXPANSION INDEX
CN	-	CONSOLIDATION	TC	-	CYCLIC TRIAXIAL
CU	-	CONSOLIDATED UNDRAINED TRIAXIAL	TV	-	TORVANE SHEAR
DS	-	DIRECT SHEAR	UC	-	UNCONFINED COMPRESSION
PP	-	POCKET PENETROMETER (TSF)	(1.5)	-	(WITH SHEAR STRENGTH IN KSF)
#200	-	Percent Passing #200 SIEVE			
RV	-	R-VALUE	UU	-	UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	-	SIEVE ANALYSIS: % PASSING			
▼	-	WATER LEVEL			

PENETRATION RESISTANCE (RECORDED AS BLOWS / FOOT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5-1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

* * UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

LEGEND TO BORING LOGS AND SOIL DESCRIPTIONS

Stantec

PROJECT: **Chevron Perris H2**
LOCATION: **4063 North Webster Avenue, Perris, CA 92571**
PROJECT NUMBER: **2057297530**
DRILLING: STARTED **4/5/24** COMPLETED: **4/5/24**
INSTALLATION: STARTED **4/5/24** COMPLETED: **4/5/24**
DRILLING COMPANY: **2R Drilling**
DRILLING EQUIPMENT: **Simco 2800**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO: **B1** PAGE 1 OF 3
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 50' 44.65"** LONGITUDE: **117° 14' 36.03"**
GROUND ELEV (ft): **1480** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **51.5**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **W. Shofner** CHECKED BY: **J. Fischer**

Time & Depth (feet)	USCS	Description	Sample	Time Sample ID	Geotech Laboratory Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
	SM	**ARTIFICIAL FILL (af)** **SILTY SAND WITH GRAVEL** ; SM		B1-Bulk	CORR, RVAL			
	SM	**QUATERNARY ALLUVIUM (Qa)** **SILTY SAND** ; SM; dark brown; 56% fine to coarse grained sand; 44% fines; dry; loose		B1-2'	SA			
5		Medium dense below 5 feet		B1-5'	DS	12 15 22		5
		85% fine to coarse grained sand; 15% fines; very dense below 7 feet		B1-7'		10 18 45		
10		Very dense below 10 feet		B1-10'	DS	14 50-6"		10
15		Dense below 15 feet		B1-15'		13 17 19		15
20	SC	**CLAYEY SAND** ; SC; dark brown; 55% fine to coarse grained sand; 45% fines; moist; dense		B1-20'		9 15 32		20

GEO FORM 304 CHEVRON_PERRIS_LOGS.GPJ SECOR INTL.GDT 5/4/24

PROJECT: **Chevron Perris H2**
LOCATION: **4063 North Webster Avenue, Perris, CA 92571**
PROJECT NUMBER: **2057297530**
DRILLING: STARTED **4/5/24** COMPLETED: **4/5/24**
INSTALLATION: STARTED **4/5/24** COMPLETED: **4/5/24**
DRILLING COMPANY: **2R Drilling**
DRILLING EQUIPMENT: **Simco 2800**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO: **B1** PAGE 2 OF 3
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 50' 44.65"** LONGITUDE: **117° 14' 36.03"**
GROUND ELEV (ft): **1480** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **51.5**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **W. Shofner** CHECKED BY: **J. Fischer**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotech Laboratory Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
25		SM	**SILTY SAND** ; SM; pale brown; 80% fine to coarse grained sand; 20% fines; dry; very dense		B1-25'		20 24 30		25
30			Dense below 30 feet		B1-30'		13 19 24		30
35					B1-35'		11 18 20		35
40			Very dense below 40 feet		B1-40'		23 27 37		40

GEO FORM 304 CHEVRON_PERRIS_LOGS.GPJ SECOR INTL.GDT 5/4/24

PROJECT: **Chevron Perris H2**
LOCATION: **4063 North Webster Avenue, Perris, CA 92571**
PROJECT NUMBER: **2057297530**
DRILLING: STARTED **4/5/24** COMPLETED: **4/5/24**
INSTALLATION: STARTED **4/5/24** COMPLETED: **4/5/24**
DRILLING COMPANY: **2R Drilling**
DRILLING EQUIPMENT: **Simco 2800**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO: **B1** PAGE 3 OF 3
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 50' 44.65"** LONGITUDE: **117° 14' 36.03"**
GROUND ELEV (ft): **1480** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **51.5**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **W. Shofner** CHECKED BY: **J. Fischer**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotech Laboratory Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
45			Dense below 45 feet		B1-45'		11 13 17		45
50		SW-SM	**WELL GRADED SAND WITH SILT** ; SW-SM; grayish brown; 90% fine to coarse grained sand; 10% fines; dry; medium dense		B1-50'		11 13 13		50
			Hole terminated at 51.5 feet.						
55									55
60									60
65									65

GEO FORM 304 CHEVRON_PERRIS_LOGS.GPJ SECOR INTL.GDT 5/4/24

PROJECT: **Chevron Perris H2**
LOCATION: **4063 North Webster Avenue, Perris, CA 92571**
PROJECT NUMBER: **2057297530**
DRILLING: STARTED **4/5/24** COMPLETED: **4/5/24**
INSTALLATION: STARTED **4/5/24** COMPLETED: **4/5/24**
DRILLING COMPANY: **2R Drilling**
DRILLING EQUIPMENT: **Simco 2800**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO: **B2** PAGE 1 OF 2
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 50' 44.9"** LONGITUDE: **117° 14' 34.55"**
GROUND ELEV (ft): **1477** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **31.5**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **W. Shofner** CHECKED BY: **J. Fischer**

Time & Depth (feet)	USCS	Description	Sample	Time Sample ID	Geotech Laboratory Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
	SM	**ARTIFICIAL FILL (af)** **SILTY SAND WITH GRAVEL** ; SM		B2-Bulk				
	SM	**QUATERNARY ALLUVIUM (Qa)** **SILTY SAND** ; SM; dark brown; 1% fine gravel; 60% fine to coarse grained sand; 39% fines; dry; loose		B2-2'	SA			
5	ML	**SILT** ; ML; dark brown; 10% fine grained sand; 90% fines; non plastic; moist; stiff		B2-5'		4 5 6		5
	SM	**SILTY SAND** ; SM; dark brown; 1% fine gravel; 51% fine to medium grained sand; 48% fines; medium dense; moist		B2-7'	SA, DS	13 12 18		
10		85% fine to medium grained sand; 15% fines below 10 feet		B2-10'		6 5 5		10
15		Very dense below 15 feet		B2-15'		9 28 43		15
20		Medium dense below 20 feet		B2-20'		7 10 9		20

GEO FORM 304 CHEVRON_PERRIS_LOGS.GPJ SECOR INTL.GDT 5/4/24

PROJECT: **Chevron Perris H2**
LOCATION: **4063 North Webster Avenue, Perris, CA 92571**
PROJECT NUMBER: **2057297530**
DRILLING: STARTED **4/5/24** COMPLETED: **4/5/24**
INSTALLATION: STARTED **4/5/24** COMPLETED: **4/5/24**
DRILLING COMPANY: **2R Drilling**
DRILLING EQUIPMENT: **Simco 2800**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO: **B2** PAGE 2 OF 2
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 50' 44.9"** LONGITUDE: **117° 14' 34.55"**
GROUND ELEV (ft): **1477** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **31.5**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **W. Shofner** CHECKED BY: **J. Fischer**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotech Laboratory Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
25		SW	**WELL GRADED SAND** ; SW; greenish gray; 95% fine to coarse grained sand; 5% fines; medium dense; moist		B2-25'		10 12 14		25
30		SM	**SILTY SAND** ; SM; dark grayish brown; 85% fine to medium grained sand; 15% fines; medium dense; moist		B2-30'		11 12 10		30
			Hole terminated at 31.5 feet.						
35									35
40									40

GEO FORM 304 CHEVRON_PERRIS_LOGS.GPJ SECOR INTL.GDT 5/4/24

PROJECT: **Chevron Perris H2**
LOCATION: **4063 North Webster Avenue, Perris, CA 92571**
PROJECT NUMBER: **2057297530**
DRILLING: STARTED **4/5/24** COMPLETED: **4/5/24**
INSTALLATION: STARTED **4/5/24** COMPLETED: **4/5/24**
DRILLING COMPANY: **2R Drilling**
DRILLING EQUIPMENT: **Simco 2800**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO: **B3** PAGE 1 OF 1
NORTHING (ft): EASTING (ft):
LATITUDE: **35° 50' 45.03"** LONGITUDE: **117° 14' 33.34"**
GROUND ELEV (ft): **1475** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **21.5**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **---**
WELL CASING DIAMETER (in): **---** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **W. Shofner** CHECKED BY: **J. Fischer**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotech Laboratory Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
		SM	**ARTIFICIAL FILL (af)** **SILTY SAND WITH GRAVEL** ; SM		B3-Bulk	CORR			
		SM	**QUATERNARY ALLUVIUM (Qa)** **SILTY SAND** ; SM; dark brown; 1% fine gravel; 59% fine to coarse grained sand; 41% fines; dry; medium dense		B3-2'	SA			
5			85% fine to coarse grained sand; 15% fines; dense below 5 feet		B3-5'	DS	25 26 29		5
			Very dense below 7 feet		B3-7'		15 17 50-5"		
10			85% fine to medium grained sand; 15% fines below 10 feet		B3-10'	DS	31 50-5"		10
15			Medium dense below 15 feet		B3-15'		9 10 17		15
20			Very dense below 20 feet		B3-20'		12 30 43		20
			Hole terminated at 21.5 feet.						

GEO FORM 304 CHEVRON_PERRIS_LOGS.GPJ SECOR INTL.GDT 5/4/24

PROJECT: **Chevron Perris H2**
LOCATION: **4063 North Webster Avenue, Perris, CA 92571**
PROJECT NUMBER: **2057297530**
DRILLING: STARTED **4/5/24** COMPLETED: **4/5/24**
INSTALLATION: STARTED **4/5/24** COMPLETED: **4/5/24**
DRILLING COMPANY: **2R Drilling**
DRILLING EQUIPMENT: **Simco 2800**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO: **P1** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 50' 44.79"** LONGITUDE: **117° 14' 33.02"**
GROUND ELEV (ft): **1475** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **5.2**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **5.2**
WELL CASING DIAMETER (in): **2** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **W. Shofner** CHECKED BY: **J. Fischer**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotech Laboratory Testing	Blow Count	PID Reading (ppmv)	Depth (feet)	Well Construction
		SM	**ARTIFICIAL FILL (af)** **SILTY SAND WITH GRAVEL** ; SM							
		ML	**QUATERNARY ALLUVIUM (Qa)** **SANDY SILT** ; ML; dark brown; 47% fine to medium grained sand; 53% fines; dry; soft		P1-2'	SA				
5			Very stiff below 5 feet		P1-5'		10 9 10		5	Gravel Pack 5' by 2" PVC 0.010" slot
			Hole terminated at 6.5 feet.							
10									10	
15									15	
20									20	

GEO FORM 304 CHEVRON_PERRIS_LOGS.GPJ SECOR INTL.GDT 5/4/24

PROJECT: **Chevron Perris H2**
LOCATION: **4063 North Webster Avenue, Perris, CA 92571**
PROJECT NUMBER: **2057297530**
DRILLING: STARTED **4/5/24** COMPLETED: **4/5/24**
INSTALLATION: STARTED **4/5/24** COMPLETED: **4/5/24**
DRILLING COMPANY: **2R Drilling**
DRILLING EQUIPMENT: **Simco 2800**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO: **P2** PAGE 1 OF 1

Stantec

NORTHING (ft): EASTING (ft):
LATITUDE: **35° 50' 44.73"** LONGITUDE: **117° 14' 32.99"**
GROUND ELEV (ft): **1475** TOC ELEV (ft):
INITIAL DTW (ft): **NE** BOREHOLE DEPTH (ft): **5.2**
STATIC DTW (ft): **NE** WELL DEPTH (ft): **5.2**
WELL CASING DIAMETER (in): **2** BOREHOLE DIAMETER (in): **8**
LOGGED BY: **W. Shofner** CHECKED BY: **J. Fischer**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotech Laboratory Testing	Blow Count	PID Reading (ppmv)	Depth (feet)	Well Construction
		SM	**ARTIFICIAL FILL (af)** **SILTY SAND WITH GRAVEL** ; SM							
		ML	**QUATERNARY ALLUVIUM (Qa)** **SANDY SILT** ; ML; dark brown; 45% fine to medium grained sand; 55% fines; moist; soft		P2-2'					
5			1% fine gravel; 42% fine to coarse grained sand; 57% fines; dry; hard below 5 feet		P2-5'	SA	15 17 18		5	Gravel Pack 5' by 2" PVC 0.010" slot
			Hole terminated at 6.5 feet.							
10									10	
15									15	
20									20	

GEO FORM 304 CHEVRON_PERRIS_LOGS.GPJ SECOR INTL.GDT 5/4/24

APPENDIX D
PERCOLATION TEST RESULTS

Stantec

PERCOLATION TEST DATA SHEET							
Project:	Chevron Perris H2		Project No.	2057297530		Date:	4/19/2024
Test Hole No.		P1	Tested By:	A. Sobolew			
Depth of Test Hole, D_T:		5.2 ft	USCS Soil Classification	ML			
Test Hole Dimensions (inches)			Length	Width			
Diameter (if round)	8	Sides (if rectangular)					

Sandy Soil Test Criteria*

Tial No.	Start Time	Stop Time	Time Interval, (min)	Initial Depth of Water (in)	Final Depth of Water (in)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	8:35	9:05	59	59.3	57.75	1.55	N
2	9:05	9:35	25	59.3	57.5	1.75	N

*If two consecutive measurements show that six inches of water seeps away in less than 30 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 measurement per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Tial No.	Start Time	Stop Time	Δt, Time Interval, (min)	D_o, Initial Depth of Water (in)	D_f, Final Depth of Water (in)	ΔD, Change in Water Level (in.)	Percolation Rate (in/hour)
1	8:06	8:36	30	45.0	44.9	0.1	0.2
2	8:42	9:12	30	45.0	44.9	0.1	0.2
3	9:12	9:42	30	45.0	44.4	0.6	1.2
4	9:42	10:12	30	45.0	44.4	0.6	1.2
5	10:12	10:42	30	45.0	44.4	0.6	1.2
6	10:42	11:12	30	45.0	44.2	0.8	1.7
7	11:12	11:42	30	45.0	44.5	0.5	1.0
8	11:42	12:12	30	45.0	44.4	0.6	1.2
9	12:12	12:42	30	45.0	44.4	0.6	1.2
10	12:42	13:12	30	45.0	44.4	0.6	1.2
11	13:12	13:42	30	45.0	44.4	0.6	1.2
12	13:42	14:12	30	45.0	44.4	0.6	1.2
13							

Comments: $I_t = \Delta H\ (60\ r) / \Delta t\ (r + 2\ H_{avg}) = (1.2 \times 60 \times 4) / 30\ (4 + 2*(44.7)) = 0.1$ inch/hour

ΔH = 1.2 in. , Δt = 30 minutes, r = 4 in, Havg = (45+44.4)/2 = 44.7 in.

Factor of Safety = 3.0, I_{tall} = **0.03 in/hour**

Stantec

PERCOLATION TEST DATA SHEET							
Project:	Chevron Perris H2		Project No.	2057297530		Date:	4/19/2024
Test Hole No.		P2	Tested By:	A. Sobolew			
Depth of Test Hole, D_T:		5.2 ft	USCS Soil Classification	ML			
Test Hole Dimensions (inches)			Length	Width			
Diameter (if round)	8	Sides (if rectangular)					

Sandy Soil Test Criteria*

Tial No.	Start Time	Stop Time	Time Interval, (min)	Initial Depth of Water (in)	Final Depth of Water (in)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	10:20	10:50	30	59.5	57.1	2.4	N
2	10:50	11:20	30	59.5	58.2	1.3	N

*If two consecutive measurements show that six inches of water seeps away in less than 30 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 measurement per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Tial No.	Start Time	Stop Time	Δt, Time Interval, (min)	D_o, Initial Depth of Water (in)	D_f, Final Depth of Water (in)	ΔD, Change in Water Level (in.)	Percolation Rate (in/hour)
1	8:04	8:34	30	45.0	23.9	21.1	42.2
2	8:40	9:10	30	45.0	38.4	6.6	13.2
3	9:10	9:40	30	45.0	38.9	6.1	12.2
4	9:40	10:10	30	45.0	37.9	7.1	14.2
5	10:10	10:40	30	45.0	37.6	7.4	14.8
6	10:40	11:10	30	45.0	37.7	7.3	14.6
7	11:10	11:40	30	45.0	37.8	7.2	14.4
8	11:40	12:10	30	45.0	35.9	9.1	18.2
9	12:10	12:40	30	45.0	37.8	7.2	14.4
10	12:40	13:10	30	45.0	37.8	7.2	14.4
11	13:10	13:40	30	45.0	37.8	7.2	14.4
12	13:40	14:10	30	45.0	37.8	7.2	14.4
13							

Comments: $I_t = \Delta H\ (60\ r) / \Delta t\ (r + 2\ H_{avg}) = (14 \times 60 \times 4) / 30\ (4 + 2*(41.4)) = 1.3$ inch/hour

$\Delta H = 14$ in. , $\Delta t = 30$ minutes, $r = 4$ in, $Havg = (45 + 37.8)/2 = 41.4$ in.

Factor of Safety = 3.0, I_{tall} = **0.4 in/hour**

Western Riverside Area, California

GyA—Greenfield sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hcvv
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: A

Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford
Percent of map unit: 10 percent
Hydric soil rating: No

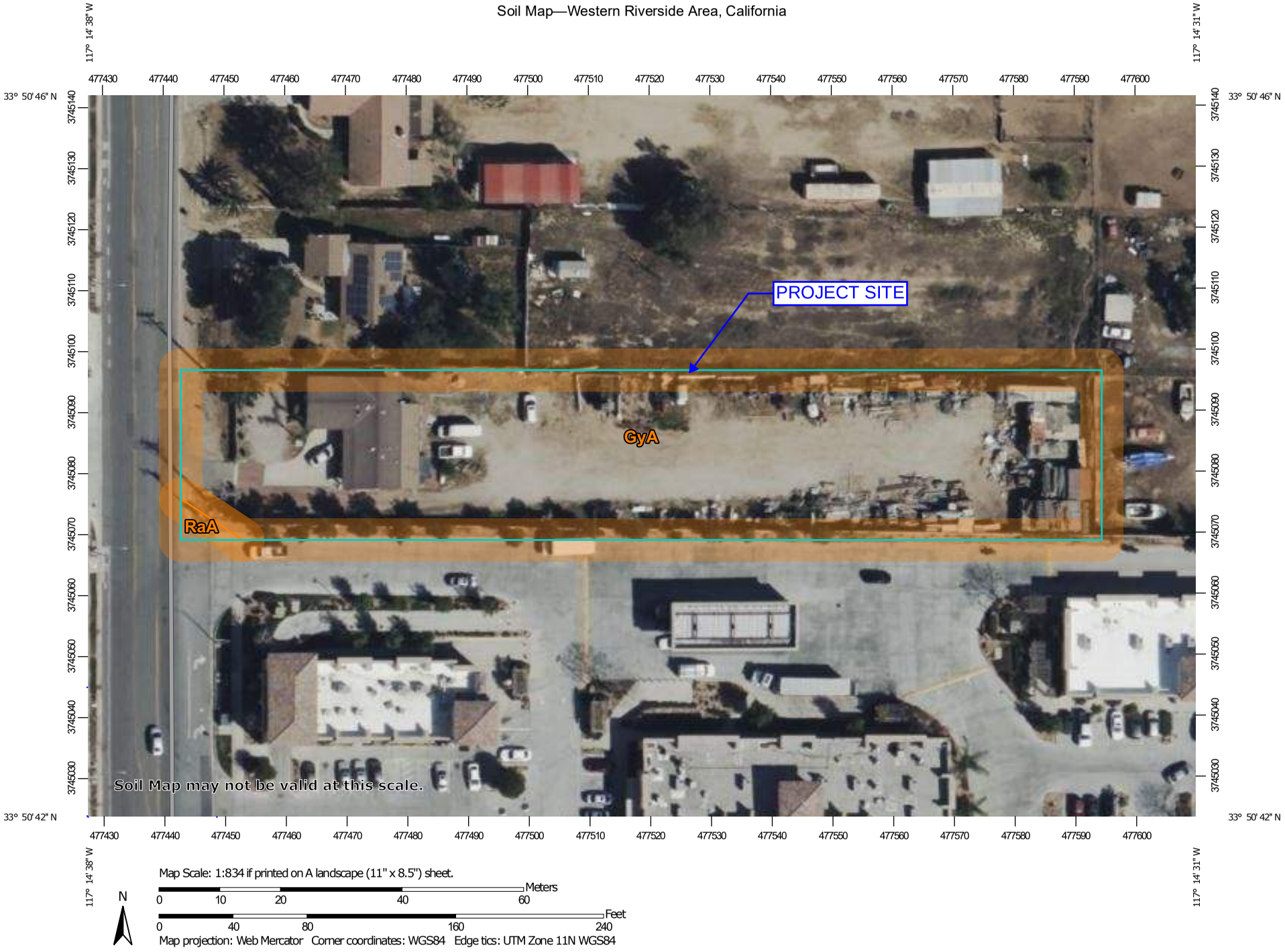
Pachappa
Percent of map unit: 2 percent
Hydric soil rating: No

Arlington
Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 1 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 15, Sep 6, 2022



Map Scale: 1:834 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 16, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GyA	Greenfield sandy loam, 0 to 2 percent slopes	1.0	99.2%
RaA	Ramona sandy loam, 0 to 2 percent slopes, MLRA 19	0.0	0.8%
Totals for Area of Interest		**1.0**	**100.0%**

Appendix 4: Historical Site Conditions

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

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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	Stantec	Date	11/19/2024
Designed by	Christian Elizondo/Vince Delgado Jr.	Case No	P23-05073
Company Project Number/Name	Chevron Perris - 2057297530		

BMP Identification

BMP NAME / ID BMP ID A1- (Runoff from DMA A1 and A2; MODULAR WETLAND LINEAR (MWS-L-8-8-V)

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)*
A1	*31425*	*Concrete or Asphalt*	*1*	*0.89*	*28031.1*			
A2	*5270*	*Ornamental Landscaping*	*0.1*	*0.110458*	*582.1*			
	36695	***Total***			**28613.2**	**0.20**	***0.1***	***0.1***

Notes:

Bioretention Facility - Design Procedure	BMP ID: A2 (DMA A3)	Legend:	Required Entries / Calculated Cells

Company Name:	Stantec	Date:	11.19.2024
Designed by:	Christain Elizonda/Vince Delgado Jr	County/City Case No.:	P23-05073

Design Volume

Enter the area tributary to this feature	A_T=	0.06	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	15	ft^3

Type of Bioretention Facility Design

- ○ Side slopes required (parallel to parking spaces or adjacent to walkways)
- ◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	2.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	8.0	ft
Total Effective Depth, d_E			
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E =	1.50	ft
Minimum Surface Area, A_m			
$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	10	ft^2
Proposed Surface Area	A=	160	ft^2
Minimum Required Length of Bioretention Facility, L	L =	1.3	ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0.001	%
6" Check Dam Spacing		0	feet
Describe Vegetation:		Natural Grasses	

Notes:

Preliminary Study- BMP A2 is located in the small Open Space area on the east side of the property

Minimum Dimensions are 8'W x 20'L.Minimum bottom surface area is 160 ft^2

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	Stantec	Date	11.19.2024
Designed by	Christain Elizonda/Vince Delgado Jr	Case No	P23-05073
Company Project Number/Name	Chevron Perris - 2057297530		

BMP Identification

BMP NAME / ID: BMP ID A2 (Runoff from DMA A3 the Landscape Area - East Portion of Site)

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

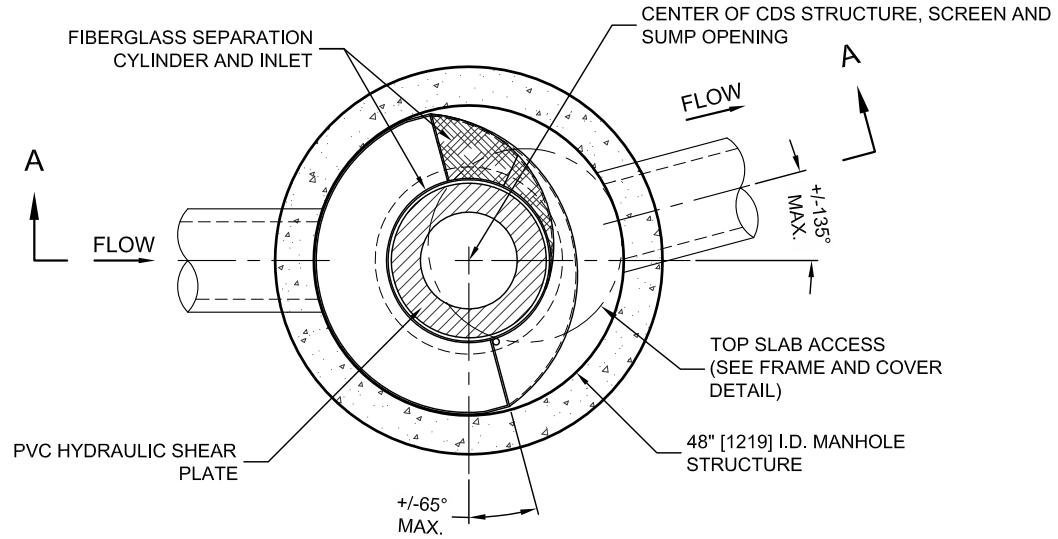
D_{85} = 0.61 inches

Drainage Management Area Tabulation

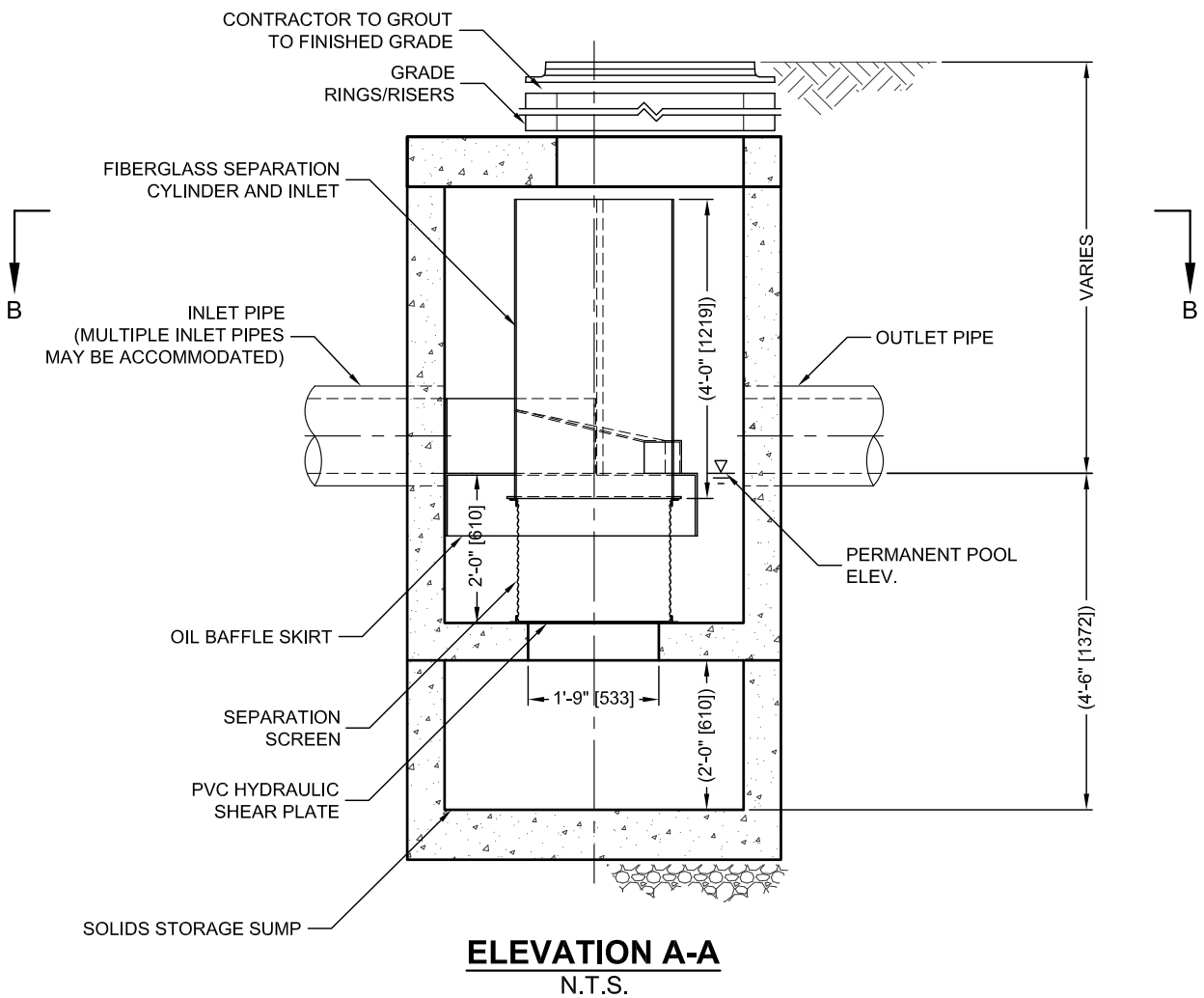
Insert additional rows if needed to accommodate all DMAs draining to the BMP

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)*
A3	*2760*	*Ornamental Landscaping*	*0.1*	*0.11*	*304.9*			
	2760	***Total***			**304.9**	**0.61**	***15.5***	***160***

Notes:



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

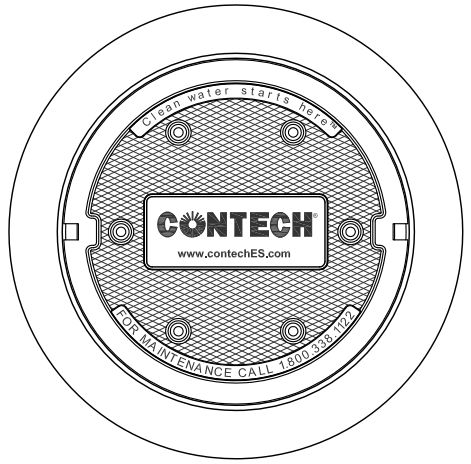
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,782; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS2015-4-C DESIGN NOTES

THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

SITE SPECIFIC DESIGN TO BE PROVIDED WITH CONSTRUCTION DOCUMENTS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

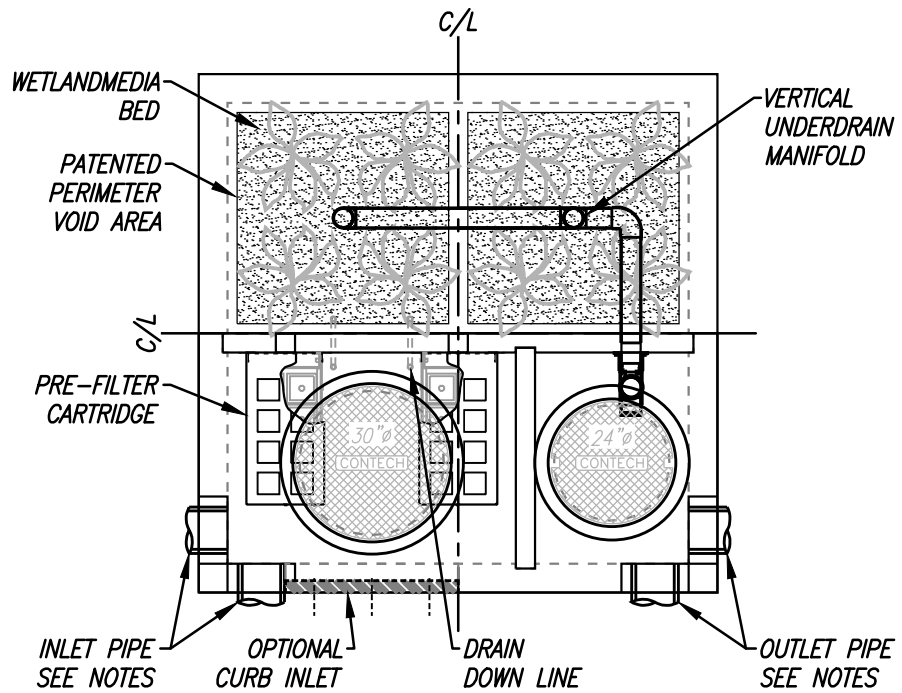
CONTECH® ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-4-C INLINE CDS STANDARD DETAIL

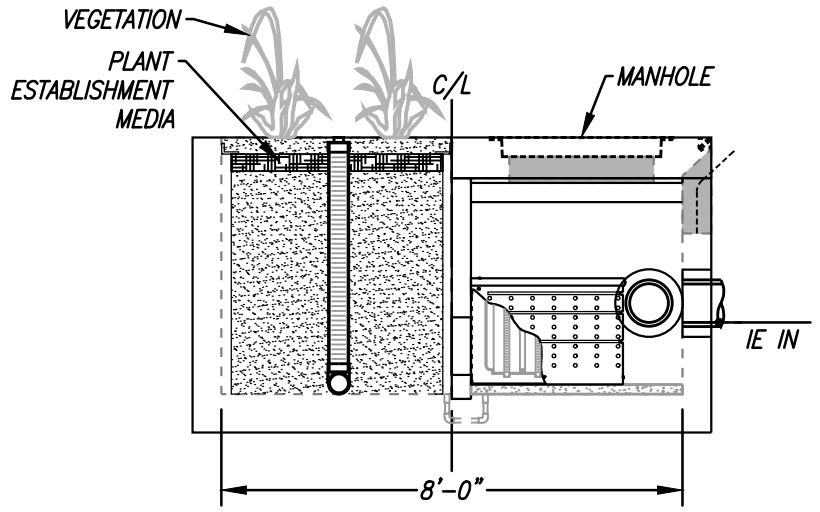
SITE SPECIFIC DATA			
PROJECT NUMBER		P23-05073	
PROJECT NAME		Chevron - Perris, CA	
PROJECT LOCATION		Perris, CA	
STRUCTURE ID		MWS DMA A	
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.100
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			2.2 (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY ONLY - NOT FOR CONSTRUCTION

SITE SPECIFIC DESIGN TO BE PROVIDED WITH CONSTRUCTION DOCUMENTS



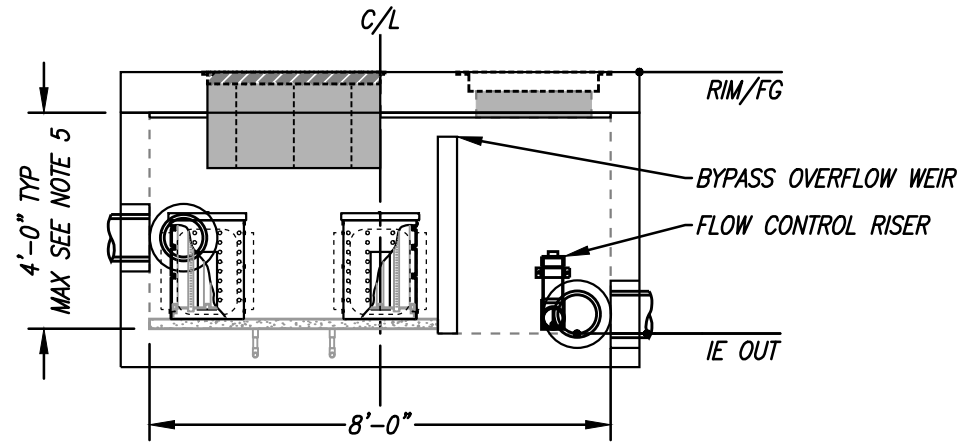
PLAN VIEW



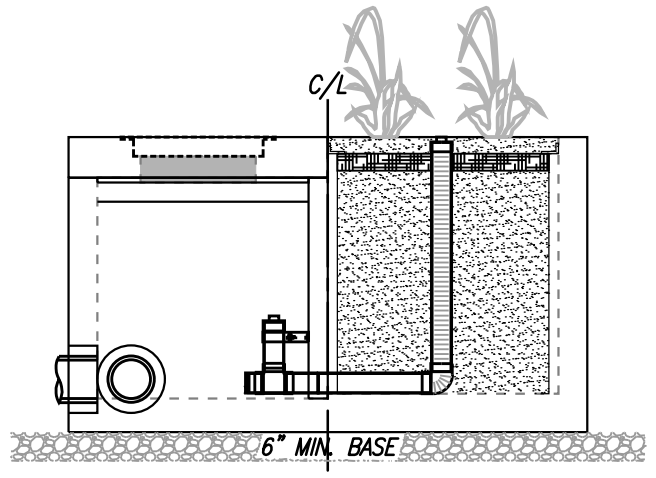
LEFT END VIEW

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 MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S 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 FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. 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 WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
4. CONTRACTOR RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE.
5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.



ELEVATION VIEW



RIGHT END VIEW

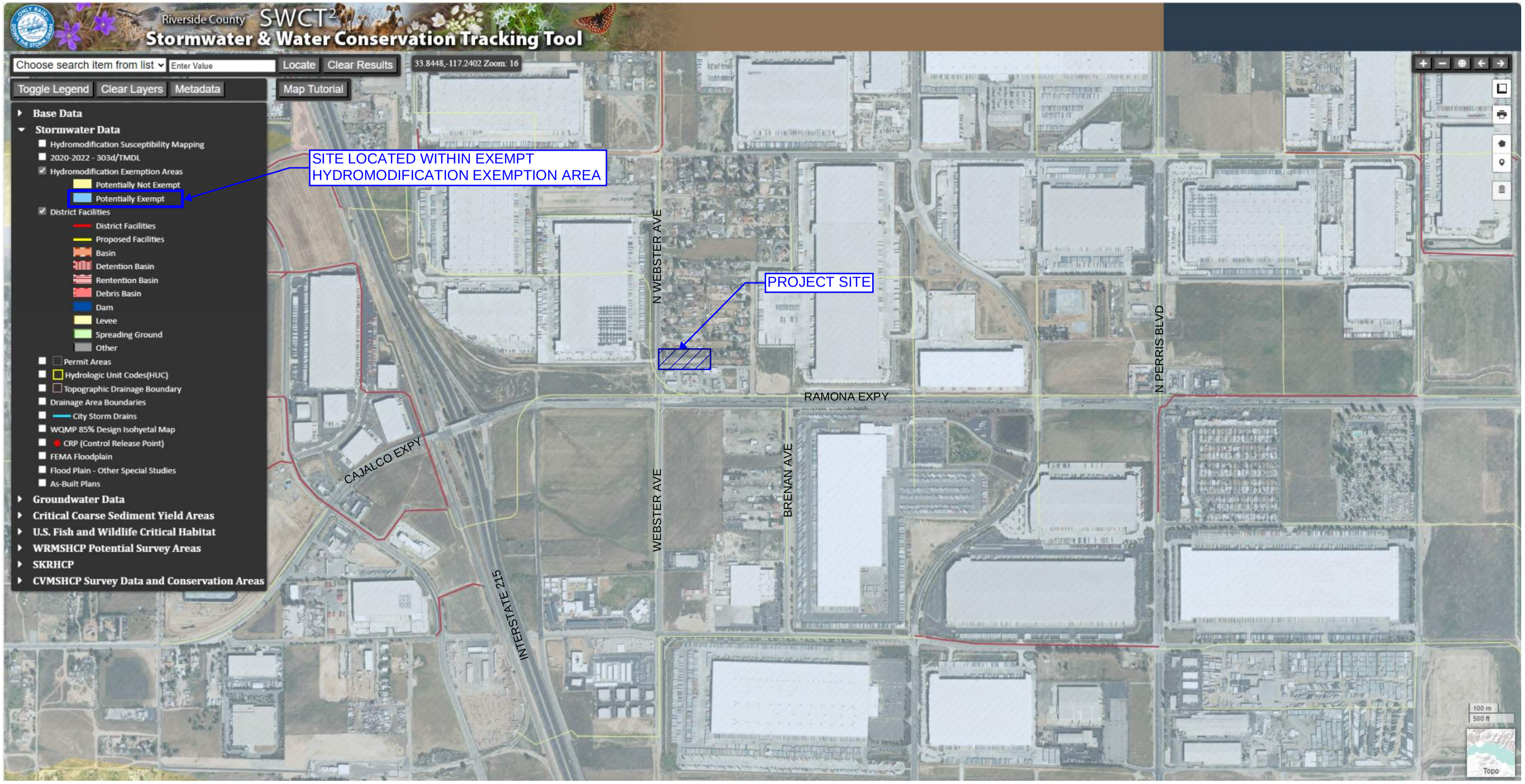
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com

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

8/14/23SCOTT.SERTICH

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern


Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool
Choose search item from list
Enter Value
Locate
Clear Results
Toggle Legend
Clear Layers
Metadata
Map Tutorial
33.8448,-117.2402 Zoom: 16
Base Data
Stormwater Data
Hydromodification Susceptibility Mapping
2020-2022 - 303d/TMDL
Hydromodification Exemption Areas
Potentially Not Exempt
Potentially Exempt
District Facilities
District Facilities
Proposed Facilities
Basin
Detention Basin
Rentention Basin
Debris Basin
Dam
Levee
Spreading Ground
Other
Permit Areas
Hydrologic Unit Codes(HUC)
Topographic Drainage Boundary
Drainage Area Boundaries
City Storm Drains
WQMP 85% Design Isohyetal Map
CRP (Control Release Point)
FEMA Floodplain
Flood Plain - Other Special Studies
As-Built Plans
Groundwater Data
Critical Coarse Sediment Yield Areas
U.S. Fish and Wildlife Critical Habitat
WRMSHCP Potential Survey Areas
SKRHCP
CVMSHCP Survey Data and Conservation Areas
SITE LOCATED WITHIN EXEMPT HYDROMODIFICATION EXEMPTION AREA
PROJECT SITE
N WEBSTER AVE
N PERRIS BLVD
RAMONA EXPY
CAJALCO EXPY
BRENAN AVE
INTERSTATE 215
100 m
500 ft
Topo

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

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 and prevention information to new site owners, lessess, or operators. • See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com • Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Landscape/Outdoor Pesticide Use	• 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	• Maintain landscaping using minimum or no pesticides. • See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater • Provide IPM information to new owners, lessees and operators.

	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.	
Fuel Dispensing Areas		• The property owner shall dry sweep the fueling area routinely. • See the Fact Sheet SD-30, "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

Appendix 9: O&M

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

CONTECH®
ENGINEERED SOLUTIONS

Modular Wetlands® Linear
Operation & Maintenance Manual

MODULAR WETLANDS®

MODULAR WETLANDS® LINEAR OPERATION & MAINTENANCE MANUAL

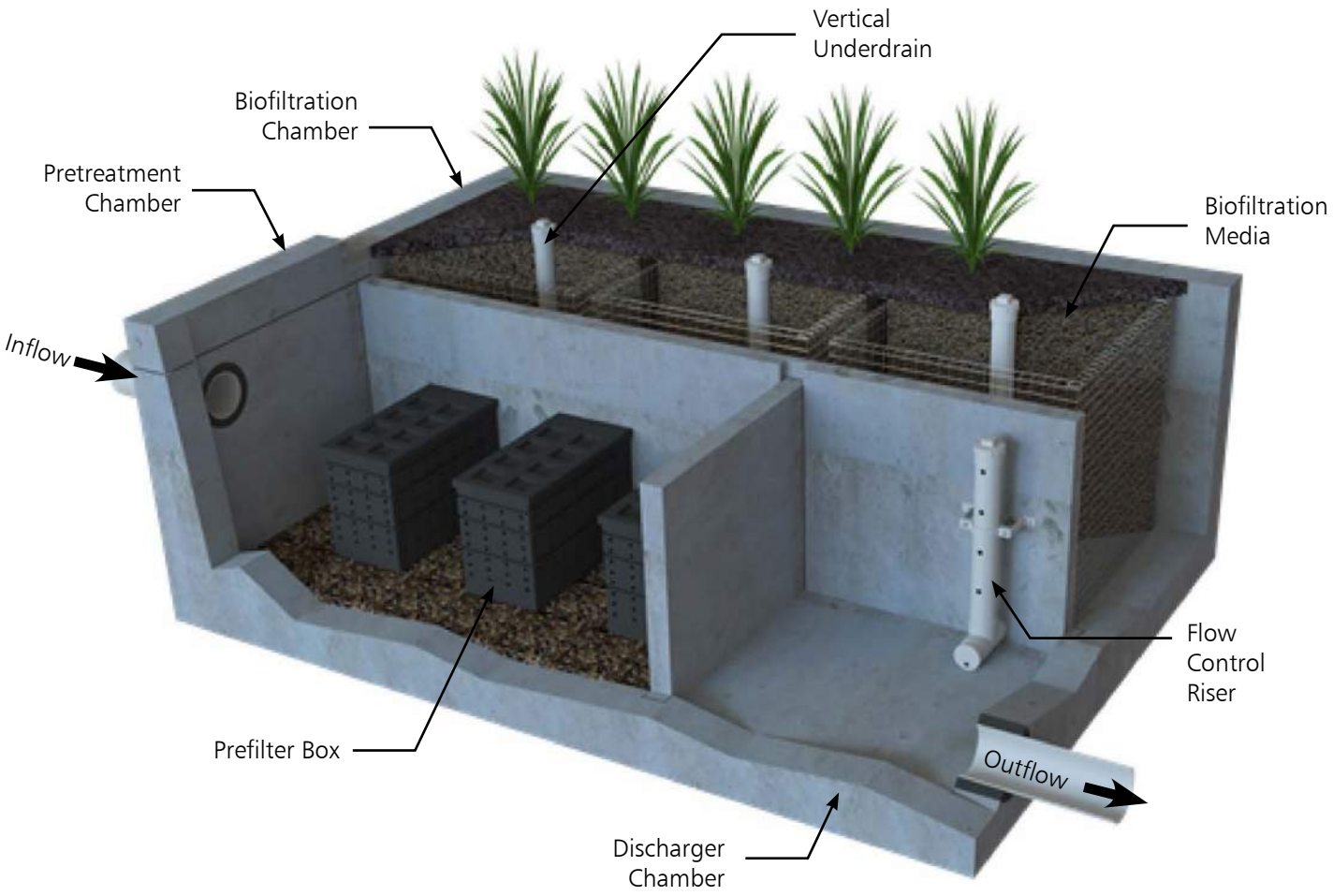
TABLE OF CONTENTS

OVERVIEW

The Modular Wetlands® Linear Biofilter is designed to remove high levels of trash, debris, sediments, nutrients, metals, and hydrocarbons. Its simple design allows for quick and easy installation. The system is housed in a standard precast structure and can be installed at various depths to meet site-specific conditions.

INTRODUCTION

This is the Modular Wetlands Linear Biofilter operation and maintenance manual. Before starting, read the instructions and equipment lists closely. It is important to follow all necessary safety procedures associated with state and local regulations. Some steps required confined space entry. Please contact Contech for more information on pre-authorized third party contractors who can provide installation services in your area. For a list of service providers in your area please visit: www.conteches.com/maintenance.



INSTRUCTIONS

INSPECTION SUMMARY

Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific loading conditions. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided.

- Inspect pre-treatment, biofiltration, and discharge chambers an average of once every six to twelve months. Varies based on site specific and local conditions.
- Average inspection time is approximately 15 minutes. Always ensure appropriate safety protocol and procedures are followed.

The following is a list of equipment required to allow for simple and effective inspection of the Modular Wetlands Linear:

- Modular Wetlands Linear Inspection Form
- Flashlight
- Manhole hook or appropriate tools to remove access hatches and covers
- Appropriate traffic control signage and procedures
- Measuring pole and/or tape measure
- Protective clothing and eye protection
- 7/16" open or closed ended wrench
- Large permanent black marker (initial inspections only - first year)

Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system

INSPECTION AND MAINTENANCE NOTES

1. Following maintenance and/or inspection, it is recommended that the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics, and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the biofiltration chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

INSPECTION PROCESS

1. Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other information (see inspection form).
2. Observe the inside of the system through the access covers. If minimal light is available and vision into the unit is impaired, utilize a flashlight to see inside the system and all of its chambers.
3. Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
4. Through observation and/or digital photographs, estimate the amount of trash, debris accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick, estimate the amount of sediment in this chamber. Record this depth on the inspection form.
5. Through visual observation, inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediment on the cartridges, any build-up on the tops of the cartridges, or clogging of the holes. Record this information on the inspection form. The prefilter cartridges can be further inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber - see notes previous notes regarding confined space entry). Record the color of the material. New material is a light green color. As the media becomes clogged, it will turn darker in color, eventually becoming dark brown or black. The closer to black the media is the higher percentage that the media is exhausted and is in need of replacement.

6. The biofiltration chamber is generally maintenance-free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation, it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection form and indicate through visual observation or digital photographs if trimming of the vegetation is required.
7. The discharge chamber houses the orifice control structure, drain down filter (only in California - older models), and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating conditions and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the pre-filter cartridge as mentioned above. Generally, the discharge chamber will be clean and free of debris. Inspect the water marks on the side walls. If possible, inspect the discharge chamber during a rain event to assess the amount of flow leaving the system while it is at 100% capacity (pre-treatment chamber water level at peak HGL - top of bypass weir). The water level of the flowing water should be compared to the watermark level on the side walls, which is an indicator of the highest discharge rate the system achieved when initially installed. Record on the form if there is any difference in level from the watermark in inches.

NOTE: During the first few storms, the water level in the outflow chamber should be observed and a 6" long horizontal watermark line drawn (using a large permanent marker) at the water level in the discharge chamber while the system is operating at 100% capacity. The diagram below illustrates where the line should be drawn. This line is a reference point for future inspections of the system.

Water level in the discharge chamber is a function of flow rate and pipe size. Observation of the water level during the first few months of operation can be used as a benchmark level for future inspections. The initial mark and all future observations shall be made when the system is at 100% capacity (water level at maximum level in the pre-treatment chamber). If future water levels are below this mark when the system is at 100% capacity, this is an indicator that maintenance to the pre-filter cartridges may be needed.

8. Finalize the inspection report for analysis by the maintenance manager to determine if maintenance is required.

MAINTENANCE INDICATORS

Based upon the observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges
- Obstructions in the system or its inlet and/or outlet pipes
- Excessive accumulation of floatables in the pretreatment chamber in which the length and width of the chamber is fully impacted more than 18". See photo below.
- Excessive accumulation of sediment in the pretreatment chamber of more than 6" in depth.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pretreatment cartridges. The following chart shows photos of the condition of the BioMediaGREEN contained within the pre-filter cartridges. When media is more than 85% clogged, replacement is required.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pretreatment cartridges. When media is more than 85% clogged, replacement is required. The darker the BioMediaGREEN, the more clogged it is and in need of replacement.

INSPECTION PROCESS

- Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter (California only - older models). The following photos show the condition of the BioMediaGREEN contained within the drain down filter. When media is more than 85% clogged, replacement is required.

- Overgrown vegetation.

- Water level in the discharge chamber during 100% operating capacity (pretreatment chamber water level at max height) is lower than the water mark by 20%.

MAINTENANCE SUMMARY

The time has come to maintain your Modular Wetlands® Linear. All necessary pre-maintenance steps must be carried out before maintenance occurs. Once traffic control has been set up per local and state regulations and access covers have been safely opened, the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition, the following is recommended:

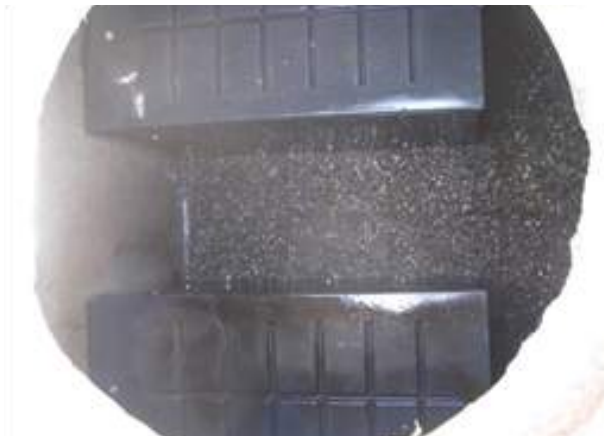
- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and cleaning equipment.
- Ensure traffic control is set up and properly positioned.
- Prepared pre-checks (OSHA, safety, confined space entry) are performed.

The following is a list of equipment to required for maintenance of the Modular Wetlands® Linear:

- Modular Wetlands Linear Maintenance Form
- Manhole hook or appropriate tools to access hatches and covers
- Protective clothing, flashlight, and eye protection
- 7/16" open or closed ended wrench
- Vacuum assisted truck with pressure washer
- Replacement BioMediaGREEN for pre-filter cartridges if required (order from one of Contech's Maintenance Team members at https://www.conteches.com/maintenance).

MAINTENANCE | PRETREATMENT CHAMBER

1. Remove access cover over pre-treatment chamber and position vacuum truck accordingly.
2. With a pressure washer, spray down pollutants accumulated on walls and pre-filter cartridges.
3. Vacuum out pre-treatment chamber and remove all accumulated pollutants including trash, debris, and sediments. Be sure to vacuum the floor until the pervious pavers are visible and clean.
4. If pre-filter cartridges require media replacement, continue to step 5. If not, replace access cover and move to step 11.

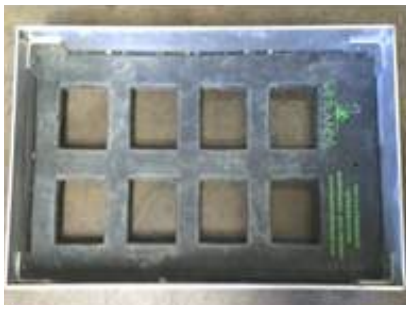


MAINTENANCE | PREFILTER CARTRIDGES

5. After successfully cleaning out the pre-treatment chamber (previous page) enter the pre-treatment chamber.
6. Unscrew the two bolts (circles shown below) holding the lid on each cartridge filter and remove lid.

7. Place the vacuum hose over each individual media filter to suck out filter media.

8. Once filter media has been sucked out, use a pressure washer to spray down the inside of the cartridge and it's media cages. Remove cleaned media cages and place to the side. Once removed, the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.
9. Reinstall media cages and fill with new media from the manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture-provided refilling tray and place on top of the cartridge. Fill the tray with new bulk media and shake down into place. Using your hands, lightly compact the media into each filter cage. Once the cages are full, remove the refilling tray and replace the cartridge top, ensuring bolts are properly tightened.



10. Exit the pre-treatment chamber. Replace access hatch or manhole cover.

MAINTENANCE | BIOFILTRATION CHAMBER

11. In general, the biofiltration chamber is maintenance-free with the exception of maintaining the vegetation. The Modular Wetlands Linear utilizes vegetation similar to surrounding landscape areas, therefore trim vegetation to match surrounding vegetation. If any plants have died, replace them with new ones.

12. Each vertical under drain on the biofiltration chamber has a removable (threaded cap) that can be taken off to check any blockages or root growth. Once removed, a jetting attachment can be used to clean out the under drain and orifice riser.
13. As with all biofilter systems, at some point the biofiltration media (WetlandMedia) will need to be replaced. Either because of physical clogging of sorptive exhaustion of the media ion exchange capacity (to remove dissolved metals and phosphorous). The general life of this media is 10 to 20 years based on site specific conditions and pollutant loading. Utilize the vacuum truck to vacuum out the media by placing the hose into the chamber. Once all the media is removed use the power washer to spray down all the netting on the outer metal cage. Inspect the netting for any damage or holes. If the netting is damaged it can be repaired or replaced with guidance by the manufacturer.
14. Contact one of Contech's Maintenance Team members at https://www.conteches.com/maintenance to order new WetlandMedia. The quantity of media needed can be determined by providing the model number and unit depth. Media will be provided in super sacks for easy installation. Each sack will weigh between 1000 and 2000 lbs. A lifting apparatus (backhoe, boom truck, or other) is recommended to position the super sack over the biofiltration chamber. Fill the media cages up to the same level as the old media. Replant with vegetation.

MAINTENANCE | DISCHARGE CHAMBER

15. Remove access hatch or manhole cover over discharge chamber.
16. Enter chamber to gain access to the drain down filter. Unlock the locking mechanism and lift up drain down filter housing to remove used BioMediaGREEN filter block as shown below. *NOTE: Drain down filter is only found on units installed in California prior to 2023. If no drain down filter is present, skip steps 16 and 17.*

17. Insert a new BioMediaGREEN filter block and lock drain down filter housing back in place.
18. Replace access hatch or manhole cover over discharge chamber.

NOTES

CONTECH® ENGINEERED SOLUTIONS

Inspection Report
Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____

CONTECH®
ENGINEERED SOLUTIONS

Cleaning and Maintenance Report
Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Inspector Name _____ Date ____/____/____ Time _____AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

CONTECH®
ENGINEERED SOLUTIONS

800-338-1122

WWW.CONTECHES.COM

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SUPPORT

DRAWINGS AND SPECIFICATIONS ARE AVAILABLE AT WWW.CONTECHES.COM

Modular Wetlands Maintenance Guide 1/2023

CONTECH®
ENGINEERED SOLUTIONS

CDS Guide
Operation, Design, Performance and Maintenance

CDS®

Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Inline units can treat up to 6 cfs, and internally bypass flows in excess of 50 cfs (1416 L/s). Available precast or cast-in-place, offline units can treat flows from 1 to 300 cfs (28.3 to 8495 L/s). The pollutant removal capacity of the CDS system has been proven in lab and field testing.

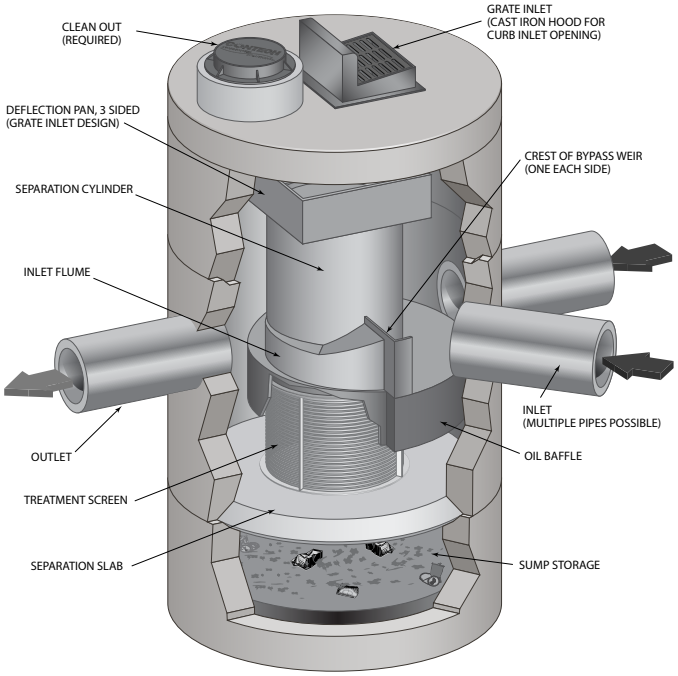
Operation Overview

Stormwater enters the diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed from the flow. All flows up to the system's treatment design capacity enter the separation chamber and are treated.

Swirl concentration and screen deflection force floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During the flow events exceeding the treatment design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants are retained in the separation cylinder.



Design Basics

There are three primary methods of sizing a CDS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow rate for a defined particle size. The Rational Rainfall Method™ or the and Probabilistic Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically in the Unites States, CDS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a gradation with an average particle size (d50) of 125 microns (μm). For some regulatory environments, CDS systems can also be designed to achieve an 80% annual solids load reduction based on an average particle size (d50) of 75 microns (μm) or 50 microns (μm).

Water Quality Flow Rate Method

In some cases, regulations require that a specific treatment rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval, e.g. the six-month storm, or a water quality depth, e.g. 1/2-inch (13 mm) of rainfall.

The CDS is designed to treat all flows up to the WQQ. At influent rates higher than the WQQ, the diversion weir will direct most flow exceeding the WQQ around the separation chamber. This allows removal efficiency to remain relatively constant in the separation chamber and eliminates the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the CDS will remove a specific gradation of sediment at a specific removal efficiency. Therefore the treatment flow rate is variable, based on the gradation and removal efficiency specified by the design engineer.

Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. It is important to take these factors into consideration when estimating the long-term performance of any stormwater treatment system. The Rational Rainfall Method combines site-specific information with laboratory generated performance data, and local historical precipitation records to estimate removal efficiencies as accurately as possible.

Short duration rain gauge records from across the United States and Canada were analyzed to determine the percent of the total annual rainfall that fell at a range of intensities. US stations' depths were totaled every 15 minutes, or hourly, and recorded in 0.01-inch increments. Depths were recorded hourly with 1-mm resolution at Canadian stations. One trend was consistent at all sites; the vast majority of precipitation fell at low intensities and high intensity storms contributed relatively little to the total annual depth.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Rainfall Method. Since most sites are relatively small and highly impervious, the Rational Rainfall Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS system are

determined. Performance efficiency curve determined from full scale laboratory tests on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Probabilistic Rational Method

The Probabilistic Rational Method is a sizing program Contech developed to estimate a net annual sediment load reduction for a particular CDS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics.

The Probabilistic Method is an extension of the Rational Method used to estimate peak discharge rates generated by storm events of varying statistical return frequencies (e.g. 2-year storm event). Under the Rational Method, an adjustment factor is used to adjust the runoff coefficient estimated for the 10-year event, correlating a known hydrologic parameter with the target storm event. The rainfall intensities vary depending on the return frequency of the storm event under consideration. In general, these two frequency dependent parameters (rainfall intensity and runoff coefficient) increase as the return frequency increases while the drainage area remains constant.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Method. Since most sites are relatively small and highly impervious, the Rational Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS are determined. Performance efficiency curve on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Treatment Flow Rate

The inlet throat area is sized to ensure that the WQQ passes through the separation chamber at a water surface elevation equal to the crest of the diversion weir. The diversion weir bypasses excessive flows around the separation chamber, thus preventing re-suspension or re-entrainment of previously captured particles.

Hydraulic Capacity

The hydraulic capacity of a CDS system is determined by the length and height of the diversion weir and by the maximum allowable head in the system. Typical configurations allow hydraulic capacities of up to ten times the treatment flow rate. The crest of the diversion weir may be lowered and the inlet throat may be widened to increase the capacity of the system at a given water surface elevation. The unit is designed to meet project specific hydraulic requirements.

Performance

Full-Scale Laboratory Test Results

A full-scale CDS system (Model CDS2020-5B) was tested at the facility of University of Florida, Gainesville, FL. This CDS unit was evaluated under controlled laboratory conditions of influent flow rate and addition of sediment.

Two different gradations of silica sand material (UF Sediment & OK-110) were used in the CDS performance evaluation. The particle size distributions (PSDs) of the test materials were analyzed using standard method "Gradation ASTM D-422 "Standard Test Method for Particle-Size Analysis of Soils" by a certified laboratory.

UF Sediment is a mixture of three different products produced by the U.S. Silica Company: "Sil-Co-Sil 106", "#1 DRY" and "20/40 Oil Frac". Particle size distribution analysis shows that the UF Sediment has a very fine gradation (d50 = 20 to 30 μm) covering a wide size range (Coefficient of Uniformity, C averaged at 10.6). In comparison with the hypothetical TSS gradation specified in the NJDEP (New Jersey Department of Environmental Protection) and NJCAT (New Jersey Corporation for Advanced Technology) protocol for lab testing, the UF Sediment covers a similar range of particle size but with a finer d50 (d50 for NJDEP is approximately 50 μm) (NJDEP, 2003).

The OK-110 silica sand is a commercial product of U.S. Silica Sand. The particle size distribution analysis of this material, also included in Figure 1, shows that 99.9% of the OK-110 sand is finer than 250 microns, with a mean particle size (d50) of 106 microns. The PSDs for the test material are shown in Figure 1.

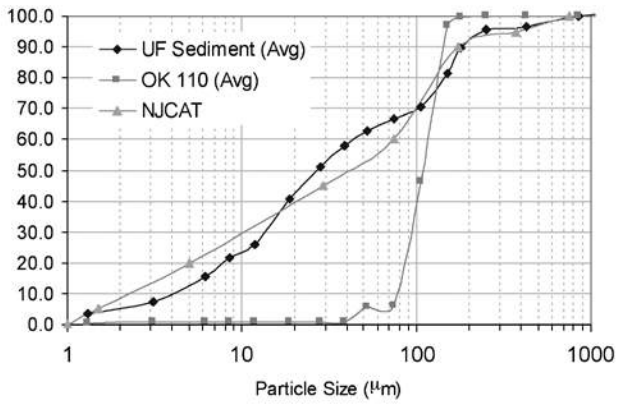


Figure 1. Particle size distributions

Tests were conducted to quantify the performance of a specific CDS unit (1.1 cfs (31.3-L/s) design capacity) at various flow rates, ranging from 1% up to 125% of the treatment design capacity of the unit, using the 2400 micron screen. All tests were conducted with controlled influent concentrations of approximately 200 mg/L. Effluent samples were taken at equal time intervals across the entire duration of each test run. These samples were then processed with a Dekaport Cone sample splitter to obtain representative sub-samples for Suspended Sediment Concentration (SSC) testing using ASTM D3977-97 "Standard Test Methods for Determining Sediment Concentration in Water Samples", and particle size distribution analysis.

Results and Modeling

Based on the data from the University of Florida, a performance model was developed for the CDS system. A regression analysis was used to develop a fitting curve representative of the scattered data points at various design flow rates. This model, which demonstrated good agreement with the laboratory data, can then be used to predict CDS system performance with respect

to SSC removal for any particle size gradation, assuming the particles are inorganic sandy-silt. Figure 2 shows CDS predictive performance for two typical particle size gradations (NJCAT gradation and OK-110 sand) as a function of operating rate.

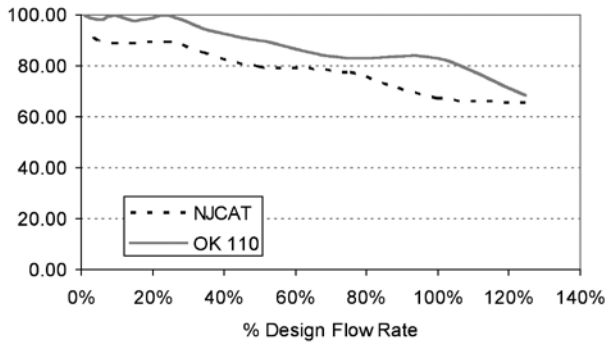


Figure 2. CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

Many regulatory jurisdictions set a performance standard for hydrodynamic devices by stating that the devices shall be capable of achieving an 80% removal efficiency for particles having a mean particle size (d50) of 125 microns (e.g. Washington State Department of Ecology — WASDOE - 2008). The model can be used to calculate the expected performance of such a PSD (shown in Figure 3). The model indicates (Figure 4) that the CDS system with 2400 micron screen achieves approximately 80% removal at the design (100%) flow rate, for this particle size distribution (d50 = 125 μm).

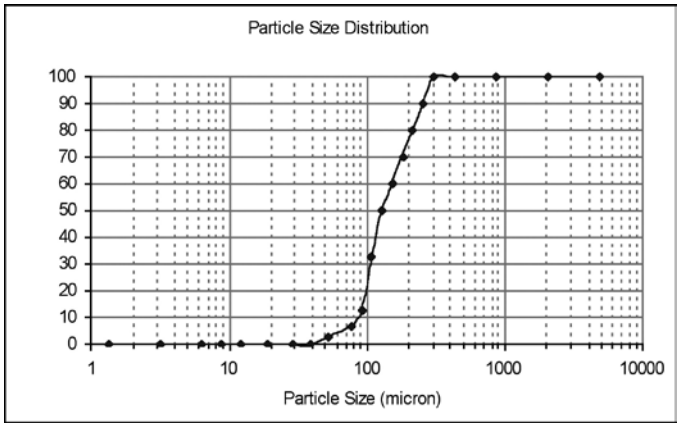


Figure 3. WASDOE PSD

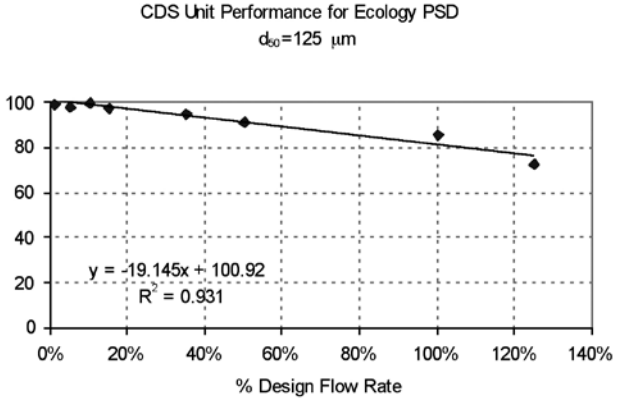


Figure 4. Modeled performance for WASDOE PSD.

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified

during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

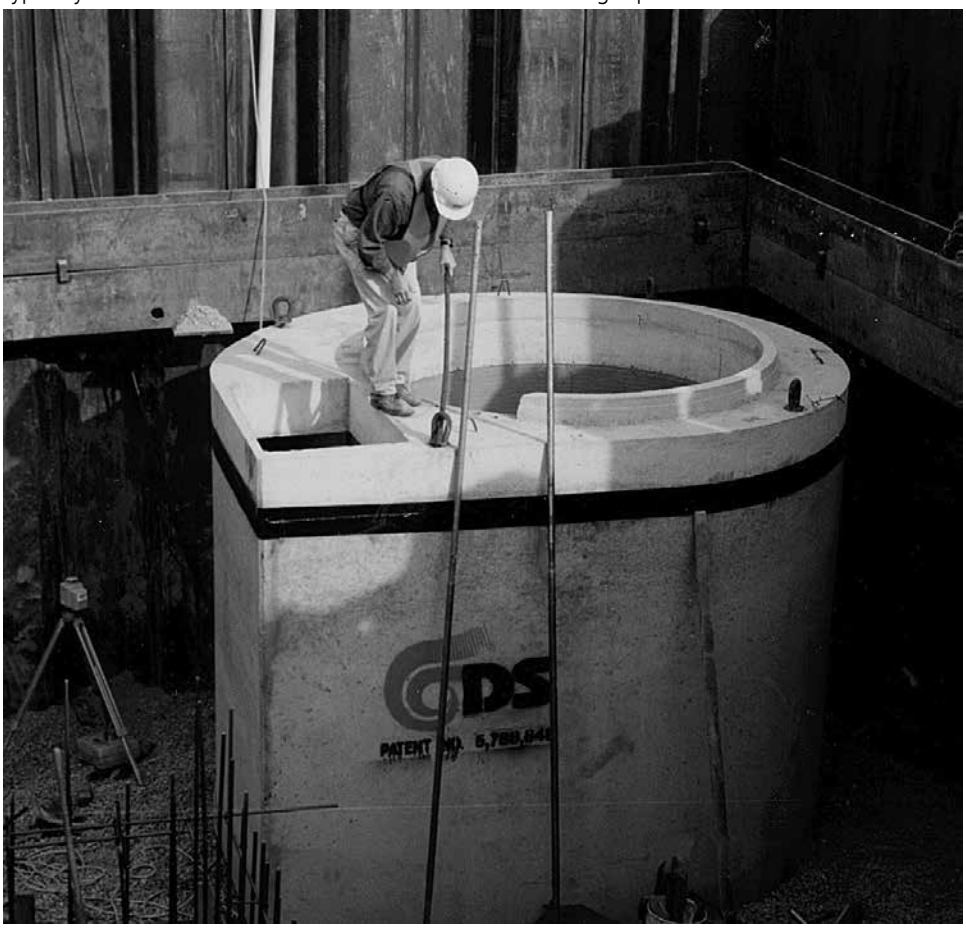
In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be cleaned to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Note: To avoid underestimating the volume of sediment in the chamber, carefully lower the measuring device to the top of the sediment pile. Finer silty particles at the top of the pile may be more difficult to feel with a measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.



CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile**.

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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ENGINEERED SOLUTIONS
800-338-1122
www.ContechES.com

Contech Engineered Solutions provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, earth stabilization and stormwater treatment products. For information on other Contech division offerings, visit www.ContechES.com or call 800.338.1122

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

cds_manual 3/17 PDF

Appendix 10: Educational Materials

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

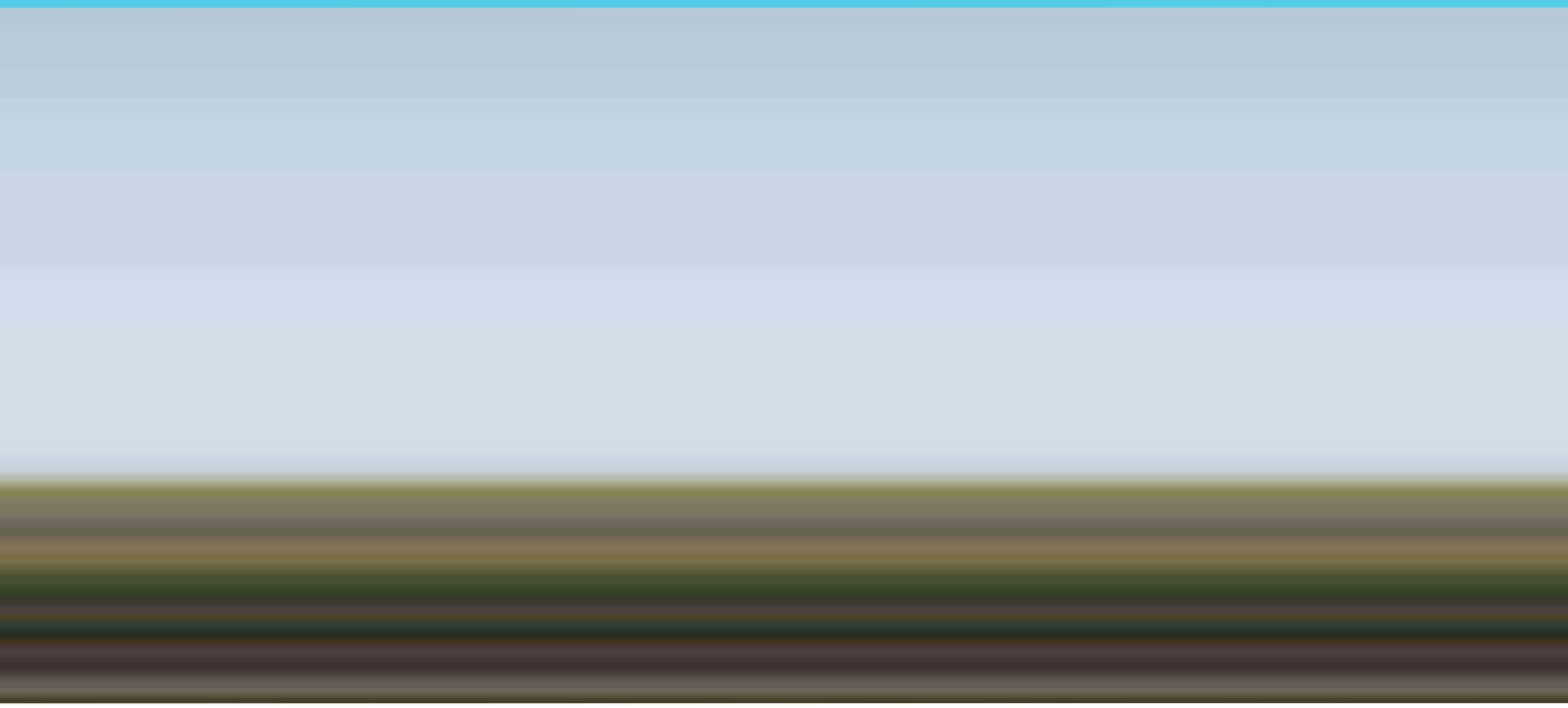
APPENDIX 10
EDUCATIONAL MATERIALS

October 24, 2023

CONTECH®
ENGINEERED SOLUTIONS

CDS®
Hydrodynamic Separator

The experts you need to solve your stormwater management challenges



Contech is the leader in stormwater management solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team

STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.

STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.

REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.

SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

Unique screening technology for stormwater runoff – CDS®

The CDS hydrodynamic separator uses swirl concentration and continuous deflective separation to screen, separate and trap trash, debris, sediment, and hydrocarbons from stormwater runoff.

At the heart of the CDS system is a unique screening technology used to capture and retain trash and debris. The screen face is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder. This results in a screen that is self-cleaning and provides 100% removal of floatables and neutrally buoyant material debris 4.7 mm or larger, without blinding.

CDS is used to meet trash Total Maximum Daily Load (TMDL) requirements, for stormwater quality control, inlet and outlet pollution control, and as pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and a variety of green infrastructure practices.

CDS® Features and Benefits

FEATURE	BENEFIT
Captures and retains 100% of floatables and neutrally buoyant debris 4.7mm or larger	Superior pollutant removal
Self-cleaning screen	Ease of maintenance
Isolated storage sump eliminates scour potential	Excellent pollutant retention
Internal bypass	Eliminates the need for additional structures
Multiple pipe inlets and 90-180º angles	Design flexibility
Clear access to sump and stored pollutants	Fast, easy maintenance

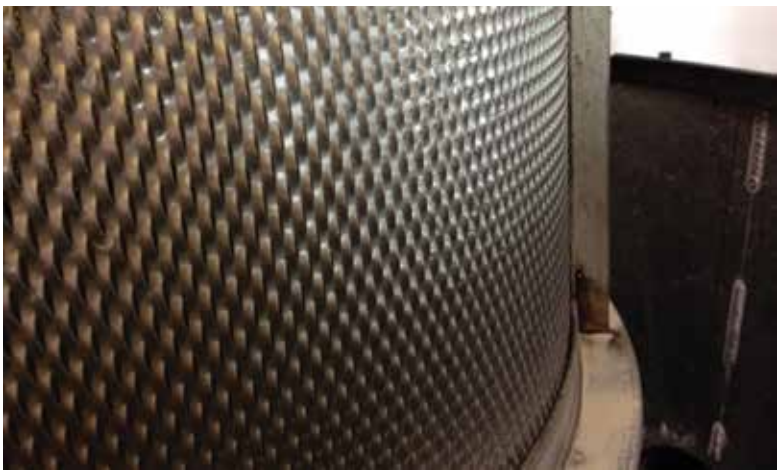
APPLICATION TIPS

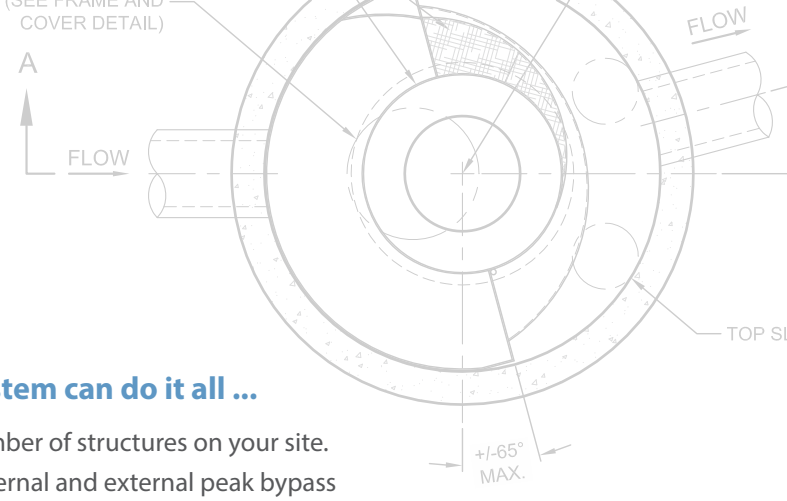
- Because of its internal peak bypass weirs, CDS systems can provide cost savings by eliminating the need for additional structures.
- Pretreating detention, infiltration, and green infrastructure practices with CDS can protect downstream structures and provide for easy maintenance.
- The CDS an ideal solution for retrofit applications due to its compact footprint and configuration flexibility.

The CDS® Screen

A fundamentally different approach to trash control ...

Traditional approaches to trash control typically involve "direct screening" that can easily become clogged, as trash is pinned to the screen as water passes through. Clogged screens can lead to flooding as water backs up. The design of the CDS screen is fundamentally different. Flow is introduced to the screen face which is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder.

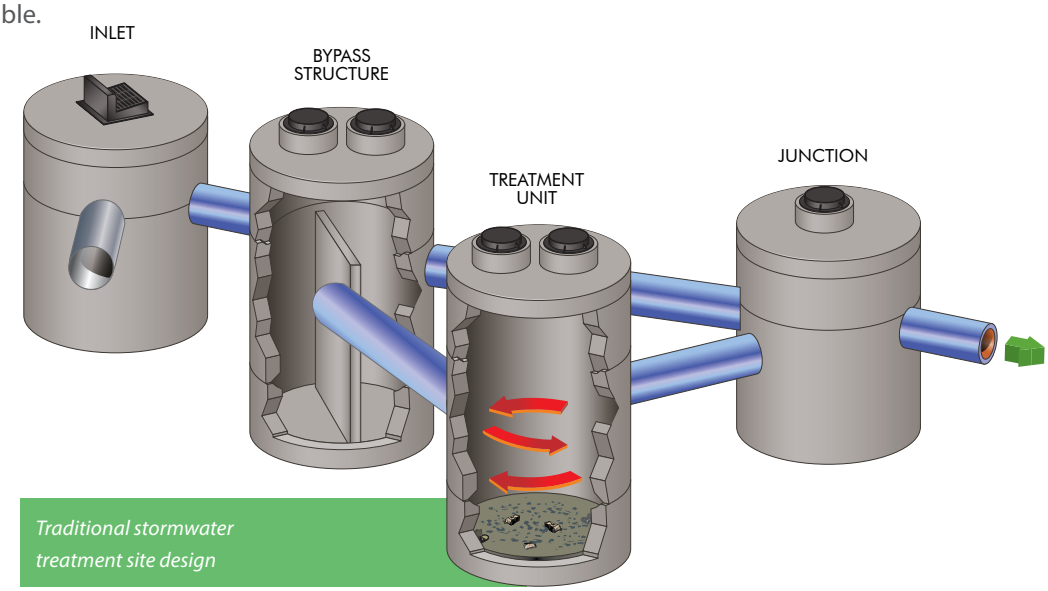




CDS® Design Configuration

Why use traditional stormwater design when ONE system can do it all ...

The CDS effectively treats stormwater runoff while reducing the number of structures on your site. Inline, offline, grate inlet, and drop inlet configurations available. Internal and external peak bypass options also available.

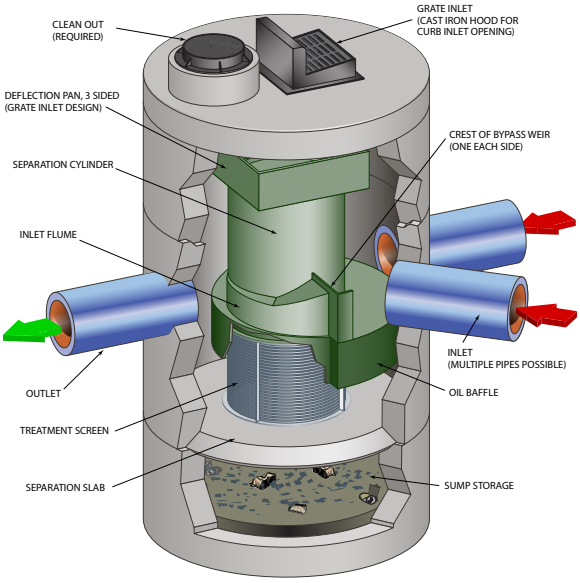


Traditional stormwater treatment site design

A Traditional Stormwater Treatment Site Design would require several structures on your site. With CDS, one system can do it all!

CDS® Advantages

- Grate inlet option available
- Internal bypass weir
- Accepts multiple inlets at a variety of angles
- Advanced hydrodynamic separator
- Captures and retains 100% of floatables and neutrally buoyant debris 4.7 mm or larger
- Indirect screening capability keeps screen from clogging
- Retention of all captured pollutants, even at high flows
- Performance verified by NJCAT, WA Ecology, and ETV Canada



Learn More:
www.ContechES.com/cds

CDS® Applications

CDS is commonly used in the following stormwater applications:

- Stormwater quality control – trash, debris, sediment, and hydrocarbon removal
- Urban retrofit and redevelopment
- Inlet and outlet protection
- Pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and Low Impact Development designs

CDS® provides trash control

CDS® pretreats a bioswale

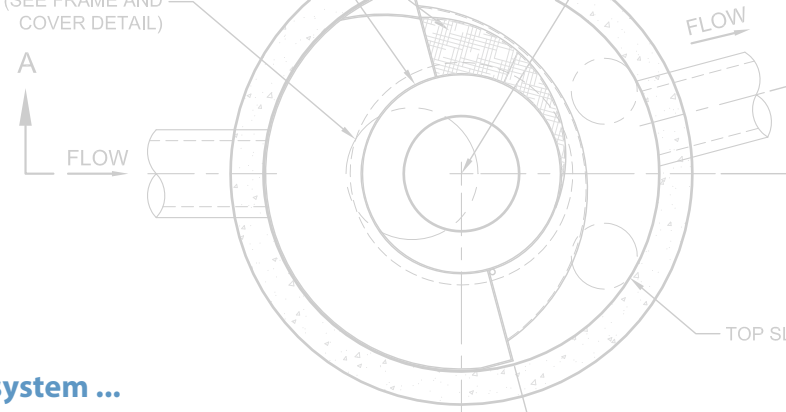
Select CDS® Certifications and Verifications

CDS has been verified by some of the most stringent stormwater technology evaluation organizations in North America, including:

- Washington State Department of Ecology (GULD) - Pretreatment
- Canadian Environmental Technology Verification (ETV)
- California Statewide Trash Amendments Full Capture System Certified*

**The CDS System has been certified by the California State Water Resources Control Board as a Full Capture System provided that it is sized to treat the peak flow rate from the region specific 1-year, 1-hour design storm, or the peak flow capacity of the corresponding storm drain, whichever is less.*

Save time, space and money with CDS



CDS® Maintenance

Select a cost-effective and easy-to-access treatment system ...

Systems vary in their maintenance needs, and the selection of a cost-effective and easy-to-access treatment system can mean a huge difference in maintenance expenses for years to come.

A CDS unit is designed to minimize maintenance and make it as easy and inexpensive as possible to keep our systems working properly.

Most CDS® units can easily be cleaned within thirty minutes.

INSPECTION

Inspection is the key to effective maintenance. Pollutant deposition and transport may vary from year to year and site to site. Semi-annual inspections will help ensure that the system is cleaned out at the appropriate time. Inspections should be performed more frequently where site conditions may cause rapid accumulation of pollutants.

RECOMMENDATIONS FOR CDS MAINTENANCE

The recommended cleanout of solids within the CDS unit's sump should occur at 75% of the sump capacity. Access to the CDS unit is typically achieved through two manhole access covers – one allows inspection and cleanout of the separation chamber and sump, and another allows inspection and cleanout of sediment captured and retained behind the screen. A vacuum truck is recommended for cleanout of the CDS unit and can be easily accomplished in less than 30 minutes for most installations.

Hydrodynamic Separator Selection & Sizing Tool

Quickly prepare designs for estimates and project meetings ...

Part of the Contech Design Center, this free, online tool fully automates the layout process for identifying the proper hydrodynamic separator for your site.

- Multiple sizing methods available.
- Site-specific questions ensure the selected unit will comply with site constraints.
- Multiple treatment options may be available based on regulations and site parameters.
- Follow up reports contain a site-specific design, sizing summary, standard detail, and specification.

Learn More:
www.ContechES.com/designcenter

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

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Modular Wetlands® Linear Stormwater Biofiltration

The experts you need to solve your stormwater challenges

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SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

Restoring Nature's Presence in Urban Areas – Modular Wetlands® Linear

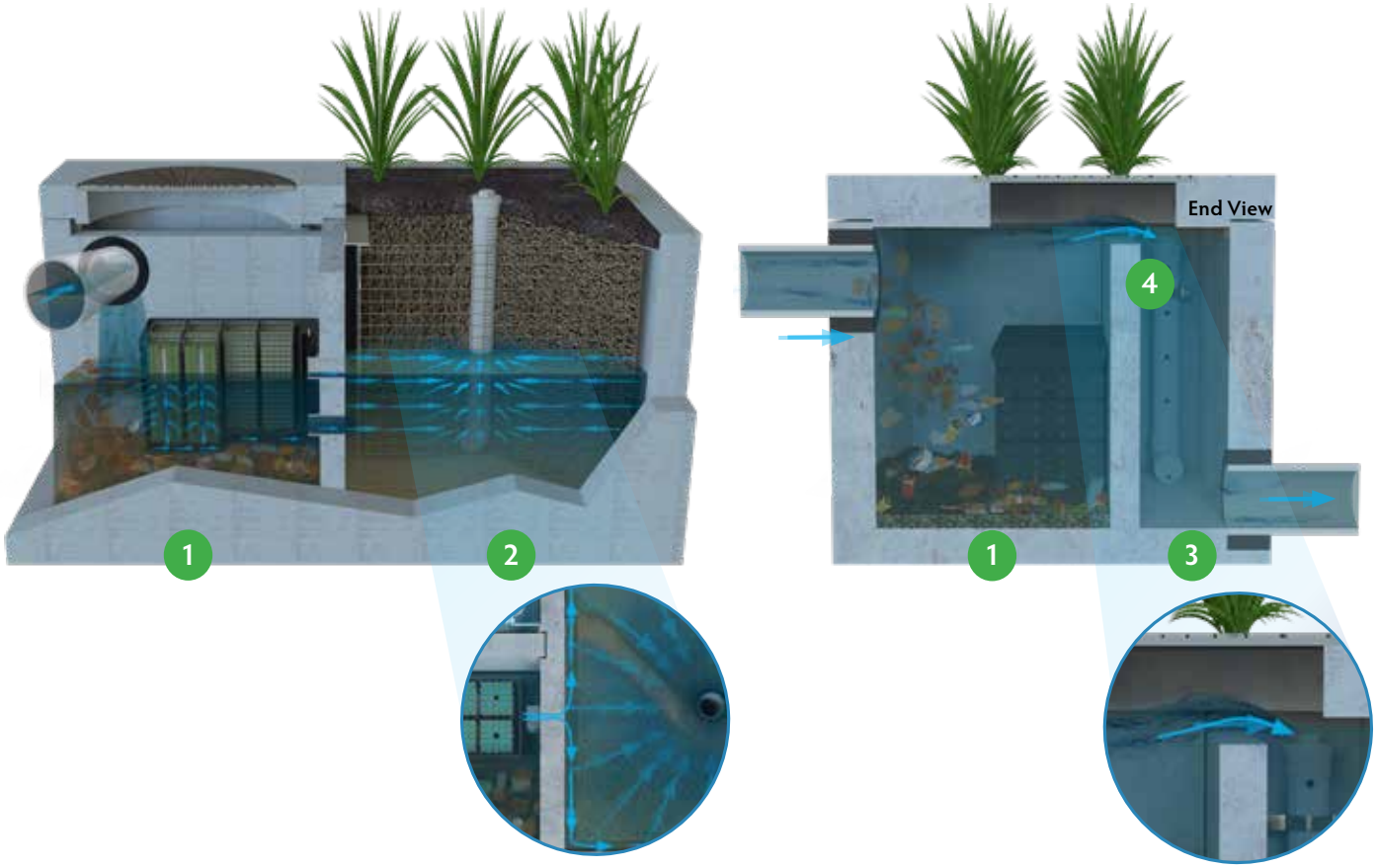
As cities grow, there is less space for natural solutions to treat stormwater. Contech understands this and is committed to providing compact, Low Impact Development (LID) solutions like the Modular Wetlands Linear to protect our nation's waterways.

The Modular Wetlands® Linear is the only biofiltration system to utilize patented horizontal flow, allowing for a small footprint, high treatment capacity, and design versatility. It is also the only biofiltration system that can be routinely installed downstream of storage for additional volume control and treatment.

With numerous regulatory approvals, the system's aesthetic appeal and superior pollutant removal make it the ideal solution for a wide range of stormwater applications, including urban development projects, commercial parking lots, residential streets, mixed-use developments, streetscapes, and more.

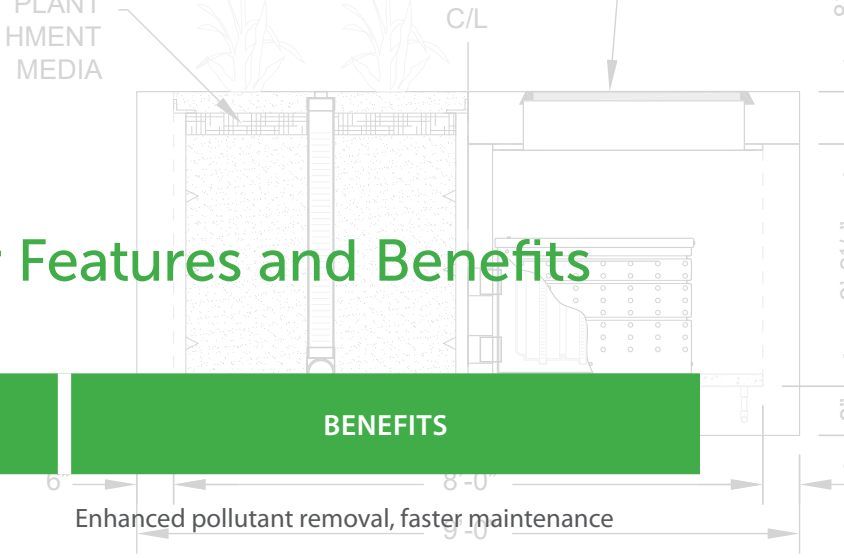
MODULAR WETLANDS®

How the Modular Wetlands® Linear Works



1. **PRETREATMENT** | Stormwater enters the pretreatment chamber where total suspended solids settle, and trash and debris are contained within the chamber. Stormwater then travels through the pretreatment filter boxes that provide additional treatment.
2. **BIOFILTRATION** | As water enters the biofiltration chamber, it fills the void space in the chamber's perimeter. Horizontal forces push the water inward through the biofiltration media, where nutrients and metals are captured. The water then enters the drain pipe to be discharged.
3. **DISCHARGE** | The specially designed vertical drain pipe and orifice control plate control the flow of water through the media to a level lower than the media's capacity, ensuring media effectiveness. The water then enters the horizontal drain pipe to be discharged.
4. **BYPASS** | During peak flows, an internal weir in the side-by-side configuration allows high flows to bypass treatment, eliminating flooding and the need for a separate bypass structure. Bypass is not provided in the end-to end configuration.

Using horizontal flow to improve performance



Modular Wetlands® Linear Features and Benefits

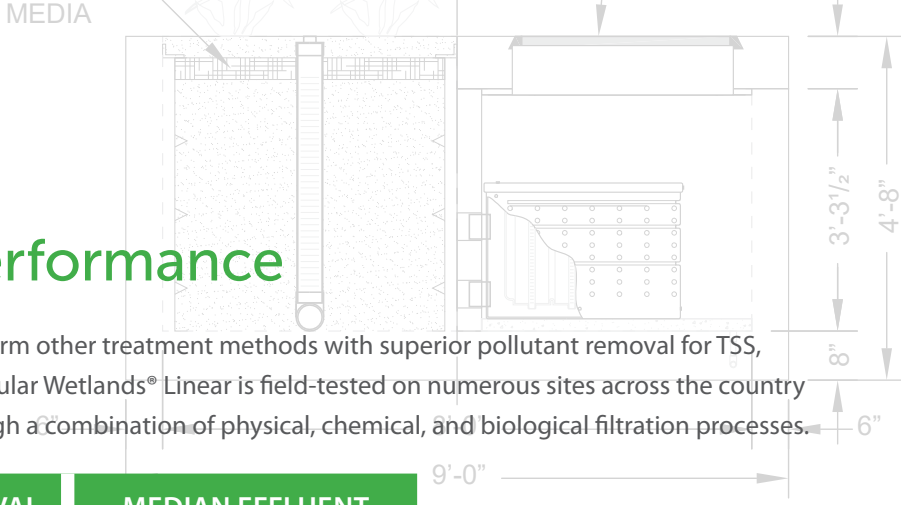
FEATURE	BENEFITS
Pretreatment chamber	Enhanced pollutant removal, faster maintenance
Horizontal flow biofiltration	Greater filter surface area
Performance verified by both the WA DOE and NJ DEP	Superior pollutant capture with confidence
Built-in high flow bypass	Eliminates flooding and the need for a separate bypass structure
Available in multiple configurations and sizes	Flexibility to meet site-specific needs

The Modular Wetlands system offers many different configurations.

Select Modular Wetlands® Linear Approvals

Modular Wetlands Linear is approved through numerous local, state and federal programs, including but not limited to:

- Washington State Department of Ecology TAPE
- California Water Resources Control Board, Full Capture Certification
- Virginia Department of Environmental Quality (VA DEQ)
- New Jersey Department of Environmental Protection (NJDEP)
- Maryland Department of the Environment - Environmental Site Design (ESD)
- Rhode Island Department of Environmental Management BMP
- Texas Commission on Environmental Quality (TCEQ)
- Atlanta Regional Commission Certification



Modular Wetlands® Performance

The Modular Wetlands® Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, and hydrocarbons. The Modular Wetlands® Linear is field-tested on numerous sites across the country and is proven to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes.

POLLUTANT OF CONCERN	MEDIAN REMOVAL EFFICIENCY	MEDIAN EFFLUENT CONCENTRATION (MG/L)
Total Suspended Solids (TSS)	89%	12
Total Phosphorus - TAPE (TP)	61%	0.041
Nitrogen (TN)	23%	1
Total Copper (TCu)	50%	0.006
Total Dissolved Copper	37%	0.006
Total Zinc (TZn)	66%	0.019
Dissolved Zinc	60%	0.0148
Motor Oil	79%	0.8

Sources:
TAPE Field Study - 2012
TAPE Field Study - 2013

Note: Some jurisdictions recognize higher removal rates. Contact your Contech Stormwater Consultant for performance expectations.

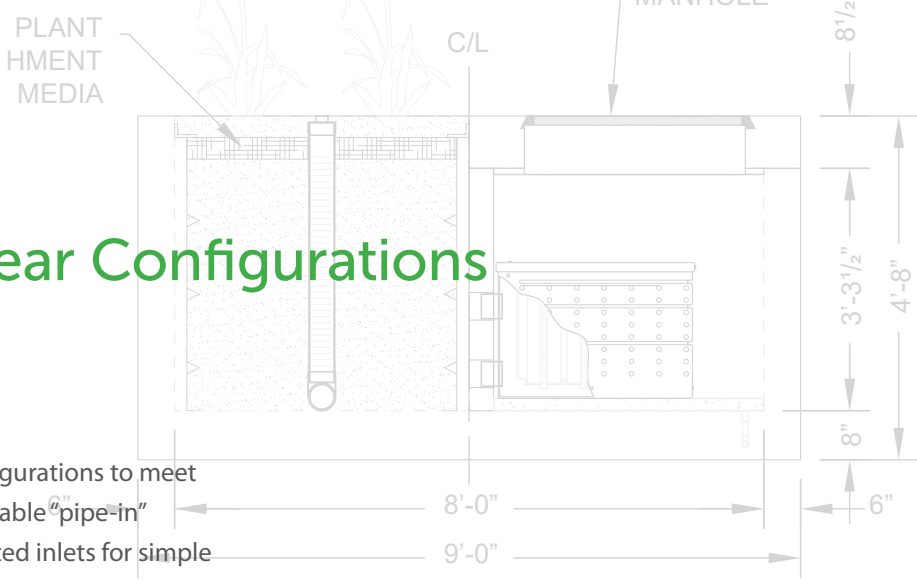
Modular Wetlands® Linear Maintenance

The Modular Wetlands® Linear is a self-contained treatment train. Maintenance requirements for the unit consist of five simple steps that can be completed using a vacuum truck. The system can also be cleaned by hand.

- Remove trash from the screening device
- Remove sediment from the separation chamber
- Periodically replace the pretreatment cartridge filter media
- Replace the drain down filter media
- Trim vegetation

Most Modular Wetland Linear systems can be cleaned in about thirty minutes.

Multiple configurations allow for easy site integration



Modular Wetlands® Linear Configurations

Multiple system configurations integrate with site hydraulic design and layout ...

The Modular Wetlands Linear is offered in multiple configurations to meet site specific needs. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your storm drain design.

Curb Inlet

The Curb Inlet configuration accepts sheet flow through a curb opening and is commonly used along roadways and parking lots. It can be used in sump or flow-by conditions.

Vault

The Vault configuration can be used in end-of-the-line installations. Another benefit of the "pipe-in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements, or for traffic-rated designs (no plants).

Downspout

The Downspout configuration is designed to accept a vertical downspout pipe from rooftop and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter, and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

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