County of San Diego
PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

ALDI Inc.
PDS2020-LDGRMJ-30257

West Corner of 16th Street & Main Street]
Ramona, CA 92065

ASSESSOR'S PARCEL NUMBER(S):
281-171-04-00

ENGINEER OF WORK:

Ryan Vliek C 82980 PROVIDE WET SIGNATURE AND STAMP ABOVE LINE]

PREPARED FOR:

ALDI Inc.
12661 ALDI Pl.
Moreno Valley, CA 92555
951-530-5750

PDP SWQMP PREPARED BY:

IngenAE
301 N. Main St. Suite B]
South Bend, IN 46601
574-400-2167

DATE OF SWQMP:
December 16, 2019

PLANS PREPARED BY:
Ryan Vliek
301 N. Main St. Suite B
South Bend,IN 46601
574-400-2167

SWQMP APPROVED BY:

APPROVAL DATE:


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COUNTY OF SAN DIEGO
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Table of Contents

Attachments

Acronyms

ACP	Alternative Compliance Project
APN	Assessor's Parcel Number
BMP	Best Management Practice
BMP DM	Best Management Practice Design Manual
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDCI	Private Development Construction Inspection Section
PDP	Priority Development Project
PDS	Planning and Development Services
PE	Professional Engineer
RPO	Resource Protection Ordinance
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan
WMAA	Watershed Management Area Analysis
WPO	Watershed Protection Ordinance
WQIP	Water Quality Improvement Plan

PDP SWQMP Preparer's Certification Page

Project Name: ALDI Inc. – Ramona, CA
Permit Application Number: PDS2018-STP-18-021

PREPARER'S CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the County of San Diego BMP Design Manual, which is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100) requirements for storm water management.

I have read and understand that the County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by County staff is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

Ryan Vliek 82980 09/30/20
Engineer of Work's Signature, PE Number & Expiration Date

Ryan Vliek
Print Name

IngenAE, LLC
Company

December 16, 2019
Date

Engineer's Seal:

Template Date: March 16, 2016
LUEG:SW **PDP SWQMP**

Preparation Date: December 16, 2019

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Submittal Record

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In column 4 summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Preliminary Design / Planning / CEQA

Submittal Number	Date	Summary of Changes
1	06/13/2018	Initial Submittal
2	11/12/2018	Revised DMA & BMP Areas
3	10/31/2019	Added Street Improvement BMP's
4	12/16/2019	Minor Revisions

Final Design

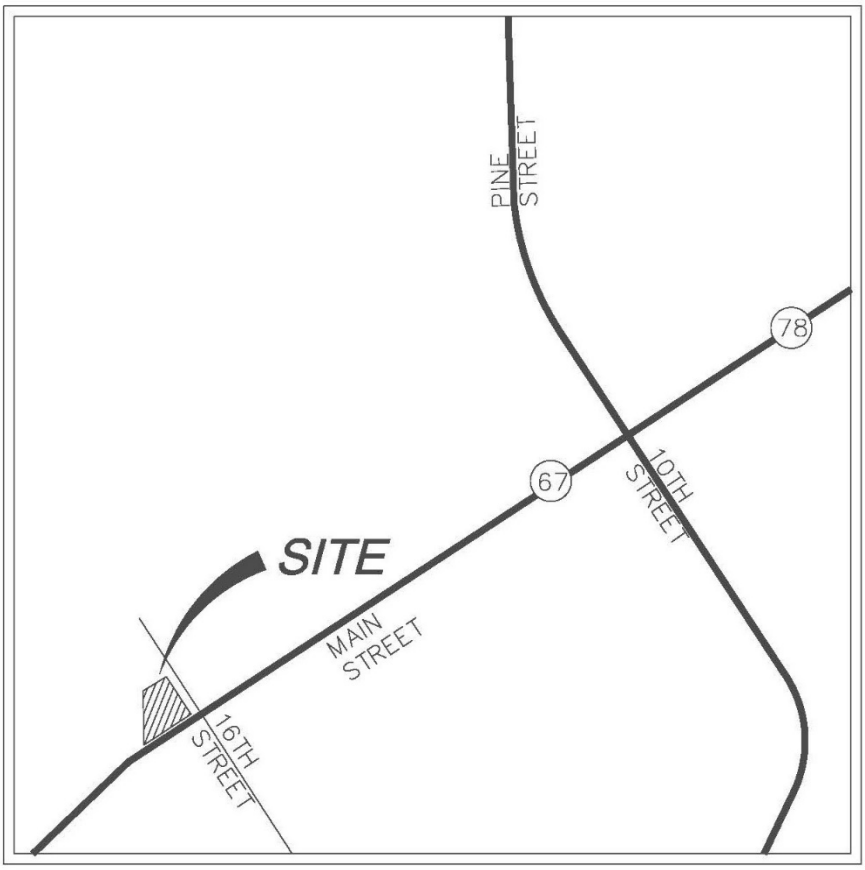
Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Plan Changes

Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Project Vicinity Map

Project Name: ALDI Inc. – Ramona, CA
Record ID: PDS2018-STP-18-021



Step 1: Project type determination (Standard or Priority Development Project)

Is the project part of another Priority Development Project (PDP)? (☐ Yes ☒ No If so, a PDP SWQMP is required. Go to Step 2.			
The project is (select one): ☒ New Development ☐ Redevelopment[1]			
The total proposed newly created or replaced impervious area is: 65714 ft^2			
The total existing (pre-project) impervious area is: 0 ft^2			
The total area disturbed by the project is: 108910 ft^2			
If the total area disturbed by the project is 1 acre (43,560 sq. ft.) or more OR the project is part of a larger common plan of development disturbing 1 acre or more, a Waste Discharger Identification (WDID) number must be obtained from the State Water Resources Control Board. WDID: _TBD__			
Is the project in any of the following categories, (a) through (f)?[2]			
Yes ☒	No ☐	(a)	New development projects that create 10,000 square feet or more of impervious surfaces [3](collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☒	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☒	No ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

[1] Redevelopment is defined as: The creation and/or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include routine maintenance activities, such as trenching and resurfacing associated with utility work; pavement grinding; resurfacing existing roadways; new sidewalks construction; pedestrian ramps; or bike lanes on existing roads; and routine replacement of damaged pavement, such as pothole repair.

[2] Applicants should note that any development project that will create and/or replace 10,000 square feet or more of impervious surface (collectively over the entire project site) is considered a new development.

[3] For solar energy farm projects, the area of the solar panels does not count toward the total impervious area of the site.

Project type determination (continued)

Yes ☐	No ☒	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). *Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.*
Yes ☐	No ☒	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ☒	No ☐	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. *Note: See BMP Design Manual Section 1.4.2 for additional guidance.*

Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?

☐ No – the project is not a Priority Development Project (Standard Project).

☒ Yes – the project is a Priority Development Project (PDP).

Further guidance may be found in Chapter 1 and Table 1-2 of the BMP Design Manual.

The following is for **redevelopment PDPs only**:

The area of existing (pre-project) impervious area at the project site is: ft^2 (A)
The total proposed newly created or replaced impervious area is ft^2 (B)
Percent impervious surface created or replaced (B/A)*100: %
The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – **only newly created or replaced impervious areas are considered a PDP and subject to stormwater requirements**

OR

☐ greater than fifty percent (50%) – **the entire project site is considered a PDP and subject to stormwater requirements**

Step 1.1: Storm Water Quality Management Plan requirements

Step	Answer	Progression
Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, complete Step 1 Project Type Determination Checklist on Pages 1 and 2, and see PDP exemption information below. For further guidance, see Section 1.4 of the BMP Design Manual *in its entirety*.	☐ Standard Project	Standard Project requirements apply, including Standard Project SWQMP. **Complete Standard Project SWQMP.**
	☒ PDP ☐ PDP with ACP	Standard and PDP requirements apply, including PDP SWQMP. **Complete PDP SWQMP.** If participating in offsite alternative compliance, **complete Step 6.3 and an ACP SWQMP.**
	☐ PDP Exemption	**Go to Step 1.2 below.**

Step 1.2: Exemption to PDP definitions

Is the project exempt from PDP definitions based on either of the following:	If so:
☐ Projects that are only new or retrofit paved sidewalks, bicycle lanes, or trails that meet the following criteria: (i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR (ii) Designed and constructed to be hydraulically disconnected from paved streets or roads [i.e., runoff from the new improvement does not drain directly onto paved streets or roads]; OR (iii) Designed and constructed with permeable pavements or surfaces in accordance with County of San Diego Guidance on Green Infrastructure;	Standard Project requirements apply, AND any additional requirements specific to the type of project. County concurrence with the exemption is required. *Provide discussion and list any additional requirements below in this form.* **Complete Standard Project SWQMP**
☐ Projects that are only retrofitting or redeveloping existing paved alleys, streets or roads that are designed and constructed in accordance with the County of San Diego Guidance on Green Infrastructure.	**Complete Green Streets PDP Exempt SWQMP.**
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:	

Step 2: Construction Storm Water BMP Checklist

Minimum Required Standard Construction Storm Water BMPs		
If you answer "Yes" to any of the questions below, your project is subject to Table 1 on the following page (Minimum Required Standard Construction Stormwater BMPs). As noted in Table 1, please select at least the minimum number of required BMPs, or as many as are feasible for your project. If no BMP is selected, an explanation must be given in the box provided. The following questions are intended to aid in determining construction BMP requirements for your project. **Note: All selected BMPs below must be included on the BMP plan incorporated into the construction plan sets.**		
1. Will there be soil disturbing activities that will result in exposed soil areas? (This includes minor grading and trenching.) **Reference Table 1 Items A, B, D, and E** Note: Soil disturbances NOT considered significant include, but are not limited to, change in use, mechanical/electrical/plumbing activities, signs, temporary trailers, interior remodeling, and minor tenant improvement.	☒Yes	☐No
2. Will there be asphalt paving, including patching? **Reference Table 1 Items D and F**	☒Yes	☐No
3. Will there be slurries from mortar mixing, coring, or concrete saw cutting? **Reference Table 1 Items D and F**	☒Yes	☐No
4. Will there be solid wastes from concrete demolition and removal, wall construction, or form work? **Reference Table 1 Items D and F**	☒Yes	☐No
5. Will there be stockpiling (soil, compost, asphalt, concrete, solid waste) for over 24 hours? **Reference Table 1 Items D and F**	☒Yes	☐No
6. Will there be dewatering operations? **Reference Table 1 Items C and D**	☐Yes	☒No
7. Will there be temporary on-site storage of construction materials, including mortar mix, raw landscaping and soil stabilization materials, treated lumber, rebar, and plated metal fencing materials? **Reference Table 1 Items E and F**	☒Yes	☐No
8. Will trash or solid waste product be generated from this project? **Reference Table 1 Item F**	☒Yes	☐No
9. Will construction equipment be stored on site (e.g.: fuels, oils, trucks, etc.?) **Reference Table 1 Item F**	☒Yes	☐No
10. Will Portable Sanitary Services ("Porta-potty") be used on the site? **Reference Table 1 Item F**	☒Yes	☐No

Table 1. Construction Storm Water BMP Checklist

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook[4] Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
A. Select Erosion Control Method for Disturbed Slopes (choose at least one for the appropriate season)			
Vegetation Stabilization Planting[5] (Summer)	SS-2, SS-4	☒	
Hydraulic Stabilization Hydroseeding[2] (Summer)	SS-4	☐	
Bonded Fiber Matrix or Stabilized Fiber Matrix[6] (Winter)	SS-3	☒	
Physical Stabilization Erosion Control Blanket[3] (Winter)	SS-7	☐	
B. Select erosion control method for disturbed flat areas (slope < 5%) (choose at least one)			
County Standard Lot Perimeter Protection Detail	PDS 659[7], SC-2	☒	
Will use erosion control measures from Item A on flat areas also	SS-3, 4, 7	☒	
County Standard Desilting Basin (must treat all site runoff)	PDS 660[8], SC-2	☐	
Mulch, straw, wood chips, soil application	SS-6, SS-8	☐	

[4] State of California Department of Transportation (Caltrans). 2003. Storm Water Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual. March. Available online at: http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm.

[5] If Vegetation Stabilization (Planting or Hydroseeding) is proposed for erosion control it may be installed between May 1st and August 15th. Slope irrigation is in place and needs to be operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. The owner must implement a contingency physical BMP by August 15th if vegetation establishment does not occur by that date. If landscaping is proposed, erosion control measures must also be used while landscaping is being established. Established vegetation must have a subsurface mat of intertwined mature roots with a uniform vegetative coverage of 70 percent of the natural vegetative coverage or more on all disturbed areas.

[6] All slopes over three feet must have established vegetative cover prior to final permit approval.

[7] County of San Diego, Planning & Development Services. 2012. Standard Lot Perimeter Protection Design System. Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds659.pdf.

[8] County of San Diego, Planning & Development Services. 2012. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Building Division. PDS 659. Available online at http://www.sandiegocounty.gov/pds/docs/pds660.pdf.

Table 1. Construction Storm Water BMP Checklist (continued)

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook Detail or County Std. Detail	✔ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
C. If runoff or dewatering operation is concentrated, velocity must be controlled using an energy dissipater			
Energy Dissipater Outlet Protection[9]	SS-10	☒	
D. Select sediment control method for all disturbed areas (choose at least one)			
Silt Fence	SC-1	☒	
Fiber Rolls (Straw Wattles)	SC-5	☒	
Gravel & Sand Bags	SC-6 & 8	☒	
Dewatering Filtration	NS-2	☐	
Storm Drain Inlet Protection	SC-10	☐	
Engineered Desilting Basin (sized for 10-year flow)	SC-2	☐	
E. Select method for preventing offsite tracking of sediment (choose at least one)			
Stabilized Construction Entrance	TC-1	☒	
Construction Road Stabilization	TC-2	☐	
Entrance/Exit Tire Wash	TC-3	☐	
Entrance/Exit Inspection & Cleaning Facility	TC-1	☐	
Street Sweeping and Vacuuming	SC-7	☐	
F. Select the general site management BMPs			
F.1 Materials Management			
Material Delivery & Storage	WM-1	☒	
Spill Prevention and Control	WM-4	☒	
F.2 Waste Management[10]			
Waste Management Concrete Waste Management	WM-8	☒	
Solid Waste Management	WM-5	☒	
Sanitary Waste Management	WM-9	☒	
Hazardous Waste Management	WM-6	☒	

Note: The Construction General Permit (Order No. 2009-0009-DWQ) also requires all projects not subject to the BMP Design Manual to comply with runoff reduction requirements through the implementation of post-construction BMPs as described in Section XIII of the order.

[9] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater is also acceptable for velocity reduction.

[10] Not all projects will have every waste identified. The applicant is responsible for identifying wastes that will be onsite and applying the appropriate BMP. For example, if concrete will be used, BMP WM-8 must be selected.

Step 3: County of San Diego PDP SWQMP Site Information Checklist

Step 3.1: Description of Existing Site Condition

Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	905.41, San Dieguito, Santa Maria Valley, Ramona

Current Status of the Site (select all that apply):

- ☐ Existing development
- ☐ Previously graded but not built out
- ☐ Demolition completed without new construction
- ☐ Agricultural or other non-impervious use
- ☒ Vacant, undeveloped/natural

Description / Additional Information:
The existing site is a vacant/undeveloped site with existing vegetative cover

Existing Land Cover Includes (select all that apply and provide each area on site):

- ☒ Vegetative Cover 2.50 Acres (108910 Square Feet)
- ☐ Non-Vegetated Pervious Areas _____ Acres (_____ Square Feet)
- ☐ Impervious Areas _____ Acres (_____ Square Feet)

Description / Additional Information:
The existing site is a vacant/undeveloped site with existing vegetative cover

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

- ☐ NRCS Type A
- ☐ NRCS Type B
- ☒ NRCS Type C
- ☒ NRCS Type D

Approximate Depth to Groundwater (GW) (or N/A if no infiltration is used):

- ☐ GW Depth < 5 feet
- ☐ 5 feet < GW Depth < 10 feet
- ☐ 10 feet < GW Depth < 20 feet
- ☒ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

- ☐ Watercourses
- ☐ Seeps
- ☐ Springs
- ☐ Wetlands
- ☒ None
- ☐ Other

Description / Additional Information:

Step 3.2: Description of Existing Site Drainage Patterns

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

(1) Whether existing drainage conveyance is natural or urban;
(2) Is runoff from offsite conveyed through the site? if yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site;
(3) Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and
(4) Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Describe existing site drainage patterns:

The existing site is vacant and generally drains from the south towards the northwest. There is no existing drainage conveyance network through the site. There are no existing drainage structures. The site sheet flows to a single existing onsite discharge point at the northwest portion of the site onto Ramona Street and adjacent properties. There is also run-on drainage that flows from the undeveloped property directly east of the site, via an old existing culvert pipe under 16th street that discharges on to the site at the east side of the property.

Step 3.3: Description of Proposed Site Development

Project Description / Proposed Land Use and/or Activities:
ALDI is proposing to construct a 19,857 sft grocery store with associated parking lot, landscaping, utilities and stormwater BMP's.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):
The proposed impervious features include a single building, asphalt parking lot and concrete sidewalks.

List/describe proposed pervious features of the project (e.g., landscape areas):
The proposed pervious areas include landscape areas.

Does the project include grading and changes to site topography?
☒Yes
☐No

Description / Additional Information:
The proposed site in general is higher in elevation than the existing topography with minimal slopes. The approximate CUT is 3,000 cyd, FILL is 3,225 cyd, IMPORT is 225 cyd and EXPORT is 0 cyd

Insert acreage or square feet for the different land cover types in the table below:

Change in Land Cover Type Summary			
Land Cover Type	Existing (acres or ft^2)	Proposed (acres or ft^2)	Percent Change
Vegetation	108910	43196	60%
Pervious (non-vegetated)	0	0	0%
Impervious	0	65714	60%

Step 3.4: Description of Proposed Site Drainage Patterns

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☒Yes

☐No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre- and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Describe proposed site drainage patterns:

The runoff from the proposed site will sheet flow from the proposed parking lot into the biofiltration basins located at the north end of the site. The landscape areas will drain into the parking area or proposed drainage swales that discharge into the biofiltration basin. The storm water that does not infiltrate will be release at a restricted rate to Ramona Street. The post-project flow rate shall be less than the pre-project condition 100 year peak flow rate. Discharge of the flow rates ranging from 10 percent of the 2-year runoff event to the 10-year run-off event must not be exceeded, in both duration and rate, 10 percent of the pre-development discharge and durations. The run-off from the new improvements in the 16th street R/W will flow into and be fully captured by tree wells located within the proposed sidewalk area. The existing run-on from the adjacent site to the east will be diverted around the proposed site and discharge at the existing condition discharge location. Refer to the drainage study for more detailed calculations.

Step 3.5: Potential Pollutant Source Areas

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply). Select "Other" if the project is a phased development and provide a description:

- ☒ On-site storm drain inlets
- ☒ Interior floor drains and elevator shaft sump pumps
- ☐ Interior parking garages
- ☐ Need for future indoor & structural pest control
- ☐ Landscape/Outdoor Pesticide Use
- ☐ Pools, spas, ponds, decorative fountains, and other water features
- ☐ Food service
- ☒ Refuse areas
- ☐ Industrial processes
- ☐ Outdoor storage of equipment or materials
- ☐ Vehicle and Equipment Cleaning
- ☐ Vehicle/Equipment Repair and Maintenance
- ☐ Fuel Dispensing Areas
- ☒ Loading Docks
- ☐ Fire Sprinkler Test Water
- ☒ Miscellaneous Drain or Wash Water
- ☒ Plazas, sidewalks, and parking lots
- ☐ Other (provide description)

Description / Additional Information:

There are interior floor drains that discharge by gravity to the sanitary sewer system. There are no elevator shaft sump pumps

Step 3.6: Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):
The storm water travels through the municipal system to the Santa Maria Creek, Santa Ysabel Creek, San Dieguito River and Pacific Ocean

List any 303(d) impaired water bodies[11] within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
San Dieguito River	Enterococcus, Fecal Coliform, Nitrogen, Phosphorus, TDS, Toxicity	*All scheduled for TMDL Completion 2021*
Pacific Ocean Shoreline at San Dieguito Lagoon Mouth	*Enterococcus, Fecal Coliform, Total Coliform*	*Total Coliform*

Identification of Project Site Pollutants*

*Identification of project site pollutants below is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs. Note the project must also participate in an alternative compliance program (unless prior lawful approval to meet earlier PDP requirements is demonstrated).

Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☐	☐	☐
Nutrients	☐	☐	☐
Heavy Metals	☐	☐	☐
Organic Compounds	☐	☐	☐
Trash & Debris	☐	☐	☐
Oxygen Demanding Substances	☐	☐	☐
Oil & Grease	☐	☐	☐

[11] The current list of Section 303(d) impaired water bodies can be found at http://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired

Bacteria & Viruses	☐	☐	☐
Pesticides	☐	☐	☐

Step 3.7: Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

☒Yes, hydromodification management requirements for flow control and preservation of critical coarse sediment yield areas are applicable.

☐No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA[12] for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

[12] The Watershed Management Area Analysis (WMAA) is an optional element for inclusion in the Water Quality Improvement Plans (WQIPs) described in the 2013 MS4 Permit [Provision B.3.b.(4)]. It is available online at the Project Clean Water website: http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=248

Step 3.7.1: Critical Coarse Sediment Yield Areas*

***This Section only required if hydromodification management requirements apply**

Projects must satisfy critical coarse sediment yield area (CCSYA) requirements by characterizing the project as one of the scenario-types presented below and satisfying associated criteria. Projects must appropriately satisfy all requirements for identification, avoidance, and bypass, OR may alternatively elect to demonstrate no net impact.

☐ **Scenario 1**: Project is subject to and in compliance with RPO requirements *(without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3) that result in impacts to more than 15% of the project-scale CCSYAs)*.

- ☐ Identify: Project has identified both onsite and upstream CCSYAs as areas that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☐ Avoid: Project has avoided onsite CCSYAs per existing RPO steep slope encroachment criteria. AND,
- ☐ Bypass: Project has demonstrated that both onsite and upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 1 criteria above and must alternatively demonstrate no net impact to the receiving water.

☐ **Scenario 2**: Project is entirely exempt/not subject to RPO requirements without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3).

- ☒ Identify: Project has identified upstream CCSYAs that are coarse, ≥25% slope, and ≥50' tall. *(Optional refinement methods may be performed per guidance in Section H.1.2). AND,*
- ☒ Avoid: Project is not required to avoid onsite CCSYAs as none were identified in the previous step. AND,
- ☒ Bypass: Project has demonstrated that upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,
- ☐ No Net Impact: Project does not satisfy all Scenario 2 criteria above and must alternatively demonstrate no net impact to the receiving water. *(Skip to next row).*

☐ **Scenario 3**: Project utilizes exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3) and impacts more than 15% of the project-scale CCSYAs.

- ☐ No Net Impact: Project is not eligible for traditional methods of identification, avoidance, and bypass. Project must demonstrate no net impact to the receiving water.

Critical Coarse Sediment Yield Areas Continued
Demonstrate No Net Impact
If the project elects to satisfy CCSYA criteria through demonstration of no net impact to the receiving water. Applicants must identify the methods utilized from the list below and provide supporting documentation in Attachment 2c of the SWQMP. Check all that are applicable. ☒ N/A, the project appropriately identifies, avoids, and bypasses CCSYAs. ☐ Project has performed additional analysis to demonstrate that impacts to CCSYAs satisfy the no net impact standard of Ep/Sp≤1.1. ☐ Project has provided alternate mapping of CCSYAs. ☐ Project has implemented additional onsite hydromodification flow control measures. ☐ Project has implemented an offsite stream rehabilitation project to offset impacts. ☐ Project has implemented other applicant-proposed mitigation measures.

Step 3.7.2: Flow Control for Post-Project Runoff*

*This Section only required if hydromodification management requirements apply
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit. The point of compliance (POC #1) is a pump outlet that discharges the restricted flow to Ramona Street.
Has a geomorphic assessment been performed for the receiving channel(s)? ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold) ☐ Yes, the result is the low flow threshold is 0.1Q2 ☐ Yes, the result is the low flow threshold is 0.3Q2 ☐ Yes, the result is the low flow threshold is 0.5Q2 *If a geomorphic assessment has been performed, provide title, date, and preparer:* *Discussion / Additional Information: (optional)*

Step 3.8: Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

Per Caltrans Arborist, ALDI has been instructed to limit any improvements or grading activities within 40 ft from the existing eucalyptus trees along Main Street.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Step 4: Source Control BMP Checklist

Source Control BMPs			
All development projects must implement source control BMPs 4.2.1 through 4.2.6 where applicable and feasible. See Chapter 4.2 and Appendix E of the County BMP Design Manual for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the source control BMP as described in Chapter 4.2 and/or Appendix E of the County BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification must be provided.			
Source Control Requirement	**Applied?**		
4.2.1 Prevention of Illicit Discharges into the MS4	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.1 not implemented:			
4.2.2 Storm Drain Stenciling or Signage	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.2 not implemented:			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.3 not implemented:			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.4 not implemented:			

Source Control Requirement	Applied?		
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.5 not implemented:			
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below):			
☐ A. On-site storm drain inlets	☒Yes	☐No	☐N/A
☐ B. Interior floor drains and elevator shaft sump pumps	☐Yes	☐No	☒N/A
☐ C. Interior parking garages	☐Yes	☐No	☒N/A
☐ D. Need for future indoor & structural pest control	☐Yes	☐No	☒N/A
☐ E. Landscape/outdoor pesticide use	☒Yes	☐No	☐N/A
☐ F. Pools, spas, ponds, fountains, and other water features	☐Yes	☐No	☒N/A
☐ G. Food service	☐Yes	☐No	☒N/A
☐ H. Refuse areas	☒Yes	☐No	☐N/A
☐ I. Industrial processes	☐Yes	☐No	☒N/A
☐ J. Outdoor storage of equipment or materials	☐Yes	☐No	☒N/A
☐ K. Vehicle and equipment cleaning	☐Yes	☐No	☒N/A
☐ L. Vehicle/equipment repair and maintenance	☐Yes	☐No	☒N/A
☐ M. Fuel dispensing areas	☐Yes	☐No	☒N/A
☐ N. Loading docks	☒Yes	☐No	☐N/A
☐ O. Fire sprinkler test water	☐Yes	☐No	☒N/A
☐ P. Miscellaneous drain or wash water	☐Yes	☒No	☐N/A
☐ Q. Plazas, sidewalks, and parking lots	☒Yes	☐No	☐N/A
Discussion / justification if 4.2.6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above. All drain or wash water is from interior utility sinks and drains that discharge into the building sanitary sewer system			

Note: Show all source control measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 5: Site Design BMP Checklist

Site Design BMPs
All development projects must implement site design BMPs SD-A through SD-H where applicable and feasible. See Chapter 4.3 and Appendix E of the County BMP Design Manual for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the site design BMP as described in Chapter 4.3 and/or Appendix E of the County BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification must be provided.

Site Design Requirement	Applied?		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.1 not implemented:			
4.3.2 Conserve Natural Areas, Soils, and Vegetation	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.2 not implemented:			
4.3.3 Minimize Impervious Area	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.3 not implemented:			
4.3.4 Minimize Soil Compaction	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.4 not implemented:			
4.3.5 Impervious Area Dispersion	☐Yes	☒No	☐N/A
Discussion / justification if 4.3.5 not implemented: Impervious area dispersion was not feasible for this project. Other methods have been utilized that are more advantageous with the proposed site design and project parameters.			

Site Design Requirement	Applied?		
4.3.6 Runoff Collection	☐Yes	☒No	☐N/A
Discussion / justification if 4.3.6 not implemented: Runoff collection was not feasible for this project			
4.3.7 Landscaping with Native or Drought Tolerant Species	☒Yes	☐No	☐N/A
Discussion / justification if 4.3.7 not implemented:			
4.3.8 Harvesting and Using Precipitation	☐Yes	☒No	☐N/A
Discussion / justification if 4.3.8 not implemented: Harvesting and re-using precipitation was not feasible for this project			

Note: Show all site design measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 6: PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the County at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the County must confirm the maintenance (see Section 7 of the BMP Design Manual).

Use this section to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (Step 6.2) for each structural BMP within the project (copy the BMP summary information sheet [Step 6.2] as many times as needed to provide summary information for each individual structural BMP).

Step 6.1: Description of structural BMP strategy

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. At the end of this discussion provide a summary of all the structural BMPs within the project including the type and number.

The BMP's were selected based on San Diego County BMP Design Manual. Harvest and use BMP's were determined to not be feasible for this project based on the low demand for harvested water and practical means to collect and store. Low infiltration rates eliminated the option for fully DCV captured BMP's, however the site parameters did allow for partial infiltration. A Biofiltration with Partial Infiltration BMP (BMP #1) was selected to control both the pollutant and flow control requirements. The discharge is restricted by an orifice within the control structure M.H. #1. The San Diego County BMP Sizing Spreadsheet was utilized to size the proposed BMP's. Tree wells were utilized along the 16th street sidewalk to fully capture the street improvement DCV and hydromodification requirements.

(Continue on following page as necessary.)

Description of structural BMP strategy continued **(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)**
(Continued from previous page)

Step 6.2: Structural BMP Checklist

(Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. BMP#1	
Construction Plan Sheet No. C.2	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☒ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☒ Biofiltration with Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3) meeting all requirements of Appendix F ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☒ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms (See Section 1.12 of the BMP Design Manual)	ALDI Inc. Skip Janes, Director of Real Estate 12661 Aldi Place Moreno Valley, CA 92555 Tel. 951.530.5750
Who will be the final owner of this BMP?	☐ HOA ☒ Property Owner ☐ County ☐ Other (describe)
Who will maintain this BMP into perpetuity?	☐ HOA ☒ Property Owner ☐ County ☐ Other (describe)
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	1

Discussion (as needed): *(Continue on subsequent pages as necessary)*

Step 6.3: Offsite Alternative Compliance Participation Form

PDP INFORMATION	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
What are your PDP Pollutant Control Debits? *See Attachment 1 of the PDP SWQMP	
What are your PDP HMP Debits? (if applicable) *See Attachment 2 of the PDP SWQMP	
ACP Information	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
Project Owner/Address	
What are your ACP Pollutant Control Credits? *See Attachment 1 of the ACP SWQMP	
What are your ACP HMP Debits? (if applicable) *See Attachment 2 of the ACP SWQMP	
Is your ACP in the same watershed as your PDP? ☐ Yes ☐ No	Will your ACP project be completed prior to the completion of the PDP? ☐ Yes ☐ No
Does your ACP account for all Deficits generated by the PDP? ☐ Yes ☐ No (PDP and/or ACP must be redesigned to account for all deficits generated by the PDP.	What is the difference between your PDP debits and ACP Credits? *(ACP Credits -Total PDP Debits = Total Earned Credits)

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	Storm Water Pollutant Control Worksheet Calculations -Worksheet B.3-1 (Required) -Worksheet B.1-1 (Required) -Worksheet B.4-1 (if applicable) -Worksheet B.4-2 (if applicable) -Worksheet B.5-1 (if applicable) -Worksheet B.5-2 (if applicable) -Worksheet B.5-3 (if applicable) -Worksheet B.6-1 (if applicable) -Summary Worksheet (optional)	☒ Included
Attachment 1b	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☒ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1c	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☒ Included
Attachment 1d	Individual Structural BMP DMA Mapbook (Required) -Place each map on 8.5”x11” paper. -Show at a minimum the DMA, Structural BMP, and any existing hydrologic features within the DMA.	☒ Included

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☒ Critical coarse sediment yield areas to be protected
☒ Existing topography and impervious areas
☒ Existing and proposed site drainage network and connections to drainage offsite
☒ Proposed demolition
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
☒ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Step 3.5)
☒ Structural BMPs (identify location, structural BMP ID#, type of BMP, and size/detail)

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Note that it is not necessary to investigate each and every criterion in the worksheet if infiltration is precluded. Instead a letter of justification from a geotechnical professional familiar with the local conditions substantiating any geotechnical issues will be required.

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis:

A percolation test was performed and the infiltration rate was found to be 0.05 inches per hour. This includes a factor of safety of 2.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

The project infiltration rate is less than 0.5 inches per hour

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: The project infiltration rate is less than 0.5 inches per hour Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: The project infiltration rate is less than 0.5 inches per hour Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

The soil and geologic conditions are not such that infiltration would be detrimental, however the rate and volume are very minimal

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

The soil and geologic conditions are not such that infiltration would be detrimental, however the rate and volume are very minimal

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Form I-8 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: The soil and geologic conditions are not such that infiltration would be detrimental, however the rate and volume are very minimal Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question must be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: The soil and geologic conditions are not such that infiltration would be detrimental, however the rate and volume are very minimal Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

County of San Diego Automated Stormwater Pollutant Control Worksheets
(Version 1.3)

WELCOME:

Welcome to the County of San Diego Automated Stormwater Pollutant Control Worksheets. Priority Development Projects that are required to satisfy stormwater pollutant control performance standards set forth in the 2013 MS4 Permit may use these automated worksheets to calculate design capture volumes and determine what portion of pollutant control performance standards are satisfied by their project.

INSTRUCTIONS:

General: To use this workbook users must navigate to the appropriate worksheet tabs and populate yellow cells with project specific information. These worksheet tabs are formatted to accommodate calculations for up to 10 drainage areas and associated BMPs. Each drainage area and/or BMP is represented as a discrete column with corresponding user inputs and calculations appearing in the rows below. Please note that projects with more than 10 drainage areas may need to use more than one workbook to accommodate their entire project. Yellow cells represent items that require user input, white cells are locked for editing and are automatically calculated, blue cells are also locked for editing and are automatically populated based on results from previous worksheet tabs, grey cells represent items that typically require user input but may be omitted based on a previous user input, orange cells represent warnings where supplemental information and/or revisions may be required for compliance, and red cells represent errors associated with proposed stormwater pollutant control measures that negatively affect compliance.

Step 1. Navigate to the orange tab at the bottom of the workbook and provide required inputs to determine the structural BMP types that are acceptable for implementation at the project site.

Step 2. Navigate to the blue tab at the bottom of the workbook and provide the required inputs to determine the design capture volume for each PDP drainage area and identify what type of BMP this area drains to. The calculations in this worksheet determine the initial design capture volume and also apply any applicable reductions associated with site design techniques including dispersion to pervious surfaces, incorporation of tree wells, and incorporation of rain barrels. Upon completion of Step 2, applicants must proceed to Step 3 to ensure that appropriate stormwater pollutant control measures are applied to this volume.

Step 3. Examine the green tabs at the bottom of the workbook and identify which of these BMP types are implemented by the PDP. Click the green tab for each of the proposed BMP types and provide the required user inputs to determine the portion of the pollutant control performance standards that are satisfied by the proposed BMP. After providing appropriate inputs users should verify that no red error messages appear at the bottom of their worksheets and, if necessary, refine user inputs until satisfied with the proposed stormwater pollutant control approach. Once satisfied, applicants must proceed to Step 4 to facilitate their project submittal.
Note: Users must ensure that all provided inputs are adequately represented in the accompanying stormwater management plans.

Step 4. Navigate to the purple "Summary" tab at the bottom of this workbook and examine the sheet for warning messages highlighted in red text at the bottom of the worksheet. Once satisfied with the overall results, print the summary sheet and all applicable supporting worksheets in color, 11x17 landscape format and include in Attachment 1a of the SWQMP submittal.

DISCLAIMER:

The County of San Diego has developed this tool in an effort to streamline traditionally complex efforts associated with planning, design, submittal, and review of PDPs that are subject to stormwater pollutant control requirements set forth in the 2013 MS4 Permit. While the calculations performed herein are deemed to be in compliance with Permit requirements, applicants may elect to provide their own calculations. Use of this tool is optional and the County will not be held liable for any errors or other negative impacts associated with its use. In the event that the County performs updates to these worksheets, applicants that have not established reliance on previous versions of the worksheet via discretionary approval may be required to utilize the latest version of the worksheets. A summary of version releases is included below.

QUESTIONS:

-Questions relating to specific projects, submittal requirements, approval process, and/or policy-related issues should be directed your PDS Land Development Project Manager (link below).

PDS Land Development Project Manager

-General questions/comments on this worksheet may be directed to Charles Mohrlock in the County of San Diego Watershed Protection Program (link below).

charles.mohrlock@sdcounty.ca.gov

Automated Worksheet B.3-1: Project-Scale BMP Feasibility Analysis (V1.3)

Category	#	Description	Value	Units
Capture & Use Inputs	0	Design Capture Volume for Entire Project Site	3,580	cubic-feet
	1	Proposed Development Type	Retail	unitless
	2	Number of Residents or Employees at Proposed Development	12	#
	3	Total Planted Area within Development	41,388	sq-ft
	4	Water Use Category for Proposed Planted Areas	Moderate	unitless
Infiltration Inputs	5	Is Average Site Design Infiltration Rate ≤0.500 Inches per Hour?	Yes	yes/no
	6	Is Average Site Design Infiltration Rate ≤0.010 Inches per Hour?	No	yes/no
	7	Is Infiltration of the Full DCV Anticipated to Produce Negative Impacts?	No	yes/no
	8	Is Infiltration of Any Volume Anticipated to Produce Negative Impacts?	No	yes/no
Calculations	9	36-Hour Toilet Use Per Resident or Employee	1.40	cubic-feet
	10	Subtotal: Anticipated 36 Hour Toilet Use	17	cubic-feet
	11	Anticipated 1 Acre Landscape Use Over 36 Hours	196.52	cubic-feet
	12	Subtotal: Anticipated Landscape Use Over 36 Hours	187	cubic-feet
	13	Total Anticipated Use Over 36 Hours	204	cubic-feet
	14	Total Anticipated Use / Design Capture Volume	0.06	cubic-feet
	15	Are Full Capture and Use Techniques Feasible for this Project?	No	unitless
	16	Is Full Retention Feasible for this Project?	No	yes/no
	17	Is Partial Retention Feasible for this Project?	Yes	yes/no
Result	18	Feasibility Category	4	1, 2, 3, 4, 5

Worksheet B.3-1 General Notes:

A. Applicants may use this worksheet to determine the types of structural BMPs that are acceptable for implementation at their project site (as required in Section 5 of the BMPDM). User input should be provided for yellow shaded cells, values for all other cells will be automatically generated. Projects demonstrating feasibility or potential feasibility via this worksheet are encouraged to incorporate capture and use features in their project.

B. Negative impacts associated with retention may include geotechnical, groundwater, water balance, or other issues identified by a geotechnical engineer and substantiated through completion of Form I-8.

C. Feasibility Category 1: Applicant must implement capture & use, retention, and/or infiltration elements for the entire DCV.

D. Feasibility Category 2: Applicant must implement capture & use elements for the entire DCV.

E. Feasibility Category 3: Applicant must implement retention and/or infiltration elements for all DMAs with Design Infiltration Rates greater than 0.50 in/hr.

F. Feasibility Category 4: Applicant must implement standard unlined biofiltration BMPs sized at ≥3% of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.011 to 0.50 in/hr. Applicants may be permitted to implement lined BMPs, reduced size BMPs, and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.

G. Feasibility Category 5: Applicant must implement standard lined biofiltration BMPs sized at ≥3% of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.010 in/hr or less. Applicants may also be permitted to implement reduced size and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.

H. PDPs participating in an offsite alternative compliance program are not held to the feasibility categories presented herein.

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	BMP #1	BMP #2									unitless
	1	Basin Drains to the Following BMP Type	Biofiltration	Flow-Thru									unitless
	2	85th Percentile 24-hr Storm Depth	0.61	0.61									inches
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.050	0.050									in/hr
	4	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	65,490	12,153									sq-ft
	5	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	6	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	4,584										sq-ft
	7	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	8	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	9	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	17,807	1,045									sq-ft
	10	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)	23,913										sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	Yes	No	No	No	No	No	No	No	No	yes/no
	12	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	13	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	14	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	16	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	17	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	18	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	19	Number of Tree Wells Proposed per SD-A		5									#
	20	Average Mature Tree Canopy Diameter		30									ft
	21	Number of Rain Barrels Proposed per SD-E											#
	22	Average Rain Barrel Size											gal
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in Downstream Drainage?	No	No	No	No	No	No	No	No	No	No	unitless
	24	Identify Downstream Drainage Basin Providing Treatment in Series											unitless
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas											percent
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
Initial Runoff Factor Calculation	28	Total Tributary Area	111,794	13,198	0	0	0	0	0	0	0	0	sq-ft
	29	Initial Runoff Factor for Standard Drainage Areas	0.63	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	31	Initial Weighted Runoff Factor	0.63	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	32	Initial Design Capture Volume	3,580	570	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	34	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.63	0.85	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	38	Design Capture Volume After Dispersion Techniques	3,580	570	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	39	Total Tree Well Volume Reduction	0	2,100	0	0	0	0	0	0	0	0	cubic-feet
	40	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	41	Final Adjusted Runoff Factor	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	42	Final Effective Tributary Area	70,430	0	0	0	0	0	0	0	0	0	sq-ft
	43	Initial Design Capture Volume Retained by Site Design Elements	0	2,100	0	0	0	0	0	0	0	0	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	3,580	0	0	0	0	0	0	0	0	0	cubic-feet

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

Automated Worksheet B.5-1: Sizing Lined or Unlined Biofiltration BMPs (V1.3)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	0	Drainage Basin ID or Name	BMP #1	-	-	-	-	-	-	-	-	-	sq-ft
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	0.050	-	-	-	-	-	-	-	-	-	in/hr
	2	Effective Tributary Area	70,430	-	-	-	-	-	-	-	-	-	sq-ft
	3	Minimum Biofiltration Footprint Sizing Factor	0.030	-	-	-	-	-	-	-	-	-	ratio
	4	Design Capture Volume Tributary to BMP	3,580	-	-	-	-	-	-	-	-	-	cubic-feet
	5	Is Biofiltration Basin Impermeably Lined or Unlined?	Unlined										unitless
	6	Provided Biofiltration BMP Surface Area	4,584										sq-ft
	7	Provided Surface Ponding Depth	12										inches
	8	Provided Soil Media Thickness	18										inches
	9	Provided Depth of Gravel Above Underdrain Invert	6										inches
	10	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.50										inches
	11	Provided Depth of Gravel Below the Underdrain	6										inches
Retention Calculations	12	Volume Infiltrated Over 6 Hour Storm	115	0	0	0	0	0	0	0	0	0	cubic-feet
	13	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	14	Gravel Pore Space Available for Retention	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	15	Effective Retention Depth	3.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	16	Calculated Retention Storage Drawdown (Including 6 Hr Storm)	54	0	0	0	0	0	0	0	0	0	hours
	17	Volume Retained by BMP	1,375	0	0	0	0	0	0	0	0	0	cubic-feet
	18	Fraction of DCV Retained	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	19	Portion of Retention Performance Standard Satisfied	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	20	Fraction of DCV Retained (normalized to 36-hr drawdown)	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	21	Design Capture Volume Remaining for Biofiltration	2,434	0	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	22	Max Hydromod Flow Rate through Underdrain	0.1013	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	CFS
	23	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.95	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	in/hr
	24	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	25	Soil Media Filtration Rate to be used for Sizing	0.95	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	26	Depth Biofiltered Over 6 Hour Storm	5.73	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	27	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	28	Effective Depth of Biofiltration Storage	18.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	29	Drawdown Time for Surface Ponding	12	0	0	0	0	0	0	0	0	0	hours
	30	Drawdown Time for Effective Biofiltration Depth	18	0	0	0	0	0	0	0	0	0	hours
	31	Total Depth Biofiltered	23.73	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	32	Option 1 - Biofilter 1.50 DCV: Target Volume	3,651	0	0	0	0	0	0	0	0	0	cubic-feet
	33	Option 1 - Provided Biofiltration Volume	3,651	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Option 2 - Store 0.75 DCV: Target Volume	1,826	0	0	0	0	0	0	0	0	0	cubic-feet
	35	Option 2 - Provided Storage Volume	1,826	0	0	0	0	0	0	0	0	0	cubic-feet
	36	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	37	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	-	-	-	-	-	-	-	-	-	yes/no
	38	Overall Portion of Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	39	This BMP Overflows to the Following Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	40	**Deficit of Effectively Treated Stormwater**	0	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

Worksheet B.5-1 General Notes:

A. Applicants may use this worksheet to size Lined or Unlined Biofiltration BMPs (BF-1, PR-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red/orange and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

Summary of Stormwater Pollutant Control Calculations (V1.3)

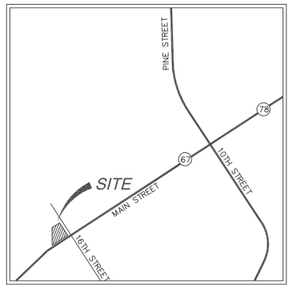
Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
General Info	0	Drainage Basin ID or Name	BMP #1	BMP #2	-	-	-	-	-	-	-	-	unitless
	1	85th Percentile Storm Depth	0.61	0.61	-	-	-	-	-	-	-	-	inches
	2	Design Infiltration Rate Recommended by Geotechnical Engineer	0.050	0.050	-	-	-	-	-	-	-	-	in/hr
	3	Total Tributary Area	111,794	13,198	-	-	-	-	-	-	-	-	sq-ft
	4	85th Percentile Storm Volume (Rainfall Volume)	5,683	671	-	-	-	-	-	-	-	-	cubic-feet
Initial DCV	5	Initial Weighted Runoff Factor	0.63	0.85	-	-	-	-	-	-	-	-	unitless
	6	Initial Design Capture Volume	3,580	570	-	-	-	-	-	-	-	-	cubic-feet
Site Design Volume Reductions	7	Dispersion Area Reductions	0	0	-	-	-	-	-	-	-	-	cubic-feet
	8	Tree Well and Rain Barrel Reductions	0	2,100	-	-	-	-	-	-	-	-	cubic-feet
BMP Volume Reductions	9	Effective Area Tributary to BMP	70,430	0	-	-	-	-	-	-	-	-	square feet
	10	Final Design Capture Volume Tributary to BMP	3,580	0	-	-	-	-	-	-	-	-	cubic-feet
	11	Basin Drains to the Following BMP Type	Biofiltration	Flow-Thru	-	-	-	-	-	-	-	-	unitless
	12	Volume Retained by BMP (normalized to 36 hour drawdown)	1,146	0	-	-	-	-	-	-	-	-	cubic-feet
Total Volume Reductions	13	Total Fraction of Initial DCV Retained within DMA	0.32	3.68	-	-	-	-	-	-	-	-	fraction
	14	Percent of Average Annual Runoff Retention Provided	39.2%	#N/A	-	-	-	-	-	-	-	-	%
	15	Percent of Average Annual Runoff Retention Required	11.4%	11.4%	-	-	-	-	-	-	-	-	%
Performance Standard	16	Percent of Pollution Control Standard Satisfied	100.0%	0.0%	-	-	-	-	-	-	-	-	%
Treatment Train	17	Discharges to Secondary Treatment in Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	18	Impervious Surface Area Still Requiring Treatment	0	0	-	-	-	-	-	-	-	-	square feet
	19	Impervious Surfaces Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
	20	Impervious Surfaces Not Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
Result	21	Deficit of Effectively Treated Stormwater	0	0	-	-	-	-	-	-	-	-	cubic-feet

Summary Notes:

All fields in this summary worksheet are populated based on previous user inputs. If applicable, drainage basin elements that require revisions and/or supplemental information outside the scope of these worksheets are highlighted in orange and summairzed in the red text below. If all drainage basins achieve full compliance without a need for supplemental information, a green message will appear below.

-Congratulations, all specified drainage basins and BMPs are in compliance with stormwater pollutant control requirements. Include 11x17 color prints of this summary sheet and supporting worksheet calculations as part of the SWQMP submittal package.

False



VICINITY MAP

NOTE: GROUNDWATER DEPTH IS GREATER THAN 20 FT

SURFACE AREA LEGEND

- IMPERVIOUS AREA (C VALUE – 0.90)
- PERVIOUS AREA (HYDROLOGIC SOIL GROUP C) (C VALUE – 0.23)
- PERVIOUS AREA (HYDROLOGIC SOIL GROUP D) (C VALUE – 0.30)

AREA SUMMARY

DMA #1
PERVIOUS AREA (TYPE C): 1.775 ACRES
PERVIOUS AREA (TYPE D): 0.791 ACRES
TOTAL: 2.566 ACRES

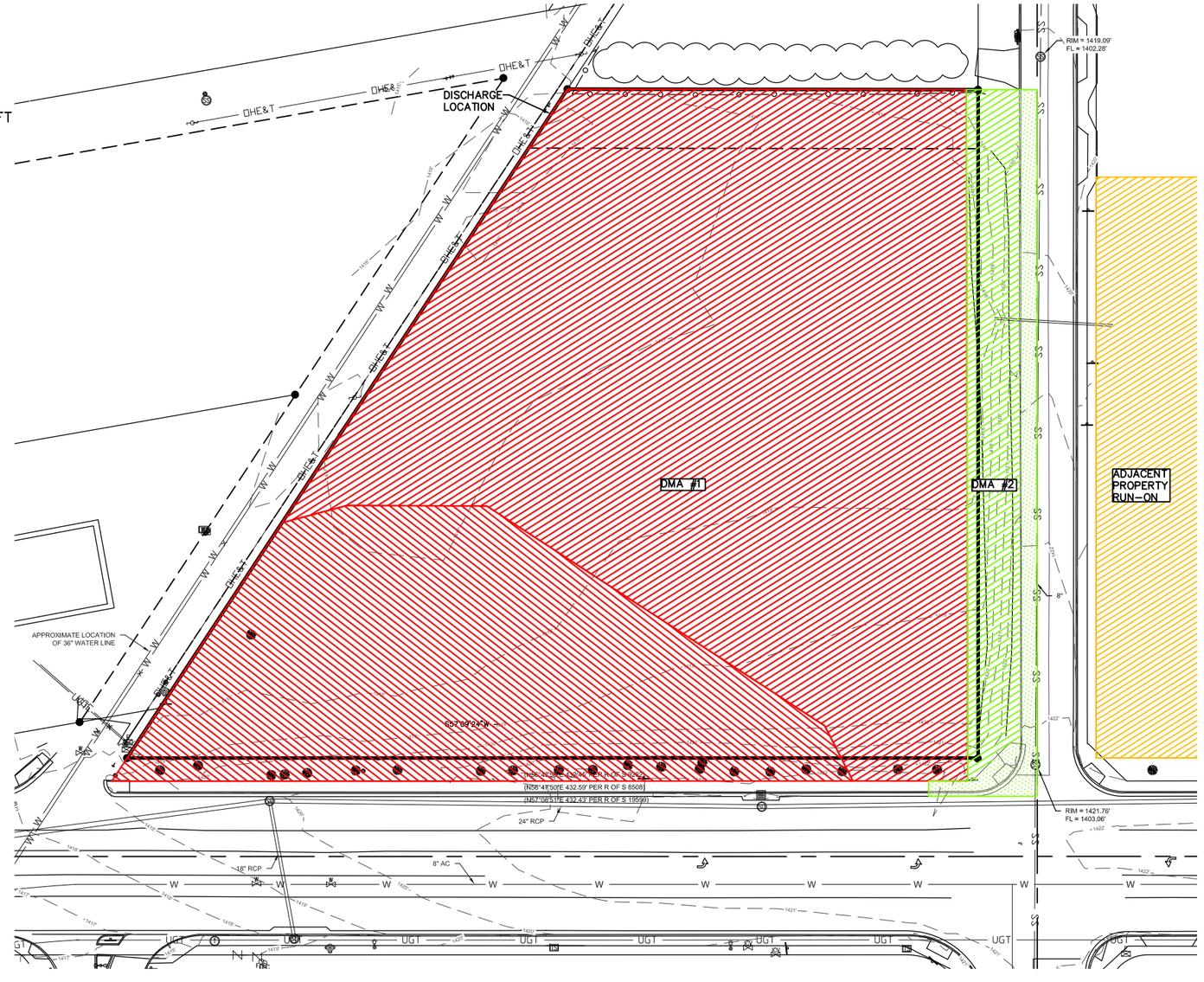
WEIGHTED RUNOFF FACTOR = 0.25

DMA #2
IMPERVIOUS AREA: 0.087 ACRES
PERVIOUS AREA (TYPE C): 0.216 ACRES
TOTAL: 0.303 ACRES

WEIGHTED RUNOFF FACTOR = 0.42

ADJACENT PROPERTY RUN–ON
PERVIOUS AREA (TYPE C): 1.524 ACRES
TOTAL: 1.524 ACRES

WEIGHTED RUNOFF FACTOR = 0.23



GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.

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Submissions / Revisions:		Date:
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11		
12		
13		

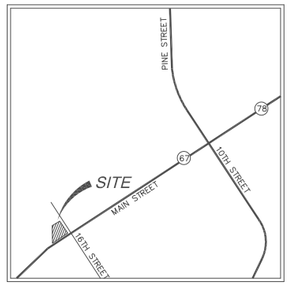
ALDI Inc.
12661 ALDI PLACE
MORENO VALLEY, CA
92555-6703
(951) 530-5750

Project Name & Location:

ALDI
16TH STREET &
MAIN STREET
RAMONA, CA

Drawing Name:
EXISTING DMA EXHIBIT

Date: 12/16/19	Project No. AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	



VICINITY MAP

NOTE: GROUNDWATER DEPTH IS GREATER THAN 20 FT

SURFACE AREA LEGEND

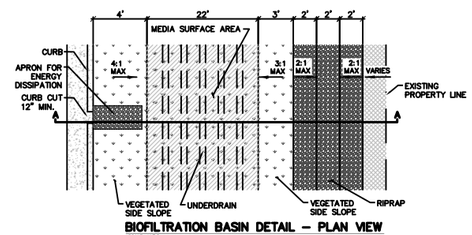
- IMPERVIOUS AREA (C VALUE – 0.90)
- PERVIOUS AREA (HYDROLOGIC SOIL GROUP C) (C VALUE – 0.23)
- PERVIOUS AREA (HYDROLOGIC SOIL GROUP D) (C VALUE – 0.30)
- IMPERVIOUS ROOF AREA (C VALUE – 0.90)

AREA SUMMARY

DMA #1	
IMPERVIOUS AREA:	1.044 ACRES
IMPERVIOUS ROOF AREA:	0.459 ACRES
PERVIOUS AREA (TYPE C):	0.514 ACRES
PERVIOUS AREA (TYPE D):	0.549 ACRES
TOTAL:	2.566 ACRES
WEIGHTED RUNOFF FACTOR = 0.64	

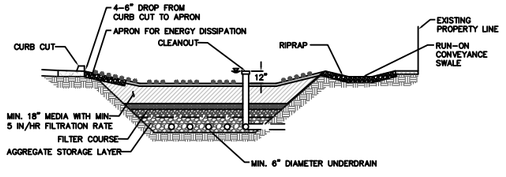
DMA #2	
IMPERVIOUS AREA:	0.279 ACRES
PERVIOUS AREA (TYPE C):	0.024 ACRES
TOTAL:	0.303 ACRES
WEIGHTED RUNOFF FACTOR = 0.85	

ADJACENT PROPERTY RUN-ON	
PERVIOUS AREA (TYPE C):	1.524 ACRES
TOTAL:	1.524 ACRES
WEIGHTED RUNOFF FACTOR = 0.23	



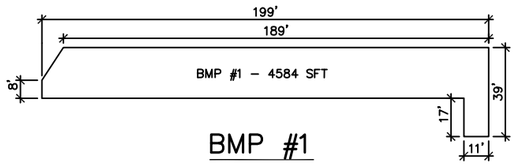
BIOFILTRATION BASIN DETAIL – PLAN VIEW

SCALE: N.T.S.

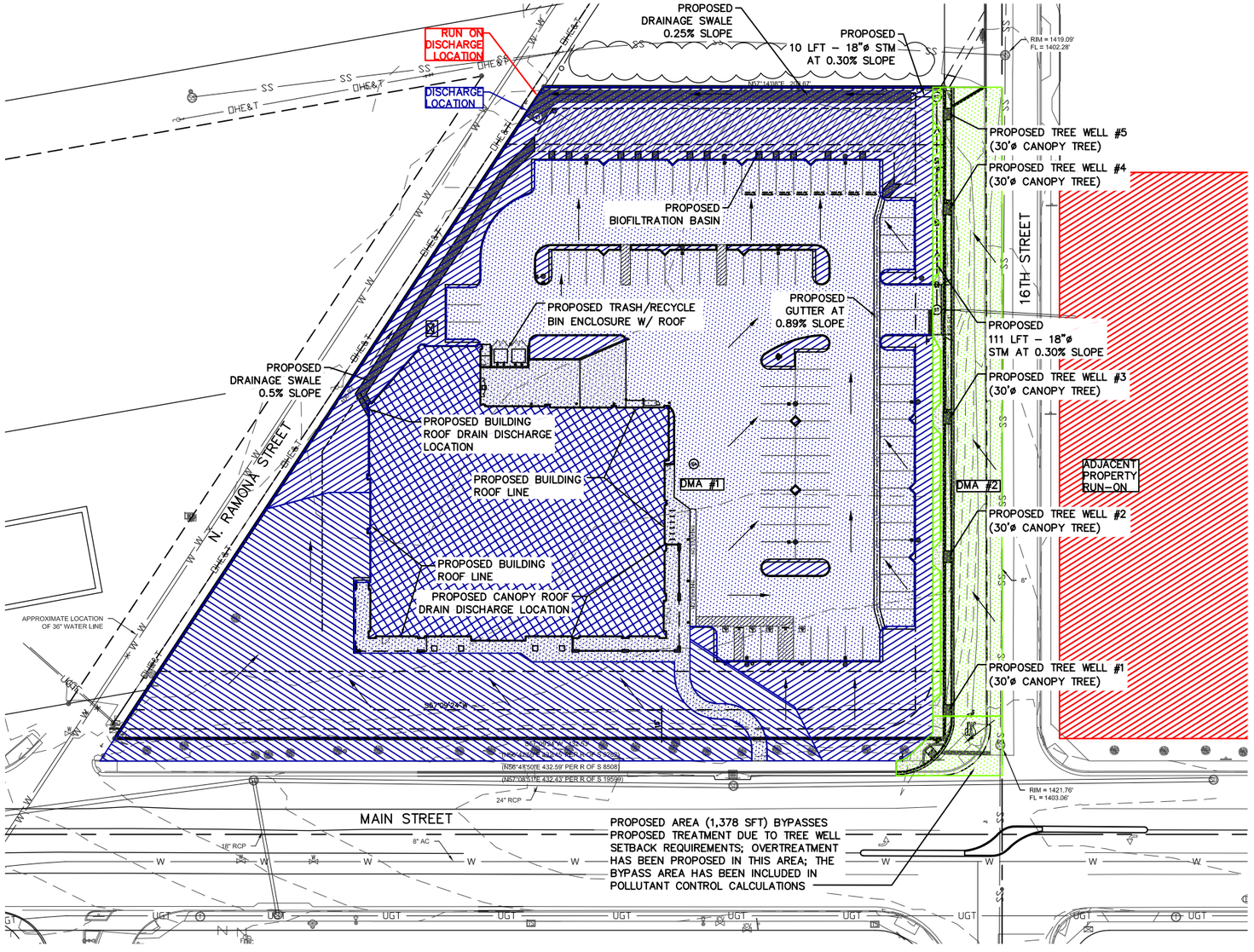


BIOFILTRATION BASIN DETAIL – SECTION A-A VIEW

SCALE: N.T.S.



BMP #1



GRAPHIC SCALE

30 0 15 30 60

(IN FEET)

1 inch = 30 ft.

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Submissions / Revisions:	Date:
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ALDI Inc.

12661 ALDI PLACE
MORENO VALLEY, CA
92555-6703
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Project Name & Location:

ALDI
16TH STREET &
MAIN STREET
RAMONA, CA

Drawing Name:
PROPOSED DMA EXHIBIT

Date:	Project No.
	AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	

ATTACHMENT 2

BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☒ Included ☐ Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2c	Management of Critical Coarse Sediment Yield Areas See Section 6.2 and Appendix H of the BMP Design Manual.	☐ Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped by Regional or Jurisdictional approaches outlined in Appendix H.1 AND, ☐ Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment per approaches outlined in Appendix H.2 and H.3. OR, ☐ Demonstration that project does not generate a net impact on the receiving water per approaches outlined in Appendix H.4.
Attachment 2d	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☒ Not performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☒ Critical coarse sediment yield areas to be protected
☒ Existing topography
☒ Existing and proposed site drainage network and connections to drainage offsite
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Point(s) of Compliance (POC) for Hydromodification Management
☒ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
☒ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

BMP Sizing Spreadsheet V3.0

Project Name:	ALDI Inc. - Ramona, CA
Project Applicant:	ALDI Inc.
Jurisdiction:	Ramona, CA (San Diego County)
Parcel (APN):	281-171-04-00
Hydrologic Unit:	905.41
Rain Gauge:	Lake Wohlford
Total Project Area (sf):	108,910
Channel Susceptibility:	High

BMP Sizing Spreadsheet V3.0			
Project Name:	ALDI Inc. - Ramona, CA	Hydrologic Unit:	905.41
Project Applicant:	ALDI Inc.	Rain Gauge:	Lake Wohlford
Jurisdiction:	Ramona, CA (San Diego County)	Total Project Area:	108,910
Parcel (APN):	281-171-04-00	Low Flow Threshold:	0.1Q2
BMP Name:	BIOFILTRATION BASIN #1	BMP Type:	Biofiltration w/ Partial Retention
BMP Native Soil Type:	C	BMP Infiltration Rate (in/hr):	0.1

Areas Draining to BMP						HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1)[1]	Surface Area	Surface Area (SF)
DMA #1 - Impervious	65,490	C	Flat	Concrete	1.0	0.065	4257
DMA #1 - Pervious	46,304	C	Flat	Landscape	0.1	0.065	301
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	111,794					Minimum BMP Size	4558
						Proposed BMP Size*	4584

* Assumes standard configuration

Surface Ponding Depth	12.00	in
Bioretention Soil Media Depth	18.00	in
Filter Course	6.00	in
Gravel Storage Layer Depth	12	in
Underdrain Offset	6.0	in

Notes:

1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manu

Describe the BMP's in sufficient detail in your PDP SWQMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, April 2018. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V3.0			
Project Name:	ALDI Inc. - Ramona, CA	Hydrologic Unit:	905.41
Project Applicant:	ALDI Inc.	Rain Gauge:	Lake Wohlford
Jurisdiction:	Ramona, CA (San Diego County)	Total Project Area:	108,910
Parcel (APN):	281-171-04-00	Low Flow Threshold:	0.1Q2
BMP Name	BIOFILTRATION BASIN #1	BMP Type:	Biofiltration w/ Partial Retention

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	Orifice Area (in^2)
		Soil Type	Slope				
DMA #1 - Impervious	Lake Wohlford	C	Flat	0.49	1.503	0.074	**1.09**
DMA #1 - Pervious	Lake Wohlford	C	Flat	0.49	1.063	0.052	**0.77**

3.50	**0.126**	**1.86**	**1.54**
Max Orifice Head (feet)	**Max Tot. Allowable Orifice Flow (cfs)**	**Max Tot. Allowable Orifice Area (in^2)**	**Max Orifice Diameter (in)**

0.111	**0.120**	**1.77**	**1.500**
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in^2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	11.5

6.0 General Requirements

- Use this attachment to document all proposed (1) self-mitigating, (2) de minimis, and (3) self-retaining DMAs. Indicate under "DMA Compliance Option" below which design options will be used to satisfy structural performance requirements for one or more DMA.

DMA Compliance Option	Required Sub-attachments	BMPDM Design Resources
☐ **Self-mitigating**	• Sub-attachment 6.1	• BMPDM Section 5.2.1
☐ **De minimis**	• Sub-attachment 6.2	• BMPDM Section 5.2.2
☒ **Self-retaining**[1]	• Sub-attachment 6.3	• BMPDM Section 5.2.3 (all options)
SSD-BMP Type(s)		
☐ **Impervious Area Dispersion**	• Sub-attachment 6.3.1	• Fact Sheet SD-B (Appendix E.8)
☒ **Tree Wells**	• Sub-attachment 6.3.2	• Fact Sheet SD-A (Appendix E.7)

- Submit this cover page and all "Required Sub-attachments" listed for each selected DMA compliance option.
- See the BMPDM sections and appendices listed under "BMPDM Design Resources" for additional explanation of design requirements. Each constructed feature must fully satisfy the requirements described in these resources, and any other guidance identified by the County.
- DMA Exhibits and Construction Plans: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.

[1] If "Self-retaining" is selected, also choose the types of Significant Site Design BMPs (SSD-BMPs) to be used. SSD-BMPs are Site Design BMPs that are sized and constructed to fully satisfy all applicable Structural Performance Standards for a DMA.

6.3 Self-retaining DMAs using Significant Site Design BMPs

Self-retaining DMAs use Site Design BMPs to fully-retain the entire DCV, at a minimum. Site Design BMPs that fully retain the DCV, at a minimum, therefore replacing the need for a Structural BMP (S-BMP), are classified as Significant Site Design BMPs (SSD-BMPs). To satisfy pollutant control requirements only, self-retaining means retention of the entire DCV. However, under some circumstances, a self-retaining DMA can also satisfy hydromodification management requirements by implementing BMPs that retain a greater volume of runoff.

- Provide the information requested below for each proposed self-retaining DMA. Add rows or copy the table if additional entries are needed.

DMA #	DMA Area (ft^2)	**BMP Type** (choose one per DMA)		*Permit # and Sheet #*
		Dispersion Area (Att. 6.3.1)	**Tree Wells (Att. 6.3.2)**	
2	13,198	☐	☒	PDS2018-STP-18-021, Sheet C-2
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	

Copy and Paste table here for additional DMAs

- "DMA #", "DMA Area", and "Permit # and Sheet #" are required.
- Select one BMP Type per DMA. Provide detailed documentation for each DMA in Attachments 6.3.1 (Impervious Dispersion Areas) and/or 6.3.2 (Tree Wells) below.
- Each self-retaining DMA must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, applicable BMPDM Appendix E Fact Sheets, and any other guidance or

[2]Applicants wishing to utilize parameters less conservative than listed here must submit modeling to support their proposal. Consult your project manager for more information.
[3]Including the permeable pavement.

6.3.2 Self-retaining DMAs with Tree Wells

Trees wells can provide a variety of benefits such as interception and increased infiltration of rainfall, reduced erosion, energy conservation, air quality improvement, and aesthetic enhancement. They can also be used to satisfy both pollutant control and hydromodification management performance standards for a DMA.

- Each self-retaining DMA with tree wells must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, Fact Sheet SD-A: Tree Wells, and any other guidance or instruction identified by the County.
- For pollutant control only, the DMA must retain the entire DCV. For hydromodification management, an additional volume must be retained in accordance with the sizing requirements presented in the DCV multiplier table in Fact Sheet SD-A.
- Documentation of compliance with applicable conditions must be submitted using the ***Summary Sheet for Self-retaining DMAs with Tree Wells*** on the next page. One version of this Summary Sheet must be completed for each applicable DMA.
- If both pollutant control and hydromodification standards apply, the soil depth of all tree wells in the DMA must be selected before determining the Required Retention Volume (RRV). Each tree well must be constructed to the selected depth. For pollutant control only, tree wells within a DMA may be constructed to different soil depths.
- In most cases tree wells must use Amended Soil per Fact Sheet SD-F. However, Structural Soil is required in some cases (e.g., placing the tree well next to a curb). See ***Structural Requirements for Confined Tree Well Soil Volume*** in Fact Sheet SD-A for additional explanation. If applicable, list the DMAs and Tree Well #s below for all tree wells requiring Structural Soil.

DMA #	**Tree Wells Requiring Structural Soil (list Tree Well #s)**

- The Design Capture Volume (DCV) must be known for each DMA in order to determine the volume to be mitigated by the tree wells. Instructions for DCV calculation are provided in BMPDM Appendix B.1. An automated version of Worksheet B.1 (Calculation of Design Capture Volume) is available at www.sandiegocounty.gov/stormwater under the Development Resources tab.

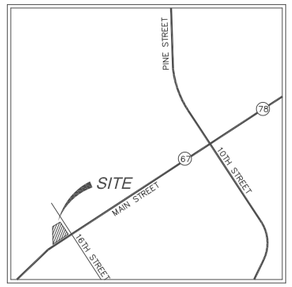
Summary Sheet for Self-retaining DMAs with Tree Wells (complete one sheet per DMA)

DMA #: 2	**DMA Area (ft²): 13,198**		
Required Retention Volume (RRV)			
a. Design Capture Volume (DCV; ft³): 570			
b. DCV Multiplier (Fact Sheet SD-A)			
Applicable Structural Performance Standards (select one)	Tree well soil depth (inches)	Underlying soil type (A, B, C, or D)	DCV Multiplier
☐ Pollutant control only	Any	All	1.0
☒ Pollutant control plus hydromodification	30	C	2.5
c. Required Retention Volume (ft³) [DCV * DCV Multiplier]			**1,425**

Tree Well Credit Volume (add records or copy this sheet as needed for additional tree wells)

Provide the information below for each tree well or group of tree wells within the DMA. A single entry can be used for any group of tree wells of the same species and soil depth.

Tree species or name	Desert Willow	**No. tree wells**	5
Mature Canopy Diameter (ft)	25	**Credit Volume per tree well (ft³)**	420
Tree well ID #(s)	1 - 5	**Combined Volume (ft³)**	**2,100**
Tree species or name		**No. tree wells**	
Mature Canopy Diameter (ft)		**Credit Volume per tree well (ft³)**	
Tree well ID #(s)		**Combined Volume (ft³)**	
Tree species or name		**No. tree wells**	
Mature Canopy Diameter (ft)		**Credit Volume per tree well (ft³)**	
Tree well ID #(s)		**Combined Volume (ft³)**	
Tree species or name		**No. tree wells**	
Mature Canopy Diameter (ft)		**Credit Volume per tree well (ft³)**	
Tree well ID #(s)		**Combined Volume (ft³)**	
Tree species or name		**No. tree wells**	
Mature Canopy Diameter (ft)		**Credit Volume per tree well (ft³)**	
Tree well ID #(s)		**Combined Volume (ft³)**	
Total Credit Volume (ft3) Add the combined volumes above. Total credit volume must equal or exceed the RRV.			**2,100**



VICINITY MAP

NOTE: GROUNDWATER DEPTH IS GREATER THAN 20 FT

SURFACE AREA LEGEND

- IMPERVIOUS AREA (C VALUE – 0.90)
- PERVIOUS AREA (HYDROLOGIC SOIL GROUP C) (C VALUE – 0.23)
- PERVIOUS AREA (HYDROLOGIC SOIL GROUP D) (C VALUE – 0.30)

AREA SUMMARY

DMA #1

PERVIOUS AREA (TYPE C):	1.775 ACRES
PERVIOUS AREA (TYPE D):	0.791 ACRES
TOTAL:	2.566 ACRES

WEIGHTED RUNOFF FACTOR = 0.25

DMA #2

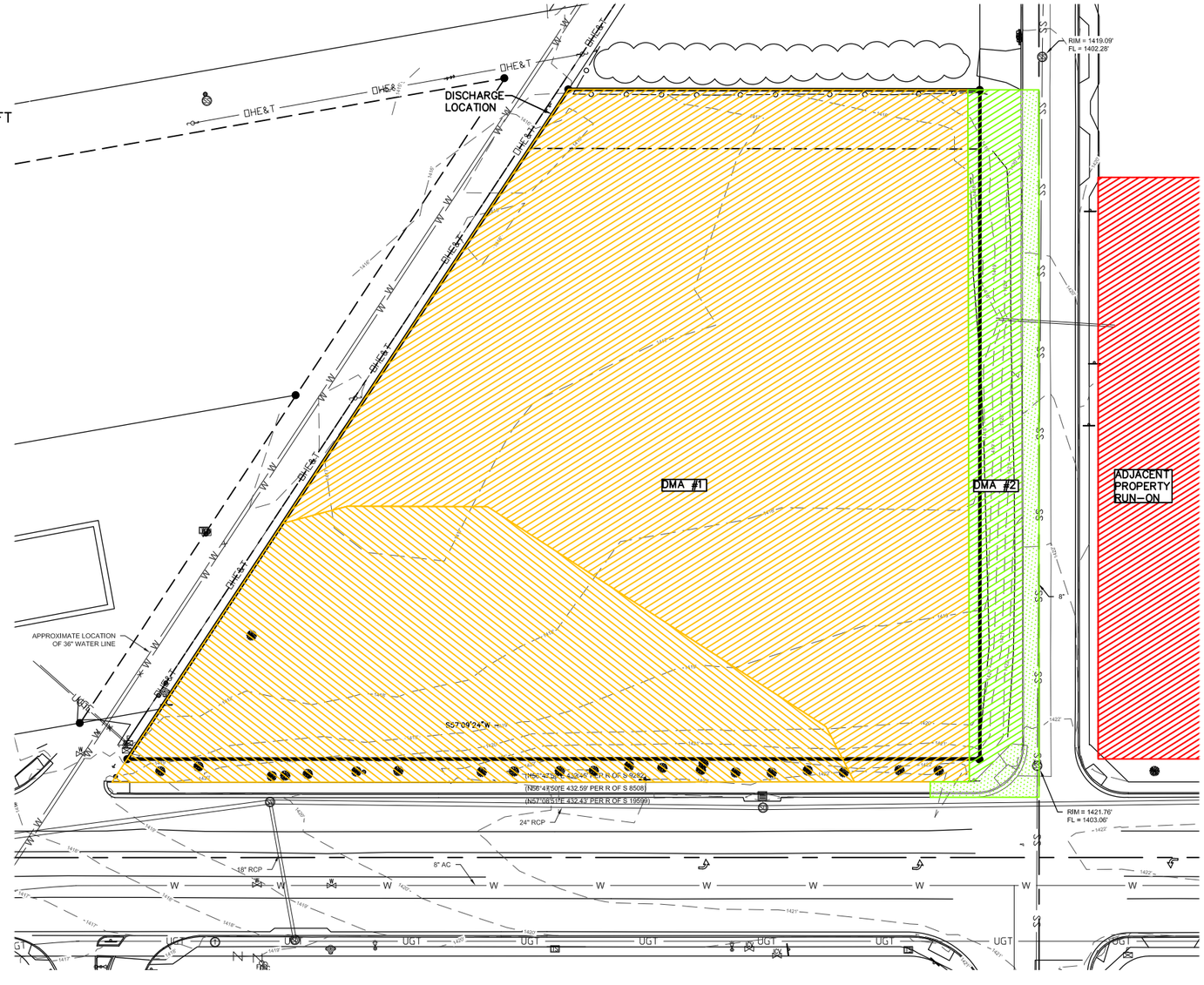
IMPERVIOUS AREA:	0.087 ACRES
PERVIOUS AREA (TYPE C):	0.216 ACRES
TOTAL:	0.303 ACRES

WEIGHTED RUNOFF FACTOR = 0.42

ADJACENT PROPERTY RUN–ON

PERVIOUS AREA (TYPE C):	1.524 ACRES
TOTAL:	1.524 ACRES

WEIGHTED RUNOFF FACTOR = 0.23



IngenAE
301 N. Main Street, Suite B
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www.ingenae.com

Submissions / Revisions:		Date:
1		
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11		
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13		

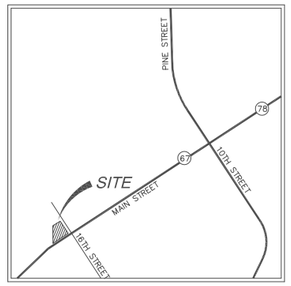
ALDI Inc.
12661 ALDI PLACE
MORENO VALLEY, CA
92555-6703
(951) 530-5750

Project Name & Location:

ALDI
16TH STREET &
MAIN STREET
RAMONA, CA

Drawing Name:
EXISTING HYDROMOD. EXHIBIT

Date: 12/16/19	Project No. AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	



VICINITY MAP

NOTE: GROUNDWATER DEPTH IS GREATER THAN 20 FT

SURFACE AREA LEGEND

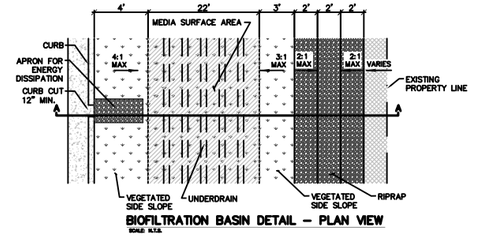
- IMPERVIOUS AREA (C VALUE – 0.90)
- PERVIOUS AREA (HYDROLOGIC SOIL GROUP C) (C VALUE – 0.23)
- PERVIOUS AREA (HYDROLOGIC SOIL GROUP D) (C VALUE – 0.30)
- IMPERVIOUS ROOF AREA (C VALUE – 0.90)

AREA SUMMARY

DMA #1	
IMPERVIOUS AREA:	1.044 ACRES
IMPERVIOUS ROOF AREA:	0.459 ACRES
PERVIOUS AREA (TYPE C):	0.514 ACRES
PERVIOUS AREA (TYPE D):	0.549 ACRES
TOTAL:	2.566 ACRES
WEIGHTED RUNOFF FACTOR = 0.64	

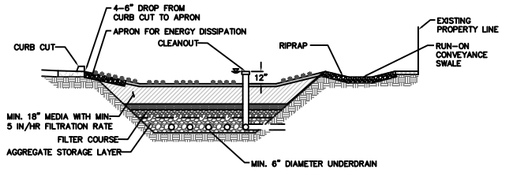
DMA #2	
IMPERVIOUS AREA:	0.279 ACRES
PERVIOUS AREA (TYPE C):	0.024 ACRES
TOTAL:	0.303 ACRES
WEIGHTED RUNOFF FACTOR = 0.85	

ADJACENT PROPERTY RUN-ON	
PERVIOUS AREA (TYPE C):	1.524 ACRES
TOTAL:	1.524 ACRES
WEIGHTED RUNOFF FACTOR = 0.23	



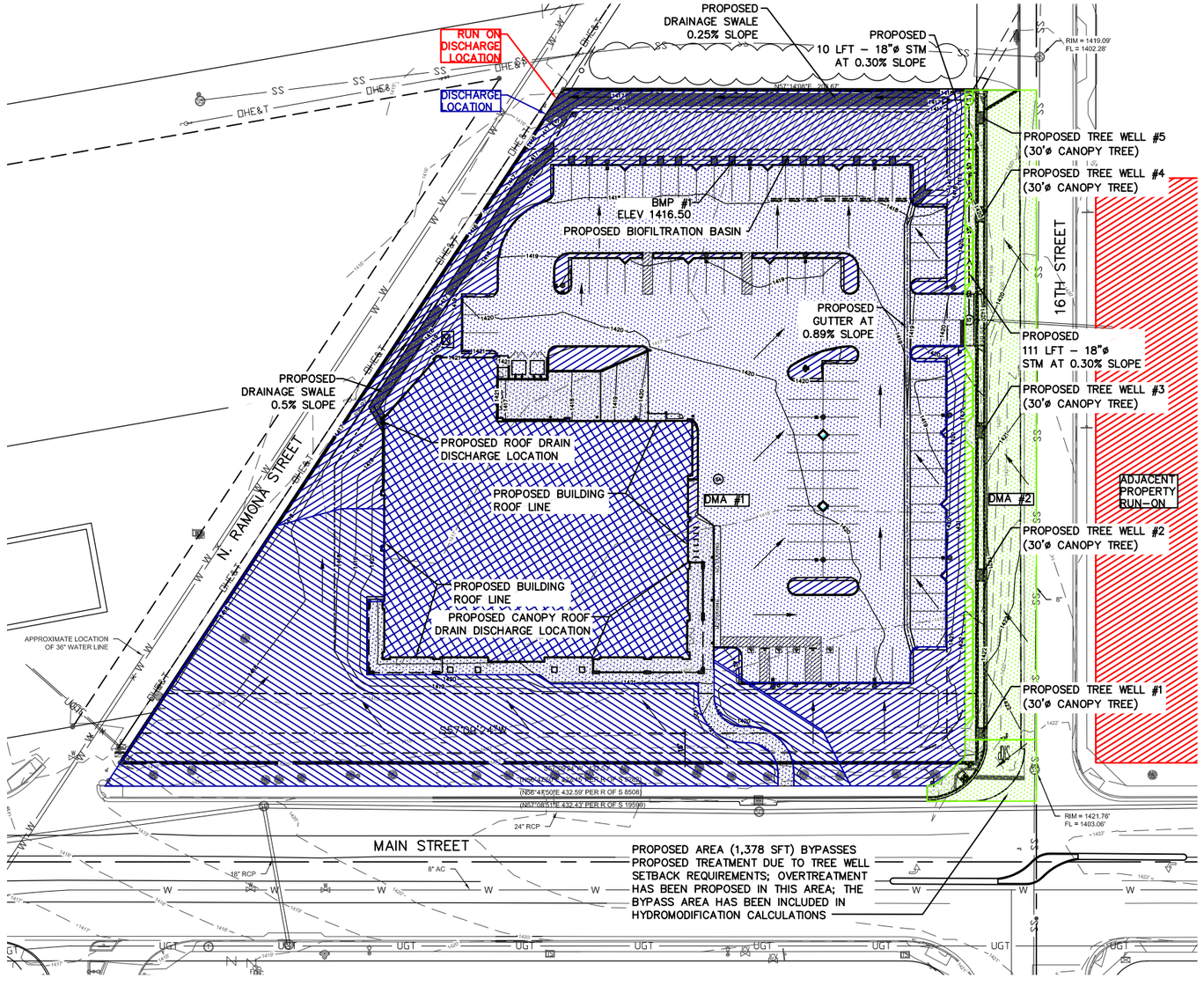
BIOFILTRATION BASIN DETAIL – PLAN VIEW

NONE N.T.S.



BIOFILTRATION BASIN DETAIL – SECTION A–A VIEW

NONE N.T.S.



GRAPHIC SCALE

30 0 15 30 60

(IN FEET)

1 inch = 30 ft.

IngenAE

301 N. Main Street, Suite B
South Bend, IN 46601
www.ingenae.com

Submissions / Revisions:	Date:
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ALDI Inc.

12661 ALDI PLACE
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Project Name & Location:

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16TH STREET &
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RAMONA, CA

Drawing Name:

HYDROMOD. MANAGEMENT EXHIBIT

Date:	Project No.
	AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	

ATTACHMENT 3

Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Plan (Required)	☒ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Stormwater Maintenance Notification / Agreement (when applicable)	☒ Included ☐ Not Applicable

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Attachment 3a must identify:

- ☒ Specific maintenance indicators and actions for proposed structural BMP(s). This must be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- ☒ How to access the structural BMP(s) to inspect and perform maintenance
- ☒ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☒ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☒ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☒ Recommended equipment to perform maintenance
- ☒ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For all Structural BMPs, Attachment 3b must include a draft maintenance agreement in the County's standard format depending on the Category (PDP applicant to contact County staff to obtain the current maintenance agreement forms). Refer to Section 7.3 in the BMP Design Manual for a description of the different categories.

PRIVATE STRUCTURAL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM
VEGETATED BMPs

1. Transcribe the information from your notification letter and complete as necessary:

Permit No.: _____

BMP Location: _____

Responsible Party: _____

Phone Number: ( ) _____ **Email:** _____

Responsible Party Address: _____
Number Street Name & Suffix City/Zip

☐ *Check here for Address Change*

2. Using the Table below, describe the inspections conducted before the start of the rainy season (i.e., October 1st) and after a storm event.

3. Under "Results of Inspection", provide the date and a description of the maintenance conducted. Examples of what to look for include: accumulation of sediment, litter, grease or standing water, erosion, poor or overgrown vegetation and structural damage (see side 2 for examples). If no maintenance was required, state "no maintenance required".

Date Inspected	Results of Inspection: Work needed? (Yes/No)	Date and Description of Maintenance Conducted

4. Attach one photo per Structural BMP (required). Include copies of service invoices, receipts, or other proof of work conducted (if available). Before submitting, please scale your photos to a small or medium size per the attached instructions. Also note that the County's email system cannot receive emails larger than 10MB.

5. Sign and submit form to:

County of San Diego Watershed Protection Program
Structural BMP Inspection and Verification Program
5510 Overland Avenue, Suite 410, MS 0332
San Diego, CA 92123 ***OR***
Email to: bmp.program@sdcounty.ca.gov

_____

Signature of Responsible Party **Print Name** **Date**

PRIVATE STRUCTURAL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

VEGETATED BMPS – SIDE 2

There are many types of vegetated BMPs including bioretention areas, biofiltration areas, flow-thru planters, tree pit style units, proprietary biofiltration, buffer strips and vegetated swales. The following list of typical maintenance indicators and activities for vegetated BMPs is provided for your reference. Conduct activities in a manner that do not cause an illegal discharge.

*If the issue is not corrected by restoring the BMP to the original plan and grade, County staff in the Watershed Protection Program shall be contacted prior to any additional repairs or reconstruction.

Vegetated BMPs Inspection and Maintenance Checklist	
Typical Maintenance Indicators	**Typical Maintenance Actions**
Accumulation of sediment litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Ensure vegetation is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary (if less than 3 inches deep).
Overgrown vegetation (woody vegetation not part of design) is present and grass excessively tall (greater than 10 inches)	Mow or trim as appropriate, but not less than the design height of the vegetation when applicable (minimum height of 6 inches is recommended). Remove noxious and invasive species.
Erosion due to concentrated irrigation flow	Reseed/replant eroded areas. Adjust the irrigation system.
Erosion due to concentrated stormwater runoff flow	Reseed/replant eroded areas and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor regrading to restore proper drainage according to the original plan.*
Standing water in the BMP for longer than 96 hours following a storm event.	Make appropriate corrective measures such as adjusting irrigation system, removing invasive vegetation, loosening or replacing top soil to allow infiltration, repairing/replacing clogged or compacted soils, or minor regrading for proper drainage. Abate any potential vectors by filling holes in the ground in and around the facility and by insuring that there are no areas where water stands longer than 96 hours following a storm.* Mosquito larvicides should be applied only when necessary and by a licensed individual.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet, or outlet structures	Repair or replace as applicable.

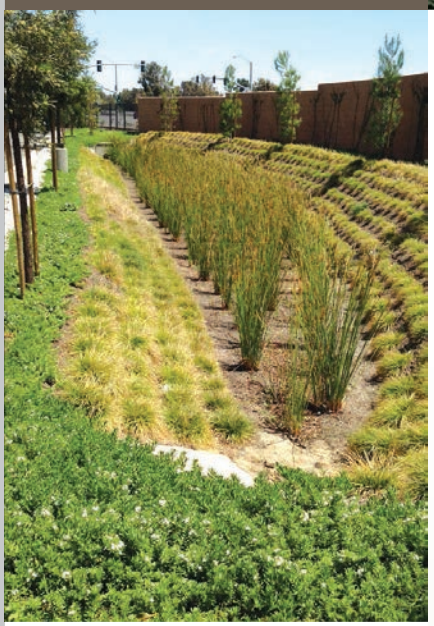
For information about the Inspection and Verification Program, visit the address below:

http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction/S-BMPs.html

TABLE 7-3. Maintenance Indicators and Actions for Vegetated BMPs

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, The County must be contacted prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, County staff in the Watershed Protection Program must be contacted prior to any additional repairs or reconstruction.
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

county of san diego



thank you for doing your part to

protect our waterways

vegetated BMPs

Stormwater Structural Best Management Practices (BMPs) are installed on certain properties across the County in order to help prevent pollutants such as trash, fertilizers, pesticides, and sediment from making their way into storm drains and ultimately to our local creeks, rivers, and ocean. Your property is one of hundreds across the County with at least one BMP.

BMPs Keep Our Waterways Clean

Your BMPs are designed to remove pollutants from stormwater runoff generated by your property to the maximum extent practicable. As an owner of one of these properties, County regulations require you to **perform routine inspections and maintenance actions** to ensure that your BMPs are operating effectively.

Our records indicate that you have at least one vegetated BMP on your property. Vegetated BMPs include flow-thru planters, buffer strips, and vegetated swales. To help you maintain this BMP, the **County of San Diego Watershed Protection Program** is providing you with this informational flyer to answer questions you may have about BMPs and how to maintain them.

How Your Vegetated BMP Works

Vegetated BMPs filter stormwater by replicating biological features found in the ecosystem. They use vegetation (often various shrubs and grasses) and soil to remove pollutants from stormwater runoff. Typically after a heavy rainfall, runoff that has collected in the BMP will slowly infiltrate into the soil,

more info > > >

20DEC2016

vegetated BMPs

county of san diego

reducing the amount of runoff and pollutants discharged to the local storm drain system. Vegetation in the BMP prevents erosion, and also contributes to pollutant removal by absorbing pollutants that have been captured within the soil. Vegetated BMPs can be found in low-lying vegetated areas, or in surface level planter boxes.

Find And Maintain Your BMP

To find your BMP, look for vegetated areas where water accumulates after rainfall. There may be a storm drain inlet in the center of the area depending on the type of vegetated BMP.

Once you have found your vegetated BMP, it is important to maintain it. Keeping the vegetated BMP in working condition helps keep our local waterways clean. Below are a few maintenance tasks to perform:

- **Remove any accumulated litter or debris obstructing the flow to the vegetated areas or buffer strips.**
- **If necessary, make grading adjustments to your BMP to ensure that it drains properly.**
- **Trim any overgrown vegetation (not more than the original design height).**
- **Remove sediment deposits over 2 inches deep, and deposits that cover vegetation.**
- **Do not obstruct curb cuts or divert flow away from the BMP.**
- **If vegetation is not present, re-vegetate the BMP.**
- **Provide adequate rip rap (or other energy dissipation structure) at the point where runoff enters the BMP.**

For a list of other tasks, refer to the maintenance verification form or maintenance plans from your housing developer.

Every year the Watershed Protection Program will send you a maintenance verification form for you to complete, sign, and return to the County. This form is used to verify that necessary maintenance has been completed for your BMP.

Failure to conduct needed maintenance of your BMPs may initiate an enforcement investigation or a follow up inspection.

thank you for doing your part to

protect our waterways

For Questions, Contact Us At:

Watershed Protection Program
1-858-495-5323
BMP.Program@sdcounty.ca.gov
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction/S-BMPs.html

20DEC2016

PR-1

Biofiltration with Partial Retention

BMP MAINTENANCE FACT SHEET
FOR
STRUCTURAL BMP PR-1 BIOFILTRATION WITH PARTIAL RETENTION

Biofiltration with partial retention facilities are vegetated surface water systems that filter water through vegetation and soil or engineered media prior to infiltrating into native soils, discharge via underdrain, or overflow to the downstream conveyance system. These BMPs have an elevated underdrain discharge point that creates storage capacity in the aggregate storage layer. Typical biofiltration with partial retention components include:

- Inflow distribution mechanisms (e.g., perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on climate and ponding depth
- Non-floating mulch layer
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Uncompacted native soils at the bottom of the facility
- Overflow structure

Normal Expected Maintenance

Biofiltration with partial retention requires routine maintenance to: remove accumulated materials such as sediment, trash or debris; maintain vegetation health; maintain infiltration capacity of the media layer; replenish mulch; and maintain integrity of side slopes, inlets, energy dissipators, and outlets. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure

If any of the following scenarios are observed, the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance, increased inspection and maintenance, BMP replacement, or a different BMP type will be required.

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.
- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.

- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.

Other Special Considerations

Biofiltration with partial retention is a vegetated structural BMP. Vegetated structural BMPs that are constructed in the vicinity of, or connected to, an existing jurisdictional water or wetland could inadvertently result in creation of expanded waters or wetlands. As such, vegetated structural BMPs have the potential to come under the jurisdiction of the United States Army Corps of Engineers, SDRWQCB, California Department of Fish and Wildlife, or the United States Fish and Wildlife Service. This could result in the need for specific resource agency permits and costly mitigation to perform maintenance of the structural BMP. Along with proper placement of a structural BMP, **routine maintenance is key to preventing this scenario**.

PR-1
Biofiltration with Partial Retention

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION		
The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	• Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Obstructed inlet or outlet structure	Clear blockage.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.	• Inspect annually. • Maintenance when needed.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintenance when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.

*"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION (Continued from previous page)		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintenance when needed.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.	• Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.
Standing water in BMP for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water. If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Underdrain clogged	Clear blockage.	• Inspect if standing water is observed for longer than 24-96 hours following a storm event. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
California Storm Water Quality Association (CASQA). 2003. Municipal BMP Handbook.
https://www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook
County of San Diego. 2014. Low Impact Development Handbook.
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html
San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet PR-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

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PR-1

Biofiltration with Partial Retention

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	
Property / Development Name:	Responsible Party Name and Phone Number:	
Property Address of BMP:	Responsible Party Address:	

INSPECTION AND MAINTENANCE CHECKLIST FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION PAGE 1 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Accumulation of sediment, litter, or debris Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove and properly dispose of accumulated materials, without damage to the vegetation ☐ If sediment, litter, or debris accumulation exceeds 25% of the surface ponding volume within one month (25% full*), add a forebay or other pre-treatment measures within the tributary area draining to the BMP to intercept the materials. ☐ Other / Comments:		
Poor vegetation establishment Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Re-seed, re-plant, or re-establish vegetation per original plans ☐ Other / Comments:		

*"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

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Biofiltration with Partial Retention

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION PAGE 2 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Dead or diseased vegetation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans ☐ Other / Comments:		
Overgrown vegetation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Mow or trim as appropriate ☐ Other / Comments:		
2/3 of mulch has decomposed, or mulch has been removed Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches ☐ Other / Comments:		

PR-1

Biofiltration with Partial Retention

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION PAGE 3 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Erosion due to concentrated irrigation flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas and adjust the irrigation system ☐ Other / Comments:		
Erosion due to concentrated storm water runoff flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan ☐ If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction ☐ Other / Comments:		

PR-1

Biofiltration with Partial Retention

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION PAGE 4 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Obstructed inlet or outlet structure Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		
Underdrain clogged (inspect underdrain if standing water is observed for longer than 24-96 hours following a storm event) Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		
Damage to structural components such as weirs, inlet or outlet structures Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair or replace as applicable ☐ Other / Comments:		

PR-1

Biofiltration with Partial Retention

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR PR-1 BIOFILTRATION WITH PARTIAL RETENTION PAGE 5 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Standing water in BMP for longer than 24 hours following a storm event* Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils ☐ Other / Comments:		
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Apply corrective measures to remove standing water in BMP when standing water occurs for longer than 24-96 hours following a storm event.** ☐ Other / Comments:		

*Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.

**If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.

RECORDING REQUESTED BY:

WHEN RECORDED MAIL TO:

(property owner)

SPACE ABOVE THIS LINE FOR RECORDER'S USE

MAINTENANCE NOTIFICATION AGREEMENT FOR CATEGORY 1 STORMWATER STRUCTURAL BMP's

THIS AGREEMENT is made on the _____ day of _____, 20_____.
_____, the Owner(s) of the hereinafter described real property:
Address_____ Post Office _____ Zip Code _____
Assessor Parcel No.(s) _____

Attach in Exhibit A and List, identify, locate (plan/drawing number) and describe the Structural Best Management Practice below:

_____

_____

Owner(s) of the above property acknowledge the existence of the storm water Structural Best Management Practice (BMP) on the said property. Perpetual maintenance of the Structural BMP(s) is the requirement of the State NPDES Permit, Order No. R9-2015-0001, Section E.3.e.(1)(c) and the County of San Diego Watershed Protection Ordinance (WPO) Ordinance No. 10385 Section 67.812 through Section 67.814, and County BMP Design Manual (BMP DM) Chapters 7 & 8. In consideration of the requirement to construct and maintain Structural BMP(s), as conditioned by Discretionary Permit, Grading Permit, and/or Building Permit (as may be applicable), I/we hereby covenant and agree that:

1. I/We are the owner(s) of the existing (or to be constructed concurrently) premises located on the above described property.
2. I/We shall take the responsibility for the perpetual maintenance of the Structural BMP(s) as listed above in accordance with the maintenance plan attached in Exhibit B and in compliance with County's self-inspection reporting and verification for as long as I/we have ownership of said property(ies).
3. I/We shall cooperate with and allow the County staff to come onto said property(ies) and perform inspection duties as prescribed by local and state regulators.
4. I/We shall inform future buyer(s) or successors of said property(ies) of the existence and perpetual maintenance requirement responsibilities for Structural BMP(s) as listed above and to ensure that such responsibility shall transfer to the future owner(s).
5. I/We will abide by all of the requirements and standards of Section 67.812 through Section 67.814 of the WPO (or renumbering thereof) as it exists on the date of this Agreement, and which hereby is incorporated herein by reference.

This Agreement shall run with the land. If the subject property is conveyed to any other person, firm, or corporation, the instrument that conveys title or any interest in or to said property, or any portion thereof, shall contain a provision transferring maintenance responsibility for Structural BMP(s) to the successive owner according to the terms of this Agreement. Any violation of this Agreement is grounds for the County to impose penalties upon the property owner as prescribed in County Code of Regulatory Ordinances, Title 1, Division 8, Chapter 1 Administrative Citations §§18.101-18.116.

_____ _____
Owner(s) Signature(s)

_____ _____
Print Owner(s) Name(s) and Title

STATE OF CALIFORNIA)
COUNTY OF _____)

On _____ before me, _____Notary Public,
personally appeared _____ 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.
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.

Include Exhibits that illustrate:

- Exhibit A: Project Site Vicinity; the Project Site Map; and a map for each BMP and it's Drainage Management Area

- Exhibit B: the maintenance plan.

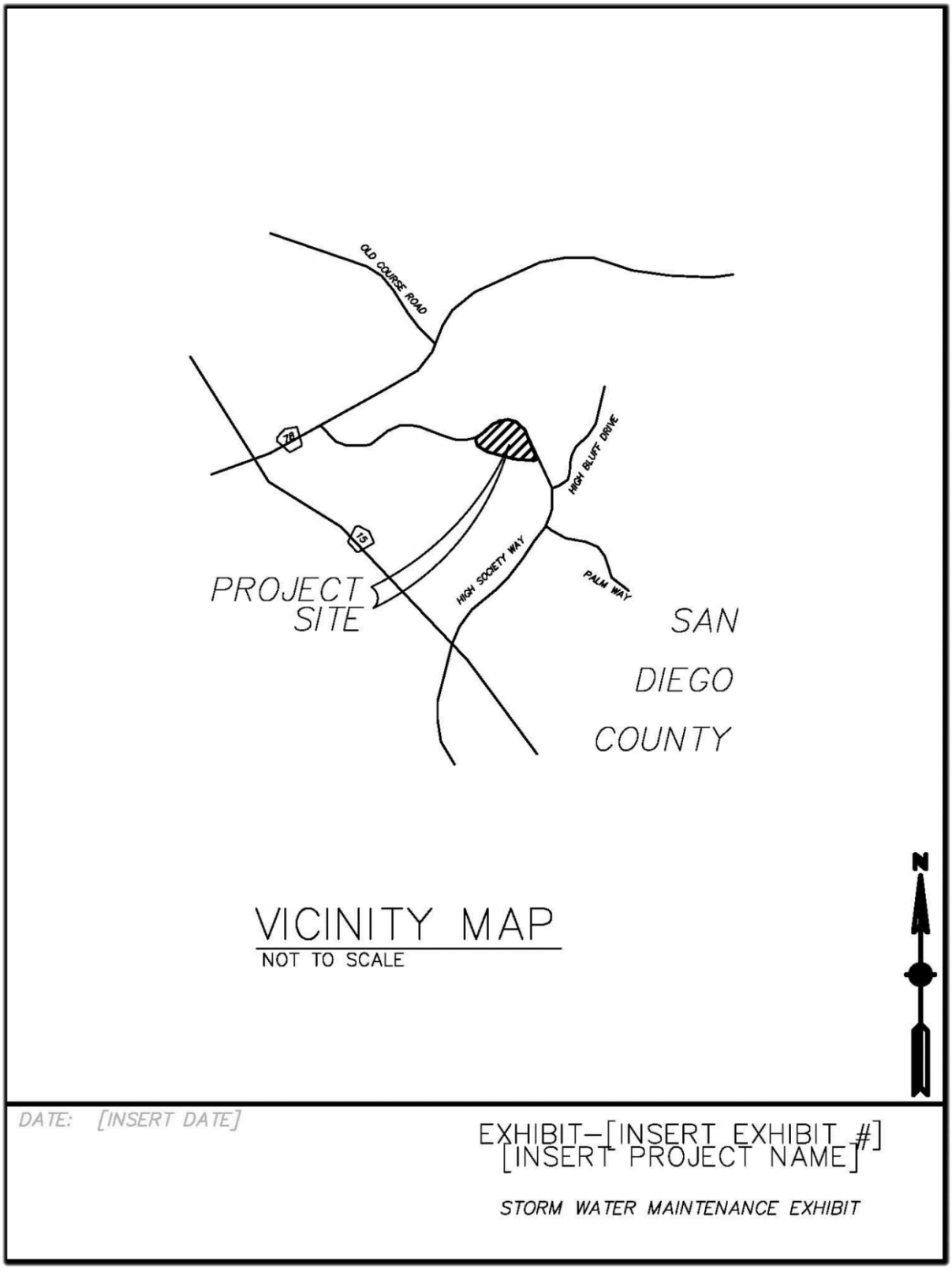


Figure I.11-1 Sample Vicinity Map

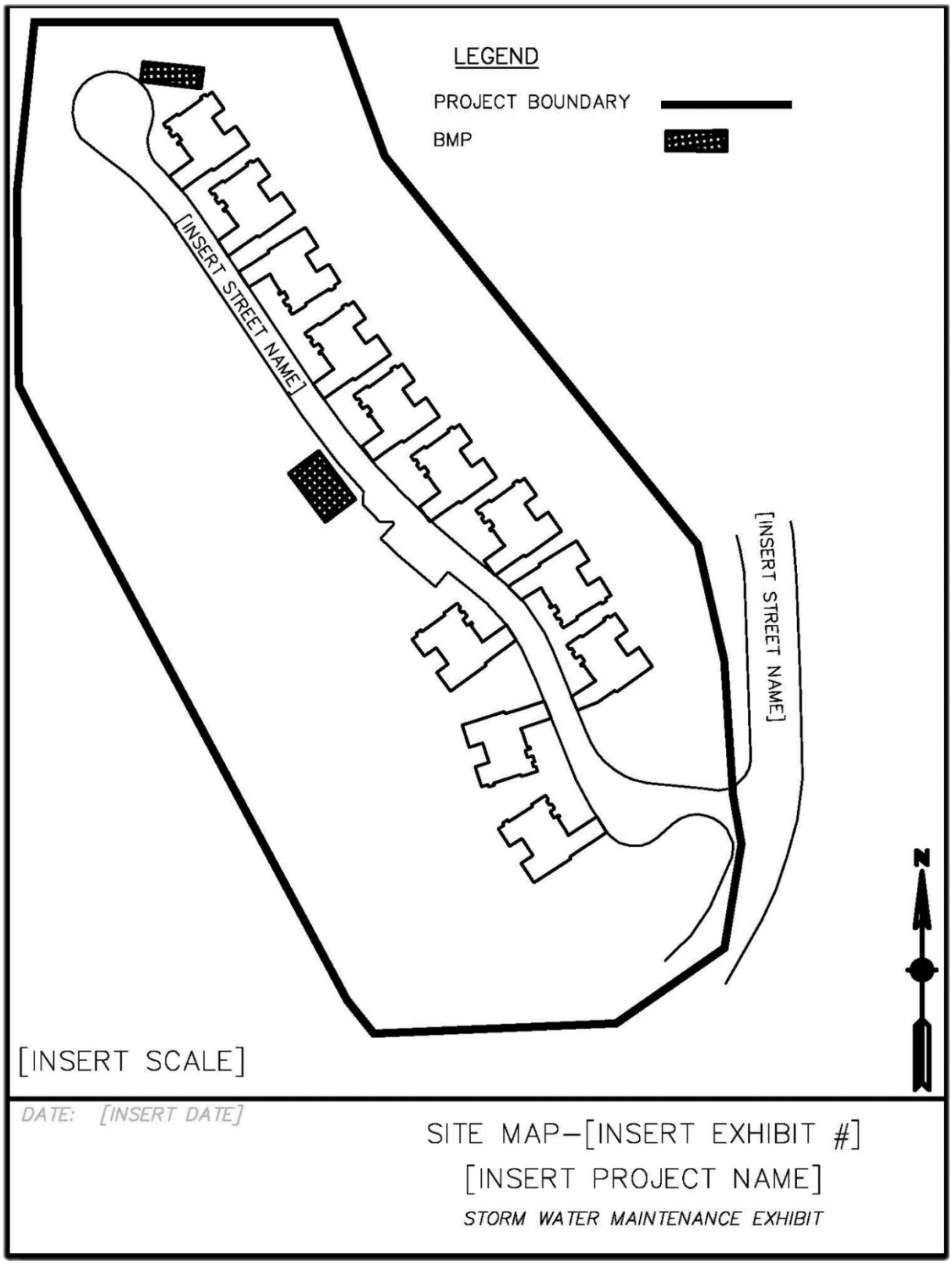


Figure I.11-2 Sample Site Map Showing Structural BMP Location

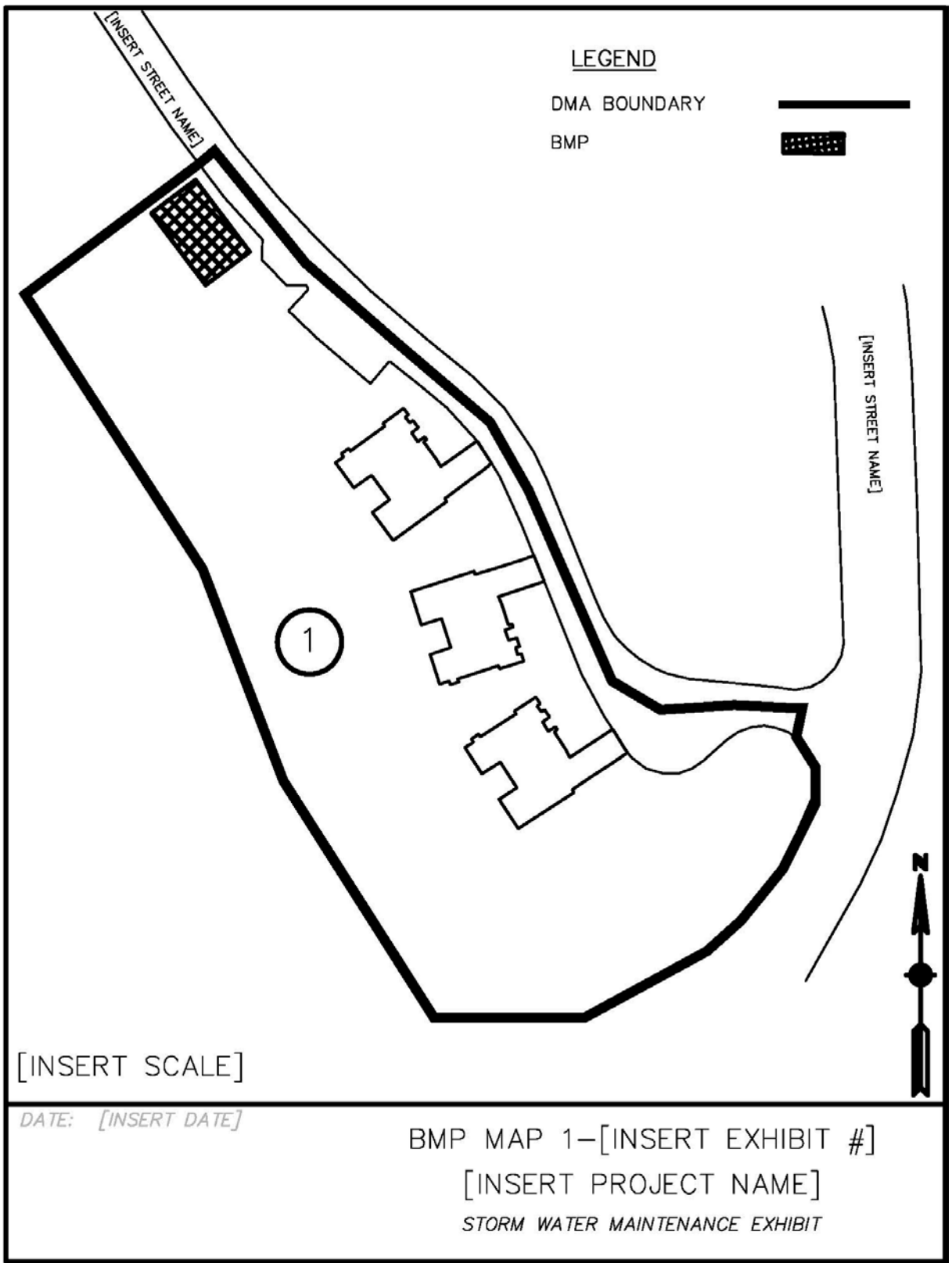
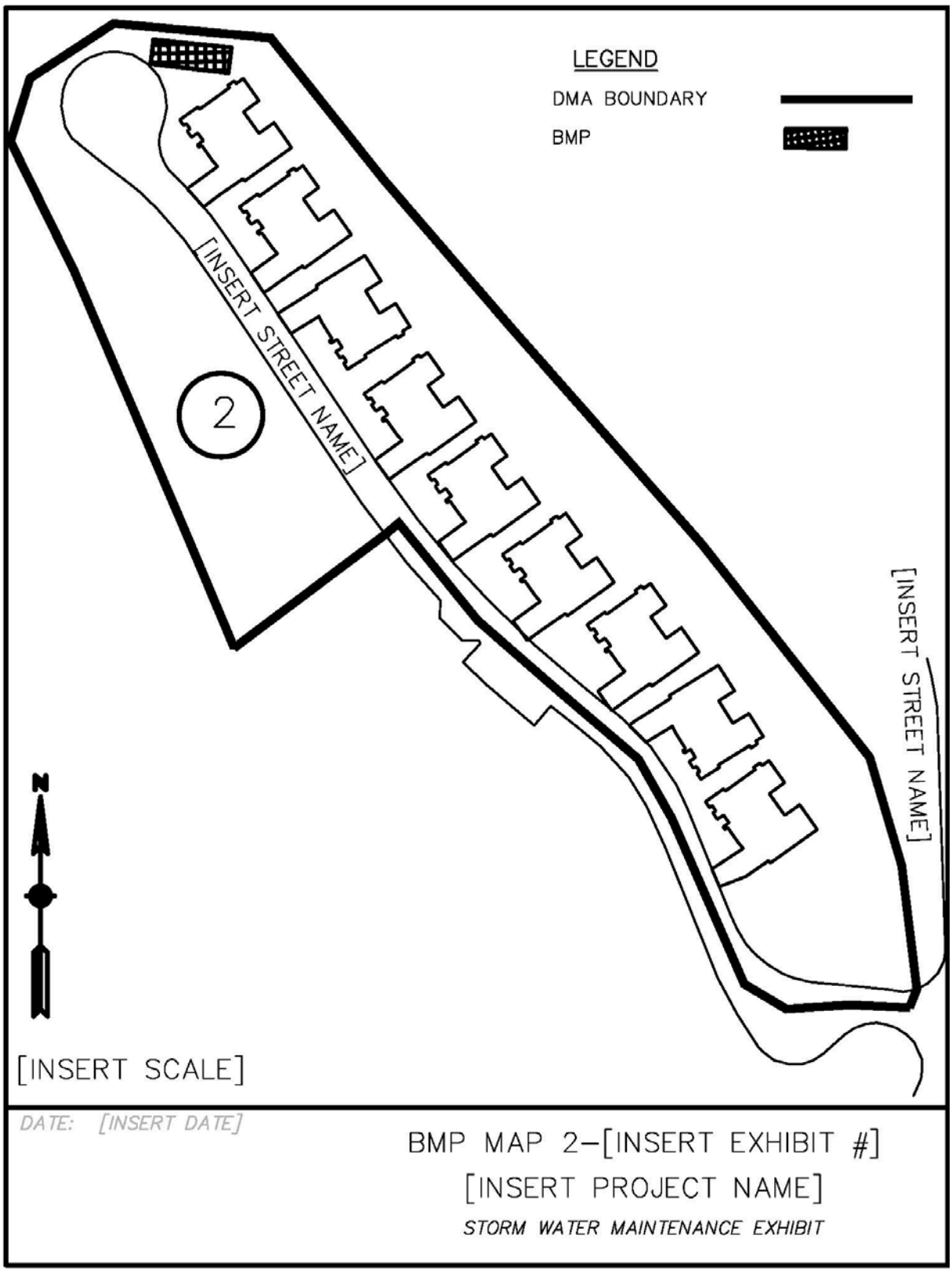


Figure I.11-3 Sample Structural BMP Map 1

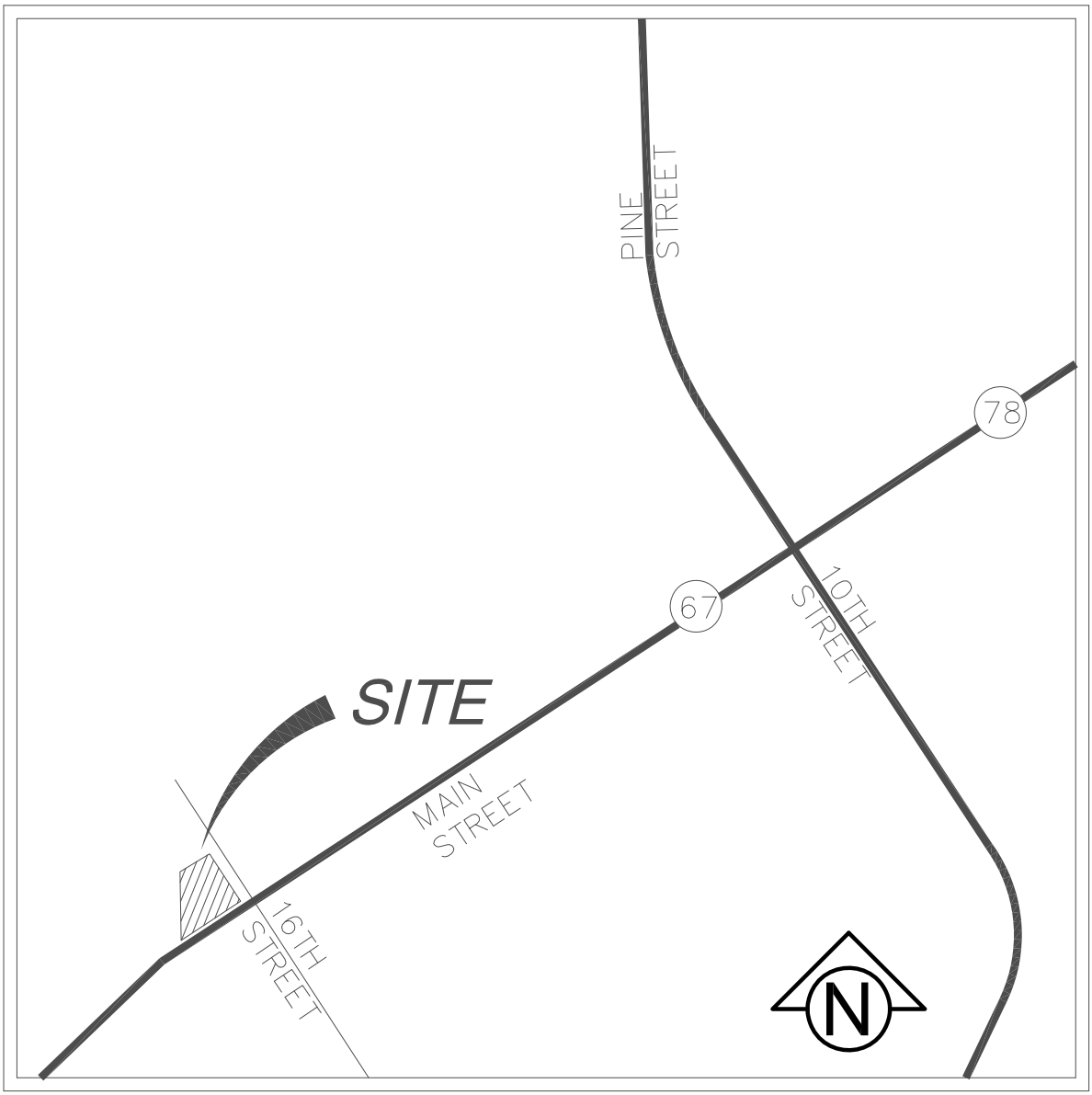


DATE: [INSERT DATE]

BMP MAP 2–[INSERT EXHIBIT #]

[INSERT PROJECT NAME]

STORM WATER MAINTENANCE EXHIBIT



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11/16/2018

VICINITY MAP

STORM WATER MAINTENANCE EXHIBIT

ALDI INC.

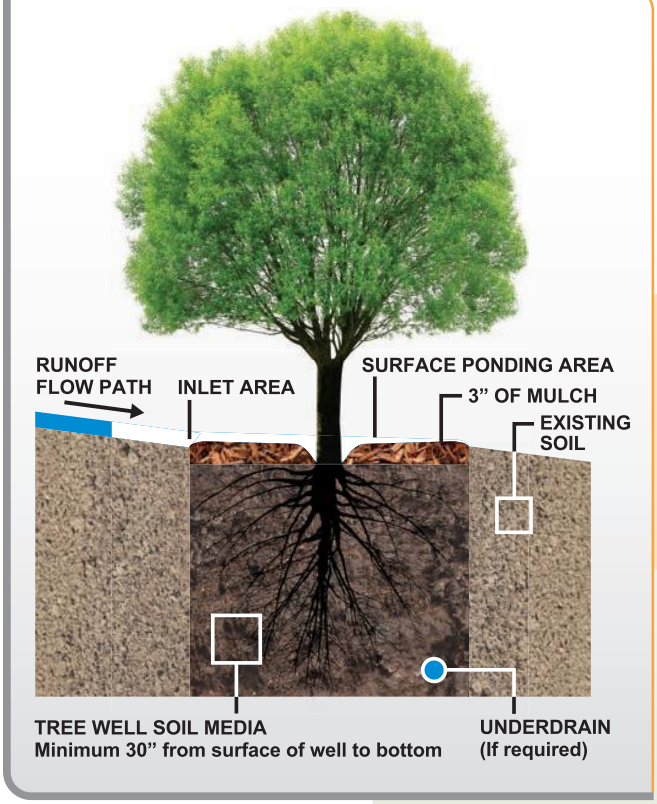
RAMONA, CA

county of san diego

tree wells

Tree Wells are a type of Significant Site Design Best Management Practice (SSD-BMP) used for managing stormwater runoff. Tree Wells are installed on certain properties across the County to help prevent pollutants such as trash, fertilizers, pesticides, and sediment from making their way into storm drains and ultimately to our local creeks, rivers, and ocean. Your property is one of several across the County with at least one Tree Well.

FIGURE 1 *Tree Well (Cross-Section View)*



Tree Wells Keep Our Waterways Clean

Your Tree Wells are designed to remove pollutants from stormwater runoff generated by your property to the maximum extent practicable. As an owner of one of these properties, the County requests your participation by performing **routine inspections and maintenance actions** to ensure that your Tree Wells are operating effectively.

Our records indicate that you have at least one Tree Well on your property. To help you maintain this Tree Well, the **County of San Diego Watershed Protection Program** is providing you with this informational flyer to answer questions you may have about Tree Wells and how to maintain them.

How Your Tree Well Works

Tree Wells divert stormwater runoff to the soil immediately surrounding a planted tree (see figure 1). Generally, the areas around the Tree Well are sloped to allow water to naturally flow into the Tree Well. Typically after heavy rainfall, runoff collected in the Tree Well filters through the soil removing pollutants from

more info > > >

05JUNE2019

county of san diego

tree wells

stormwater runoff. Tree Wells also reduce the volume of runoff entering the storm drain system and can prevent surface floods. Tree Wells are often found adjacent to walkways, driveways, and parking areas to capture and treat stormwater runoff flowing from these surfaces.

Find And Maintain Your Tree Well

To find your Tree Well, look for trees where water flows to and accumulates around the base of the tree after rainfall. Tree Wells may be planted in the ground or in planter boxes and positioned along walkways, driveways, and other landscaped areas of your property.

Once you have found your Tree Well, it is important to maintain it. Keeping the Tree Well in working condition helps keep our local waterways clean. Below are a few of the maintenance tasks that may need to be performed:

- **Remove and replace any dead trees.**
- **If you see standing water for longer than 24 hours after rainfall, loosen or replace soil to promote infiltration into the soil.**
- **Remove any accumulated litter or debris obstructing the flow to the tree well and dispose of it properly.**
- **At the entrance of the tree well, or inlet area, maintain the surface depression or slope to ensure water flows into the tree well.**
- **For tree wells with mulch around the base of the tree, keep the mulch from direct contact with the tree trunk to prevent bark rot.**

For a list of other tasks, refer to the maintenance verification form or maintenance plans from your housing developer.

The Watershed Protection Program performs visual inspections of Tree Wells periodically. Failure to conduct the recommended maintenance tasks of your Tree Well may lead to a poorly operating Tree Well and may initiate a follow up inspection.

thank you for doing your part to

protect our waterways

For Questions, Contact Us At:

Watershed Protection Program
1-858-495-5323
BMP.Program@sdcounty.ca.gov
https://www.sandiegocounty.gov/stormwater

05JUNE2019

SD-1
Tree Wells

BMP MAINTENANCE FACT SHEET
FOR
SITE DESIGN BMP SD-1 TREE WELLS

Tree wells as site design BMPs are trees planted in configurations that allow storm water runoff to be directed into the soil immediately surrounding the tree. The tree may be contained within a planter box or structural cells. The surrounding area will be graded to direct runoff to the tree well. There may be features such as tree grates, suspended pavement design, or shallow surface depressions designed to allow runoff into the tree well. Typical tree well components include:

- Trees of the appropriate species for site conditions and constraints
- Available growing space based on tree species, soil type, water availability, surrounding land uses, and project goals
- Entrance/opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression)
- Optional suspended pavement design to provide structural support for adjacent pavement without requiring compaction of underlying layers
- Optional root barrier devices as needed; a root barrier is a device installed in the ground, between a tree and the sidewalk, intended to guide roots down and away from the sidewalk in order to prevent sidewalk lifting from tree roots
- Optional tree grates; to be considered to maximize available space for pedestrian circulation and to protect tree roots from compaction related to pedestrian circulation; tree grates are typically made up of porous material that will allow the runoff to soak through
- Optional shallow surface depression for ponding of excess runoff
- Optional planter box drain

Normal Expected Maintenance

Tree health shall be maintained as part of normal landscape maintenance. Additionally, ensure that storm water runoff can be conveyed into the tree well as designed. That is, the opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression) shall not be blocked, filled, re-graded, or otherwise changed in a manner that prevents storm water from draining into the tree well. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure

Tree wells are site design BMPs that normally do not require maintenance actions beyond routine landscape maintenance. The normal expected maintenance described above ensures the BMP functionality. If changes have been made to the tree well entrance / opening such that runoff is prevented from draining into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well, or a surface depression has been filled so runoff flows away from the tree well), the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance will be required to restore drainage into the tree well as designed.

Surface ponding of runoff directed into tree wells is expected to infiltrate/evapotranspirate within 24-96 hours following a storm event. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging or compaction of the soils surrounding the tree. Loosen or replace the soils to restore drainage.

Other Special Considerations

Site design BMPs, such as tree wells, installed within a new development or redevelopment project are components of an overall storm water management strategy for the project. The presence of site design BMPs within a project is usually a factor in the determination of the amount of runoff to be managed with structural BMPs (i.e., the amount of runoff expected to reach downstream retention or biofiltration basins that process storm water runoff from the project as a whole). When site design BMPs are not maintained or are removed, this can lead to clogging or failure of downstream structural BMPs due to greater delivery of runoff and pollutants than intended for the structural BMP. Therefore, the [City Engineer] may require confirmation of maintenance of site design BMPs as part of their structural BMP maintenance documentation requirements. Site design BMPs that have been installed as part of the project should not be removed, nor should they be bypassed by re-routing roof drains or re-grading surfaces within the project. If changes are necessary, consult the [City Engineer] to determine requirements.

SD-1
Tree Wells

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR SD-1 TREE WELLS		
The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Tree health	Routine actions as necessary to maintain tree health.	• Inspect monthly. • Maintenance when needed.
Dead or diseased tree	Remove dead or diseased tree. Replace per original plans.	• Inspect monthly. • Maintenance when needed.
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health	Loosen or replace soils surrounding the tree to restore drainage.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water).	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well)	Make repairs as appropriate to restore drainage into the tree well.	• Inspect monthly. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
County of San Diego. 2014. Low Impact Development Handbook.
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html
San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet SD-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

SD-1
Tree Wells

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	
Property / Development Name:	Responsible Party Name and Phone Number:	
Property Address of BMP:	Responsible Party Address:	

INSPECTION AND MAINTENANCE CHECKLIST FOR SD-1 TREE WELLS PAGE 1 of 2			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Dead or diseased tree Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove dead or diseased tree ☐ Replace per original plans ☐ Other / Comments:		
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Loosen or replace soils surrounding the tree to restore drainage ☐ Other / Comments:		

SD-1
Tree Wells

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR SD-1 TREE WELLS PAGE 2 of 2			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Disperse any standing water from the tree well to nearby landscaping ☐ Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water) ☐ Other / Comments:		
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well) Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Make repairs as appropriate to restore drainage into the tree well ☐ Other / Comments:		

E.7 SD-A Tree Wells

Tree Wells (Source: County of San Diego LID Manual – EOA, Inc.)

MS4 Permit Category
Site Design Retention

Manual Category
Site Design Infiltration

Applicable Performance Standard
Site Design Pollutant Control Flow Control

Primary Benefits
Volume Reduction

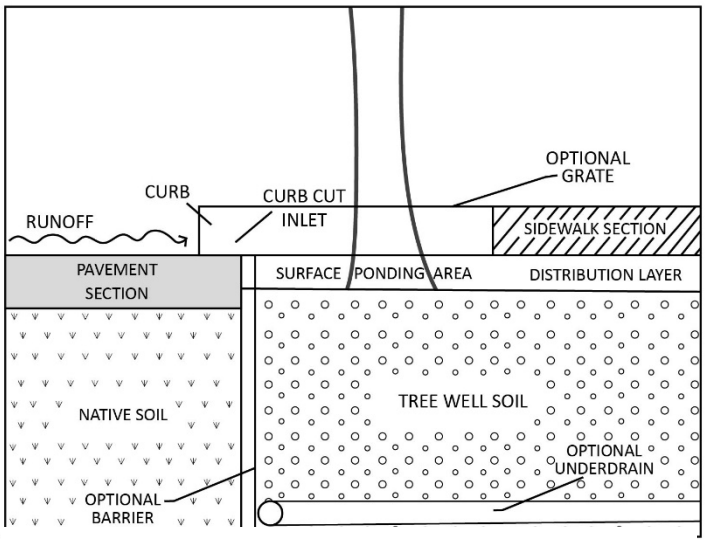
Description

Trees planted to intercept rainfall and runoff as described in this fact sheet may be used as storm water management measures to provide runoff reduction of the DCV per Appendix B.1.4. Additional benefits associated with tree wells, include energy conservation, air quality improvement, and aesthetic enhancement. In addition to the requirements provided in this fact sheet, tree wells located in the County Right-of-Way shall follow requirements in Appendix K of this manual. Deviations from the outlined criteria may be approved at the discretion of County staff. Typical storm water management benefits associated with trees include:

- **Interception of rainfall** – tree surfaces (roots, foliage, bark, and branches) intercept, evaporate, store, or convey precipitation to the soil before it reaches surrounding impervious surfaces
- **Reduced erosion** – trees protect denuded area by intercepting or reducing the velocity of rain drops as they fall through the tree canopy
- **Increased infiltration** – soil conditions created by roots and fallen leaves promote infiltration
- **Treatment of storm water** – trees provide treatment through uptake of nutrients and other storm water pollutants (phytoremediation) and support of other biological processes that break down pollutants

Typical tree well system components include:

- Trees of the appropriate species for site conditions and constraints. Refer to the Plant List in this fact sheet.
- Available soil media reservoir volume based on mature tree size, soil type, water availability, surrounding land uses, and project goals
- Optional suspended pavement design to provide structural support for adjacent pavement without requiring compaction of underlying layers



Schematic of Tree Well

- Optional root barrier devices as needed; a root barrier is a device installed in the ground, between a tree and the sidewalk, intended to guide roots down and away from the sidewalk in order to prevent sidewalk lifting from tree roots.
- Optional tree grates; to be considered to maximize available space for pedestrian circulation and to protect tree roots from compaction related to pedestrian circulation; tree grates are typically made up of porous material that will allow the runoff to soak through.
- Optional shallow surface depression for ponding of excess runoff
- Optional planter box drain

Design Adaptations for Project Goals

Site design BMP to provide incidental treatment. Tree wells primarily function as site design BMPs for incidental treatment.

Pollutant Control BMP to provide treatment. Project proponents are allowed to design trees to reduce the volume of stormwater runoff that requires treatment, (the Design Capture Volume [DCV]), or completely fulfill the pollutant control BMP requirements by retaining the entire DCV. Benefits from tree wells are accounted for by using the volume reduction values in Table B.1-3 presented in Appendix B. This credit can apply to other trees that are used for landscaping purposes that meet the same criteria. Project proponents are required to provide calculations supporting the amount of credit claimed from implementing trees within the project footprint.

Flow Control BMP to meet hydromodification requirements. Project proponents are also allowed to design tree wells as a flow control BMP. Benefits from tree wells are accounted for by using the

DCV multipliers listed below. Project proponents are required to provide calculations showing that the entire DCV including the DCV multiplier is retained.

Design Criteria and Considerations

Tree Wells, whether designed as Site Design BMPs, as Stormwater Pollutant Control BMP, or as a Flow Control BMP must meet the following design criteria and considerations, and if placed in the right-of-way must be consistent with the County of San Diego Green Streets Design Criteria and Green Streets Standard Drawings in Appendix K. Deviations from the below criteria may be approved at the discretion of the County staff if it is determined to be appropriate:

Siting and Design		*Intent/Rationale*
☐	**Tree species** is appropriately chosen for the development (private or public). For public rights-of-ways, local planning guidelines and zoning provisions for the permissible species and placement of trees are consulted. A list of trees appropriate for site design that can be used by all county municipalities are provided in this fact sheet.	Proper tree placement and species selection minimizes problems such as pavement damage by surface roots and poor growth.
☐	**Tree well placement:** ensure area is graded; and the well is located so that full amount of DCV reduction drains to the well.	Minimizes short-circuiting of run off and assures DCV reductions are retained onsite.

Siting and Design	*Intent/Rationale*
☐ **Location of trees planted along public streets** follows guidance on green infrastructure (Appendix K). Vehicle and pedestrian line of sight and clear recovery zones are considered in tree selection and placement. Unless exemption is granted by County staff the following minimum tree separation distance is followed Improvement / Minimum distance to tree well: Traffic Signal, Stop sign — 20 feet Underground Utility lines (except sewer) — 5 feet Sewer Lines — 10 feet Above ground utility structures (Transformers, Hydrants, Utility poles, etc.) — 10 feet Driveways — 10 feet Intersections (intersecting curb lines of two streets) — 25 feet	Roadway safety for both vehicular and pedestrian traffic is a key consideration for placement along public streets.
☐ **Underground utilities and overhead wires** are considered in the design and avoided or circumvented. Underground utilities are routed around or through the planter in suspended pavement applications. All underground utilities are protected from water and root penetration.	Tree growth can damage utilities and overhead wires resulting in service interruptions. Protecting utilities routed through the planter prevents damage and service interruptions. Refer to Section 6.6 of the Green Streets Design Criteria in Appendix K for guidelines regarding utility placement and potential conflict with BMP facilities.
☐ Suspended pavement was used for confined Tree Well soil volume. Suspended pavement design was developed where appropriate to minimize soil compaction and improve infiltration and filtration capabilities.	Suspended pavement designs as shown in Page 7 of the Green Streets Guidelines in Appendix K provide structural support without compaction of the underlying layers, thereby promoting tree growth.

Siting and Design		*Intent/Rationale*
	Suspended pavement was constructed with an approved structural cell.	Recommended structural cells include poured in place concrete columns, Silva Cells manufactured by Deeproot Green Infrastructures and Stratacell and Stratavault systems manufactured by Citygreen Systems.
☐	A minimum soil volume of 2 cubic feet per square foot of mature tree canopy projection area is provided for each tree. Canopy projection area is the ground area beneath the mature tree, measured at the drip line. Soil volume must be within 1.5 times the mature tree canopy radius. Soil depth shall be a minimum of 30 inches deep, preferably 36 inches deep. When placing tree well next to curb use Structural Soil as outlined in the section below titled "Confined Tree Well Soil Volume" and use Specifications in Appendix K Use Amended Soil per Fact Sheet SD-F in all other cases.	The minimum soil volume ensures that there is adequate storage volume to allow for unrestricted evapotranspiration and infiltration.
☐	To claim credit for existing trees, the root structure of existing tree shall be protected and additional soil volumes provided to meet the above requirements. A berm or well must be constructed around the perimeter of the soil volume to be credited and an inlet structure must be of the appropriate size to allow runoff to enter the well. Considerations should be made to prevent root and water intrusion damage to surrounding infrastructure.	The minimum soil volume ensures that there is adequate storage volume to allow for unrestricted storage, evapotranspiration, and infiltration.
☐	DCV from the tributary area draining to the tree is equal to or greater than the tree credit volume	The minimum tributary area ensures that the tree receives enough runoff to fully utilize the infiltration and evapotranspiration potential provided. In cases where the minimum tributary area is not provided, the tree credit volume

Siting and Design		*Intent/Rationale*
		must be reduced proportionately to the actual tributary area.
☐	Inlet opening to the tree that is at least 18 inches wide. A minimum 2 inch drop in grade from the inlet to the finish grade of the tree. Grated inlets are allowed for pedestrian circulation. Grates need to be ADA compliant and have sufficient slip resistance.	Design requirement to ensure that the runoff from the tributary area does not bypass the BMP. Different inlet openings and drops in grade may be allowed at the discretion of County staff if calculations are shown that the diversion flow rate (Appendix B.) from the tributary area can be conveyed to the tree. In cases where the inlet capacity is limiting the amount of runoff draining to the tree, the tree credit volume must be reduced proportionately.

Conceptual Design and Sizing Approach for Site Design

Determine the areas where tree wells can be used in the site design to achieve incidental treatment. Tree wells reduce runoff volumes from the site. Refer to Appendix B.2. Document the proposed tree locations in the SWQMP.

Conceptual Design and Sizing Approach for Pollutant Control

When trees are proposed as a storm water pollutant control BMP, the project proponent must submit detailed calculations for the DCV treated by trees. Document the proposed tree locations on the BMP Plan & DMA Map, and provide sizing calculations in the SWQMP Attachment following the steps in Appendix B.

Conceptual Design and Sizing Approach for Flow Control

When trees are proposed as a flow control BMP, the project proponent must submit detailed calculations for the Required Retention Volume (RRV) treated by trees. Document the proposed tree locations on the BMP Plan & DMA Map, and provide sizing calculations in the SWQMP Attachment. Tree Wells that are designed to meet flow control requirements are designated as SSD BMPs.

1. **Determine how much volume you need**. The Required Retention Volume (RRV) is the volume of rainfall that must be retained by the tree wells in the DMA to meet flow control requirements. It is calculated by multiplying the DCV by a DCV multiplier.

a. Determine the DCV. See Appendix B.

b. Determine the DCV Multiplier. The DCV Multiplier is based on two factors: (1) The tree well soil depth and, (2) The Hydrologic Soil Group. Once you know both values, determine the DCV Multiplier using this table:

c. Calculate the Required Retention Volume (DCV x DCV Multiplier). Calculate the RRV by multiplying the DCV by the DCV Multiplier. This is the volume of runoff that must be offset by the Tree Well Credit Volume. Repeat this process for each DMA.

Minimum Tree Well Soil Depth (inches)	Hydrologic Soil Group				
	A	B	C	D (Default)	
30"	1.60	2.20	2.50	2.90	DCV Multiplier
36"	1.80	2.47	2.83	3.17	
42"	2.00	2.73	3.17	3.43	
48"	2.20	3.00	3.50	3.70	

DCV Multiplier Table

Tree Well Soil Depth is the vertical distance from the top to the bottom of the soil layer in the tree well. **Hydrologic Soil Group** describes the native soil surrounding the tree well. Soil type affects how well water can infiltrate into the area surrounding the tree well. Group A soils provide the most infiltration and Group D the least. If your soil type is unknown, you can assume Group D. But this will result in larger DCV Multipliers, and in turn increase the size or number of tree wells needed.

Alternative Proposals: You can also propose RRV values or use methods and assumptions different than those described here. Proposals must be based on SWMM modeling or other methods acceptable to the County.

2. **Determine how much volume you have**. The Tree Well Credit Volume is the volume of runoff retention in cubic feet per tree (ft^3/tree) to be provided by each tree well (or group) in the DMA. Together retain a volume that is equal to or greater than the RRV for the DMA.

   The volume credited for each tree well is based on the mature canopy diameter of the tree species selected. Any species listed below can be used in a tree well so long as it meets all other applicable restrictions and requirements for the project area. Native and drought tolerant species are required where feasible.

	Botanical Name	Common Name	Mature Height (ft)	Mature Canopy Diameter (ft)	Credit Volume per Tree (ft3)
1	*Ceanothus 'Ray Hartman"*	California Mountain Lillac	30	**10**	**40**
2	*Pittosporum Phillyraeoides*	Willow Pittosporum	25	**15**	**100**
3	*Salix Lasiolepsis*	Arroyo Willow	25		
4	*Arbutus Unedo*	Strawberry Tree	30	**20**	**180**
5	*Prunus Ilicifolia*	Hollyleaf Cherry	30		
6	*Prunus Lynoii*	Catalina Cherry	40		
7	*Cercis Occidentalis*	Western Redbud	25	**25**	**290**
8	*Heteromeles Arbutifolia*	Toyon, Christmas Berry	25		
9	*Alnus Rhombifolia*	White Elder	75	**30**	**420**
10	*Arbutus 'Marina'*	Hybrid Strawberry Tree	35		
11	*Chilopsis Linearis*	Desert Willow	30		
12	*Lyonothamnus Floribundus*	Catalina Ironwood	50		
13	*Magnolia Grandiflora*	Southern Magnolia	40		
14	*Pinus Torreyana*	Torrey Pines	80		
15	*Platanus Racemosa*	California sycamore	60		
16	*Quercus Agrifolia*	Coast Live Oak	70		
17	*Quercus Engelmannii*	Engelmann Oak	50		
18	*Quercus Suber*	Cork Oak	40		
19	*Sambucus Mexicana*	Blue Elderberry	30		

Tree Palette Table

Below are sources for Tree Palette Mature Height and Mature Canopy Diameter:

A. Water Efficient Landscape Design Manual, County of San Diego, 2016
B. Sustainable Landscapes Guidelines, San Diego County Water Authority, 2015
C. Low Impact Development Handbook, County of San Diego, 2014
D. Low Impact Development Design Manual, City of San Diego, 2011
E. Street Tree Selection Guide, City of San Diego, 2013
F. Environmentally Friendly Garden Plant List, City of San Diego, 2004
G. BMP Design Manual, County of San Diego, 2016
H. California Native Plant Society. 2017

Alternative Species. Tree species other than those listed are allowable, but must be approved by the County. If you know the mature canopy diameter of the species you want to propose, use the values in the table to determine its credit volume. Note that even if you select a species with a canopy diameter greater than **30 feet**, the maximum credit any tree can generate is **420 ft^3**.

3. **Determine if you have enough volume**. Compare your total Tree Well Credit Volume from Step 2 to the RRV you calculated in Step 1. Once your Credit Volume is equal to or greater than your RRV, this requirement is satisfied. If your Credit Volume is initially too low, adjust your design either to (1) increase it with more or bigger trees, or (2) decrease the RRV through DCV reductions.

Tree wells will normally be placed at the **discharge point** of the DMA, either individually or in groups. If some of them will retain runoff from different areas in the DMA, RRV and DCV calculations must be specific to each subarea.

If an **underdrain** is proposed for the Tree Well, the sizing factors shown in the DCV Multiplier Table cannot be used, and instead continuous simulation modeling should be performed. This would allow to obtain credit for soil volume underneath the underdrain.

Tree Planting Design in New or Reconstructed Streetscapes

1. Maximized open soil area for tree planting is the most cost effective method of achieving the required soil volume.

2. Tree wells within sidewalks shall have a minimum open area of four feet wide by six feet long. Larger areas may be required to accommodate large root balls.

3. Tree well soil characteristics shall meet the requirements of SD-F Amended Soil.

Structural Requirements for Confined Tree Well Soil Volume

In order to provide adequate soil volume for tree wells, soils may be placed confined beneath adjacent paved surfaces. Acceptable soil systems capable of carrying D-50 loading include structural soils, structural slabs, and structural cells:

1. Structural soil systems include CU-StructuralSoil™, Stalite Structural Soil, or equivalent.

2. Suspended pavements that allow uncompacted growing soil beneath the sidewalk include; structural slabs that span between structural supports, structural cells, and other commercially available structural systems. See Page 7 of the Green Streets Guidelines in Appendix K for illustrations. Manufacturer details and certification must be provided for commercial systems. Structural calculations and details must be provided for structural slab installations. Structural cells are commercially-available structural systems placed subsurface that support the sidewalk and are filled with amended soil (SD-F). Manufacturer details and certification must be provided for commercial systems.

Stormwater Retention and Treatment Volume

Tree wells with expanded soil volume will serve as a method of capturing and retaining the required volume of stormwater in accordance with County requirements in Appendix B of this manual. These facilities can be designed to meet the County requirements when surface ponding volume is provided, whether designed as an enclosed plant bed with covered soil volume, or a continuous open area (either mulched or with turf) with soil volume under the adjacent sidewalk.

Maintenance Overview

Normal Expected Maintenance. Tree health shall be maintained as part of normal landscape maintenance. Additionally, ensure that storm water runoff can be conveyed into the tree well as designed. That is, the opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression) shall not be blocked, filled, re-graded, or otherwise changed in a manner that prevents storm water from draining into the tree well. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure. Trees wells are site design BMPs that normally do not require maintenance actions beyond routine landscape maintenance. The normal expected maintenance described above ensures the BMP functionality. If changes have been made to the tree well entrance / opening such that runoff is prevented from draining into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well, or a surface depression has been filled so runoff flows away from the tree well), the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance will be required to restore drainage into the tree well as designed.

Surface ponding of runoff directed into tree wells is expected to infiltrate/evapotranspirate within 24-96 hours following a storm event. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging or compaction of the soils surrounding the tree. Loosen or replace the soils to restore drainage.

Other Special Considerations. Site design BMPs, such as tree wells, installed within a new development or redevelopment project are components of an overall storm water management strategy for the project. The presence of site design BMPs within a project is usually a factor in the determination of the amount of runoff to be managed with structural BMPs (i.e., the amount of runoff expected to reach downstream retention or biofiltration basins that process storm water runoff from the project as a whole). When site design BMPs are not maintained or are removed, this can lead to clogging or failure of downstream structural BMPs due to greater delivery of runoff and pollutants than intended for the structural BMP. Therefore, the County Engineer may require confirmation of maintenance of site design BMPs as part of their structural BMP maintenance documentation requirements. Site design BMPs that have been installed as part of the project should not be removed, nor should they be bypassed by re-routing roof drains or re-grading surfaces within the project. If changes are necessary, consult the County Engineer to determine requirements.

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Summary of Standard Inspection and Maintenance

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

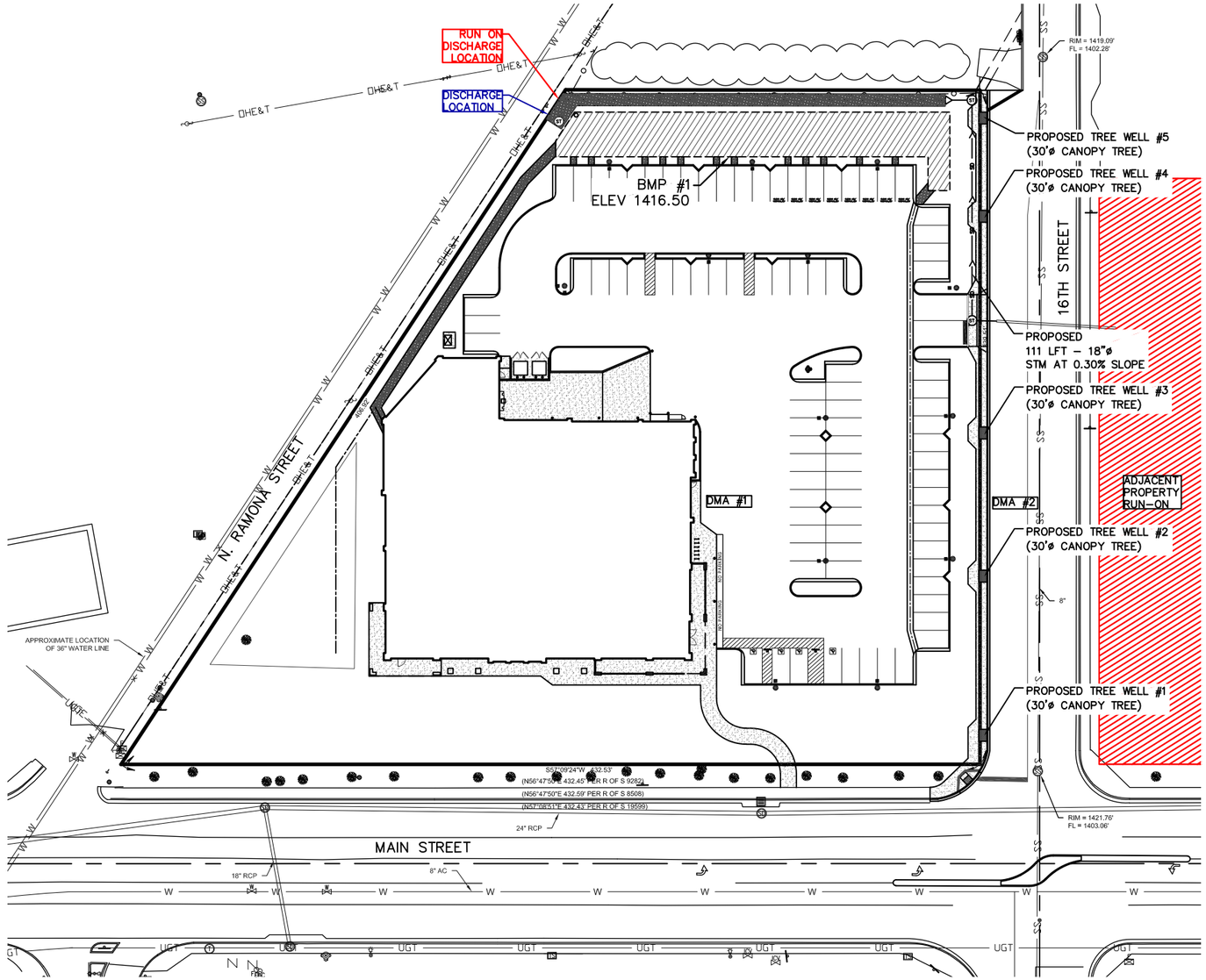
Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Tree health	Routine actions as necessary to maintain tree health.	• Inspect monthly. • Maintain when needed.
Dead or diseased tree	Remove dead or diseased tree. Replace per original plans.	• Inspect monthly. • Maintain when needed.
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health	Loosen or replace soils surrounding the tree to restore drainage.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water).	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well)	Make repairs as appropriate to restore drainage into the tree well.	• Inspect monthly. • Maintain when needed.

SURFACE AREA LEGEND

PROJECT / DMA #1 BOUNDARY

BMP AREA #1



GRAPHIC SCALE

30 0 15 30 60

(IN FEET)

1 inch = 30 ft.

IngenAE

301 N. Main Street, Suite B
South Bend, IN 46601
www.ingenae.com

Submissions / Revisions:		Date:
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		

ALDI Inc.

12661 ALDI PLACE
MORENO VALLEY, CA
92555-6703
(951) 590-9750

Project Name & Location:

ALDI

16TH STREET &
MAIN STREET
RAMONA, CA

Drawing Name:

SITE MAP-STORM WATER-MAINTENANCE EXHIBIT

Date: 12/16/19	Project No. AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	

ATTACHMENT 4

County of San Diego PDP Structural BMP Verification for Permitted Land Development Projects

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County of San Diego BMP Design Manual Verification Form	
Project Summary Information	
Project Name	ALDI Inc. – Ramona, CA
Record ID (e.g., grading/improvement plan number)	PDS2018-STP-18-021
Project Address	NW Corner of Main Street & 16th Street
Assessor's Parcel Number(s) (APN(s))	281-171-04-00
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	905.41, San Dieguito, Santa Maria Valley, Ramona
Responsible Party for Construction Phase	
Developer's Name	ALDI Inc. – Skip Janes
Address	12661 Aldi Place Moreno Valley, CA 92555
Email Address	Skip.janes@aldi.us
Phone Number	951.530.5750
Engineer of Work	Ryan Vliek
Engineer's Phone Number	574.400.2167
Responsible Party for Ongoing Maintenance	
Owner's Name(s)*	ALDI Inc. – Skip Janes
Address	12661 Aldi Place Moreno Valley, CA 92555
Email Address	Skip.janes@aldi.us
Phone Number	951.530.5750
*Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information for the Board or property manager at time of project closeout.	

County of San Diego BMP Design Manual Verification Form Page 2 of 4					
Stormwater Structural Pollutant Control & Hydromodification Control BMPs* (List all from SWQMP)					
Description/Type of Structural BMP	**Plan Sheet #**	**STRUCT-URAL BMP ID#**	**Maint-enance Category**	**Maintenance Agreement Recorded Doc #**	**Revisions**
Biofiltration Basin	C.2	BMP #1	1		
Tree Wells	C.2	BMP #2	1		
*All Priority Development Projects (PDPs) require a Structural BMP					

Note: If this is a partial verification of Structural BMPs, provide a list and map denoting Structural BMPs that have already been submitted, those for this submission, and those anticipated in future submissions.

County of San Diego BMP Design Manual Verification Form Page 3 of 4

Checklist for Applicant to submit to PDCI:

- ☐ Copy of the final accepted SWQMP and any accepted addendum.
- ☐ Copy of the most current plan showing the Stormwater Structural BMP Table, plans/cross-section sheets of the Structural BMPs and the location of each verified as-built Structural BMP.
- ☐ Photograph of each Structural BMP.
- ☐ Photograph(s) of each Structural BMP during the construction process to illustrate proper construction.
- ☐ Copy of the approved Structural BMP maintenance agreement and associated security

By signing below, I certify that the Structural BMP(s) for this project have been constructed and all BMPs are in substantial conformance with the approved plans and applicable regulations. I understand the County reserves the right to inspect the above BMPs to verify compliance with the approved plans and Watershed Protection Ordinance (WPO). Should it be determined that the BMPs were not constructed to plan or code, corrective actions may be necessary before permits can be closed.

Please sign your name and seal.

Professional Engineer's Printed Name:

_____

Professional Engineer's Signed Name:

_____

Date:_____

[SEAL]

County of San Diego BMP Design Manual Verification Form Page 4 of 4

COUNTY - OFFICIAL USE ONLY:

For PDCI: Verification Package #: _____

PDCI Inspector: _____

Date Project has/expects to close: _____

Date verification received from EOW: _____

By signing below, PDCI Inspector concurs that every noted Structural BMP has been installed per plan.

PDCI Inspector's Signature: _____ Date: _____

FOR WPP:

Date Received from PDCI: _____

WPP Submittal Reviewer: _____

WPP Reviewer concurs that the information provided for the following Structural BMPs is acceptable to enter into the Structural BMP Maintenance verification inventory:

List **acceptable** Structural BMPs:

WPP Reviewer's Signature: _____ Date: _____

ATTACHMENT 5

Copy of Plan Sheets Showing Permanent Storm Water BMPs, Source Control, and Site Design

This is the cover sheet for Attachment 5.

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

☒ Structural BMP(s) with ID numbers matching Step 6 Summary of PDP Structural BMPs
☒ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
☒ Details and specifications for construction of structural BMP(s)
☒ Signage indicating the location and boundary of structural BMP(s) as required by County staff
☒ How to access the structural BMP(s) to inspect and perform maintenance
☒ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☒ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
☒ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☒ Recommended equipment to perform maintenance
☒ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
☒ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
☒ All BMPs must be fully dimensioned on the plans
☒ When proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number must be provided. Photocopies of general brochures are not acceptable.
☒ Include all source control and site design measures described in Steps 4 and 5 of the SWQMP. Can be included as a separate exhibit as necessary.

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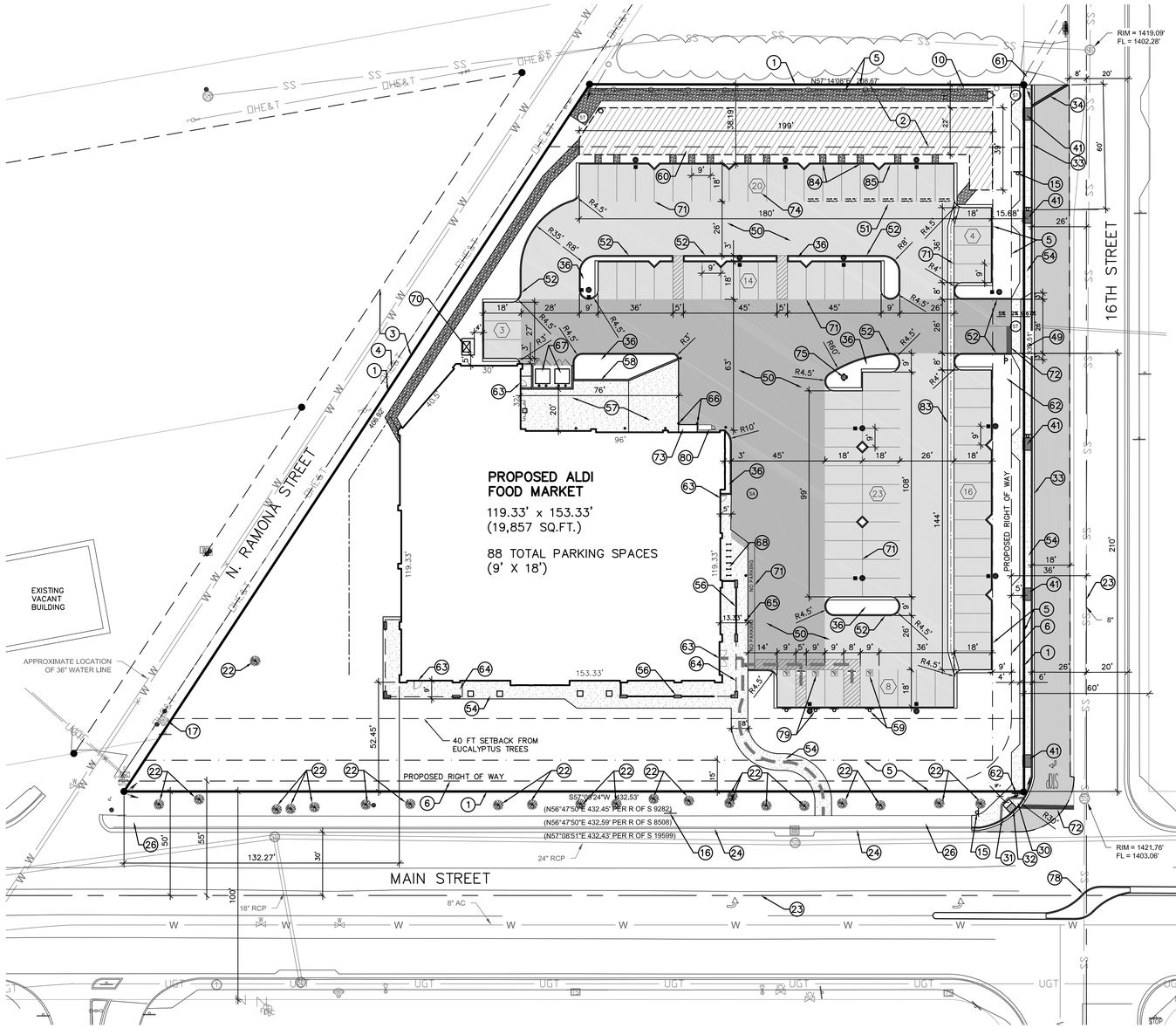
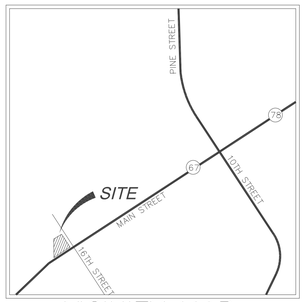




VICINITY MAP

LEGEND

- ADA PATH OF TRAVEL
- PROPOSED LIGHT-DUTY ASPHALT PAVEMENT AREA
- PROPOSED HEAVY-DUTY ASPHALT PAVEMENT AREA
- PROPOSED STREET PAVEMENT AREA
- PROPOSED CONCRETE AREAS
- PROPOSED RIPRAP AREAS (SAN DIEGO REGIONAL STANDARD DRAWING D-40)

PRINCIPAL BUILDING SETBACKS

	REQUIRED	PROPOSED
PRIMARY FRONT SETBACK	15 FT. MAX.	**52 FT.
SECONDARY FRONT SETBACK	15 FT. MAX.	139 FT.
SIDE SETBACK	0 FT. MIN.	10 FT.
REAR SETBACK	3 FT. MIN.	134 FT.

NOTE:
REQUIRED INFORMATION EXTRACTED FROM RAMONA BASED CODE, SECTION RM-V5 CENTER DISTRICT, PART EIGHT: 8730, TABLE 2.4

**PRIMARY FRONT SETBACK EXCEEDS MAXIMUM PER A CALTRANS REQUIREMENT TO HAVE A 40 FT SETBACK FROM EXISTING EUCALYPTUS TREES WITHIN THE MAIN STREET ROW.

PARKING REQUIREMENTS

	REQUIRED	PROPOSED
TOTAL NUMBER OF PARKING SPACES	3 PER 1000 SF = 60	88
TOTAL NUMBER OF ACCESSIBLE CAR SPACES	4	4
TOTAL NUMBER OF CLEAN AIR VEHICLE SPACES	8	8
TOTAL NUMBER OF BICYCLE SPACES	6	6
PERCENT OF PARKING LOT AREA DEVOTED TO LANDSCAPING	1,232 SF (3%) 14 SF PER PARKING SPACE	2,413 SF (6%)

SITE KEYNOTES

1. EXISTING PROPERTY/BOUNDARY LINE
2. 30' SANITARY SEWER EASEMENT PER INSTRUMENT NO. 79-538179
3. 30' PRIVATE STREET EASEMENT PER BOOK 5386, PAGE 234
4. UNSPECIFIED WIDTH POWER LINE EASEMENT PER BOOK 836, PAGE 282 OF OFFICIAL RECORDS
5. SETBACK LINE
6. PROPOSED R/W EASEMENT
10. EXISTING 4 FT. HIGH CHAIN LINK FENCE TO BE REMOVED AND REPLACED
15. EXISTING SIGN TO BE RELOCATED BEHIND LIMITS OF PROPOSED SIDEWALK
16. EXISTING SIGNS TO REMAIN
17. EXISTING FIRE HYDRANT TO REMAIN
22. EXISTING TREE TO REMAIN
23. EXISTING CENTERLINE OF ROAD
24. EXISTING CURB & GUTTER TO REMAIN
26. EXISTING CONCRETE SIDEWALK TO REMAIN
30. PROPOSED CURB RAMP PER SAN DIEGO REGIONAL STANDARD DRAWING G-27
31. PROPOSED 1 FT WIDE GROOVED BORDER AT EDGE OF CURB RAMP SHALL MEET 2013 CBC TITLE 24 REQUIREMENTS
32. PROPOSED DETECTABLE WARNING / TRUNCATED DOMES SHALL BE YELLOW CONFORMING TO FEDERAL STANDARDS 595C, COLOR NO. 33538 PER SEC. 11B705 2016 CBC, WARRANTED FOR SHOPPING CART TRAFFIC & MUST BE APPROVED BY ALDI
33. PROPOSED CURB & GUTTER PER SAN DIEGO REGIONAL STANDARD DRAWING G-2
34. PROPOSED AC DIKE PER SAN DIEGO REGIONAL STANDARD DRAWING G-5
36. PROPOSED LANDSCAPE AREA (TYP.)
41. PROPOSED TREE WELL WITH ADA GRATE PER SAN DIEGO COUNTY DESIGN STANDARD GS-1.02
49. PROPOSED DRIVEWAY PER SAN DIEGO REGIONAL STANDARD DRAWING G-14A
50. PROPOSED PAVEMENT AREA
51. PROPOSED CLEAN AIR/VANPOOL/EV PARKING SPACES (TYP.)
52. PROPOSED CONCRETE CURB (TYP.) PER SAN DIEGO REGIONAL STANDARD DRAWING G-1
54. PROPOSED CONCRETE SIDEWALK PER SAN DIEGO REGIONAL STANDARD DRAWING G-7
56. PROPOSED 3'-8" HIGH MASONRY SCREENING HALF HEIGHT WALL
57. PROPOSED DEPRESSED CONCRETE TRUCK DOCK
58. PROPOSED RETAINING WALL WITH GUARDRAIL
59. PROPOSED VAN ACCESSIBLE PARKING SPACE
60. PROPOSED BIOFILTRATION BASIN AREA
61. DECOMPOSED GRANITE (DG) PATHWAY
62. INSTALL (30"x30") STOP SIGN (R1-1) AND RIGHT TURN ONLY SIGN (R3-5(R)) PER DOT
63. PROPOSED BUILDING EXIT
64. PROPOSED BUILDING CANOPY OVERHANG
65. PROPOSED 6"ø BOLLARDS (TYP.)
66. PROPOSED 10"ø PIPE BOLLARDS (TYP.)
67. PROPOSED TRASH BIN W/ ENCLOSURE
68. PROPOSED BIKE PARKING (6 TOTAL RACKS)
70. PROPOSED CONCRETE PAD FOR ELECTRIC TRANSFORMER (PROPOSED UNDERGROUND ELECTRIC SERVICE)
71. PROPOSED PAVEMENT MARKINGS (TYP.)
72. PROPOSED 2' WIDE PAINTED, WHITE STOP BAR
73. PROPOSED ELECTRIC SWITCHGEAR
74. PROPOSED NUMBER OF PARKING SPACES IN PARKING ROW COUNT (TYP.)
75. PROPOSED FIRE HYDRANT
78. PROPOSED 6" RAISED CONCRETE MEDIAN PER CALTRANS
79. (4) BARRIER FREE PARKING SPACES (TYP.); PROVIDE SIGNAGE EMBEDDED WITHIN 6"ø PIPE BOLLARDS
80. PROPOSED BIKE LOCKER
83. PROPOSED 3' WIDE CONCRETE GUTTER PER SAN DIEGO REGIONAL STANDARD DRAWING G-12
84. PROVIDE (2) CONDUITS WITHIN CLEAN AIR/VANPOOL/EV PARKING SPACES FOR FUTURE MUTLI-PORT ELECTRIC VEHICLE CHARGING STATIONS
85. PROVIDE (1) CONDUIT WITHIN CLEAN AIR/VANPOOL/EV PARKING SPACE FOR FUTURE ELECTRIC VEHICLE CHARGING STATION

PRELIMINARY GRADING PLANS
NOT FOR CONSTRUCTION

PROPERTY OWNER INFORMATION

NAME: ALDI, INC.
ADDRESS: 12661 ALDI PLACE
MORENO VALLEY, CA 92555
TELEPHONE NUMBER: 951-530-5750
(24 HOUR CONTACT NUMBER)
SITE A.P.N. NUMBER: 281-171-04-00
SITE ADDRESS: MAIN & 16TH STREET
RAMONA, CA 92065

CONTACT:
RYAN VLIEK
301 N. MAIN ST, STE. B
SOUTH BEND, IN 46601
574.400.2167

SUMMARY TABLE
EXISTING STRUCTURE:
N/A

PROPOSED STRUCTURE:
FOOD MARKET 19,857 SQ. FT.

PROPOSED LANDSCAPE AREA:
41,388 SQ. FT.

NET AREA OF PARCEL
EXCLUSIVE OF ROAD
EASEMENTS: 2.45 ACRES

GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.

IngenAE
301 N. Main Street, Suite B
South Bend, IN 46601
www.ingenae.com
(574) 400-2167

PLAN CHECK/PERMITS

BUILDING PERMIT
PLAN CHECK NUMBER:
PARCEL MAP NUMBER:

ENGINEER OF WORK

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT AND THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT.

NAME: RYAN A. VLIEK DATE: 02/20/20
RCE NO: C 82980 EXPIRES: 09/30/20

PRIVATE CONTRACT

COUNTY OF SAN DIEGO
PLANNING AND DEVELOPMENT SERVICES

MINOR GRADING PLAN FOR:
ALDI INC.
SITE PLAN

SHEET: C.1 OF

APPROVED
PLANNING AND DEVELOPMENT SERVICES
BY: DATE:

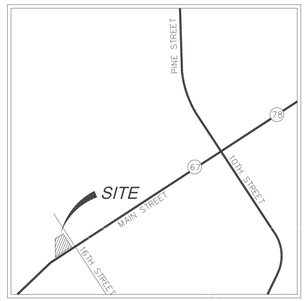
GRADING PERMIT NUMBER:
PDS2018-STP-18-021

MINOR GRADING PLAN

LEGAL DESCRIPTION:

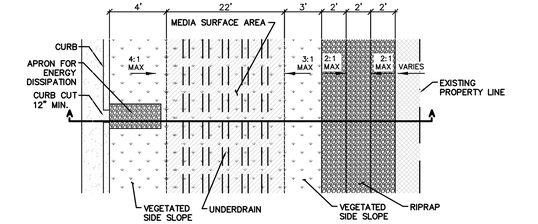
LOT 49 OF RAMONA, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 643, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 15, 1890.

APN: 281-171-04-00

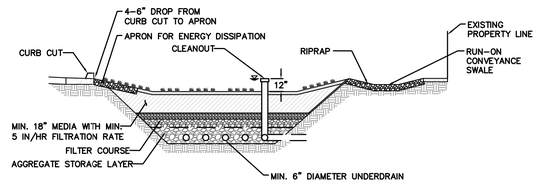


VICINITY MAP

GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.



BIOFILTRATION BASIN DETAIL – PLAN VIEW
SCALE: N.T.S.



BIOFILTRATION BASIN DETAIL – SECTION A–A VIEW
SCALE: N.T.S.

GRADING KEYNOTES

(1) EXISTING PROPERTY/BOUNDARY LINE

(2) 30' SANITARY SEWER EASEMENT PER INSTRUMENT NO. 79-538179

(3) 30' PRIVATE STREET EASEMENT PER BOOK 5386, PAGE 234

(4) UNSPECIFIED WIDTH POWER LINE EASEMENT PER BOOK 836, PAGE 282 OF OFFICIAL RECORDS

(17) EXISTING FIRE HYDRANT TO REMAIN

(38) PROPOSED DRAINAGE SWALE FLOW LINE PER SAN DIEGO REGIONAL STANDARD DRAWING G-74

(41) PROPOSED TREE WELL WITH ADA GRATE PER SAN DIEGO COUNTY DESIGN STANDARD GS-1.02

(42) CONNECT TO EXISTING STORM DRAIN

(43) PROPOSED PUMP WITHIN M.H. #A TO DISCHARGE STORM WATER AT ALLOWABLE RELEASE RATE TO PROPOSED RIPRAP AREA.

(60) PROPOSED BIOFILTRATION BASIN AREA

(70) PROPOSED CONCRETE PAD FOR ELECTRIC TRANSFORMER (PROPOSED UNDERGROUND ELECTRIC SERVICE)

(73) PROPOSED ELECTRIC SWITCHGEAR

(75) PROPOSED FIRE HYDRANT

(76) PROPOSED 1 FT WIDE OPENINGS IN 6" CONCRETE CURB, SPACED AT 9 FT INTERVALS ALONG LENGTH OF CURBLINE PER DETAIL GS-2.6b

(82) REFER TO THIS SHEET FOR GRADING CROSS SECTIONS (TYP.)

(91) PROPOSED BUILDING ROOF DRAIN TO DAYLIGHT ONTO RIP RAP AREA; REFER TO ARCHITECTURAL PLANS

(92) PROPOSED CANOPY ROOF DRAINS TO DISCHARGE AT GRADE; REFER TO ARCHITECTURAL PLANS

(93) SUMP PUMP WITHIN PROPOSED TRUCK DOCK STORM INLET

(94) CONNECT SUMP PUMP OUTLET TO PROPOSED LANDSCAPE AREA UTILIZING 70 LFT – 2" ø SCHEDULE 40 PVC PIPE (FORCED LINE) & DAYLIGHT ONTO CONCRETE SPLASH BLOCK

(95) 6" ø PERFORATED PVC UNDERDRAIN PIPE, SPACED AT 4 FT L.O.C., BENEATH BIORETENTION AREA SLOPED & CONNECTED TO STORM RISER PIPE; STORM RISER PIPE SHALL CONNECT TO M.H. #A

GRADING NOTES

1. ALL GRADING SHALL CONFORM OF THE REQUIREMENTS OF THE GRADING ORDINANCE SECTIONS 87.101 THROUGH 87.804 OF THE SAN DIEGO COUNTY CODE OF REGULATORY ORDINANCES.
2. A REGISTERED CIVIL ENGINEER IS REQUIRED TO SUPERVISE INSTALLATION OF THE FILL KEYWAY AND ALL FILL BENCHING AND COMPACTION. A SOILS REPORT WITH COMPACTION TESTS IS REQUIRED FOR ALL FILL THAT IS OVER 12" IN DEPTH. DPLU FORM #73, MINOR GRADING CERTIFICATION, AND THREE (3) COPIES OF THE COMPACTION REPORT COMPLETED BY A SOILS ENGINEER SHALL BE SUBMITTED PRIOR TO ROUGH GRADE APPROVAL.
3. ALL FILL MATERIAL SHALL BE COMPACTED TO AT LEAST 90% MAXIMUM DRY DENSITY.
4. NATURAL DRAINAGE SHALL NOT BE DIVERTED OR CONCENTRATED ONTO ADJACENT PROPERTY.
5. MAINTAIN 1% (MINIMUM) SLOPE AWAY FROM ALL BUILDINGS FOR AT LEAST 5'.
6. ALL GRADING DETAILS SHALL BE IN CONFORMANCE WITH THE FOLLOWING SAN DIEGO COUNTY DESIGN STANDARDS OR REGIONAL STANDARD DRAWINGS:
   A. DS–8 LOT GRADING
   B. DS–10 GRADING OF SLOPES
   C. DS–11 REQUIRED SETBACKS
   D. D–40 RIP RAP ENERGY DISSIPATOR
   E. D–75 DRAINAGE DITCHES
7. BERMS SHALL BE REQUIRED AT THE TOP OF ALL FILL SLOPES AND SWALES OR BROW DITCHES SHALL BE REQUIRED AT THE TOP OF ALL CUT SLOPES. ALL BERMS, SWALES, OR BROW DITCHES SHALL CONFORM TO THE DESIGN STANDARDS OR REGIONAL STANDARD DRAWINGS LISTED ABOVE.
8. REGARDLESS OF WHICH BMP'S ARE IMPLEMENTED THE FACE OF ALL CUT AND FILL SLOPES IN EXCESS OF 3' VERTICAL HEIGHT SHALL BE PLANTED AND MAINTAINED WITH A GROUND COVER OR OTHER PLANTING TO PROTECT THE SLOPES AGAINST EROSION AND INSTABILITY. PLANTING SHALL COMMENCE AS SOON AS SLOPES ARE COMPLETED. ALL PLANTING MUST HAVE A PERMANENTLY INSTALLED IRRIGATION SYSTEM
9. REQUIRED SLOPE RATIOS ARE AS FOLLOWS:
   A. CUTS – 1.5:1 FOR MINOR SLOPES (UP TO 15' VERTICAL HEIGHT)
   B. CUTS – 2:1 FOR MAJOR SLOPES (OVER 15' VERTICAL HEIGHT)
   C. FILLS – 2:1 (MAXIMUM) FOR ALL FILL SLOPES
10. NOTWITHSTANDING THE MINIMUM STANDARDS SET FORTH IN THE GRADING ORDINANCE AND NOTWITHSTANDING THE APPROVAL OF THESE GRADING PLANS, THE OWNER AND PERMITEE ARE RESPONSIBLE FOR THE PREVENTION OF DAMAGE TO ADJACENT PROPERTIES. NO PERSON SHALL EXCAVATE SO CLOSE TO THE PROPERTY LINE AS TO ENDANGER ANY ADJOINING PUBLIC STREET OR SIDEWALK, OR THE FUNCTION OF ANY SEWAGE DISPOSAL SYSTEM OR ANY OTHER PUBLIC OR PRIVATE PROPERTY.
11. THE DIRECTOR OF PLANNING AND LAND USE MAY IMPOSE CONDITIONS THAT ARE REASONABLY NECESSARY TO PREVENT THE CREATION OF A NUISANCE OR HAZARD TO PERSONS OR TO PUBLIC OR PRIVATE PROPERTY. THE DIRECTOR MAY ALSO MODIFY OR ADD CONDITIONS TO ANY VALID GRADING PERMIT WHEN SUCH MODIFICATIONS OR ADDITIONS ARE REASONABLY NECESSARY TO PREVENT THE CREATION OF A NUISANCE OR HAZARD TO PERSONS OR TO PUBLIC OR PRIVATE PROPERTY. SUCH CONDITIONS MAY INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWNG:
    A. IMPROVEMENT OF EXISTING GRADING TO CONFORM WITH THE GRADING ORDINANCE, AND;
    B. REQUIREMENTS FOR FENCING OF EXCAVATIONS OR FILLS THAT WOULD OTHERWISE BE HAZARDOUS, AND;
    C. ADEQUATE DUST CONTROL MEASURES.
12. ALL OPERATIONS CONDUCTED ON THE PREMISES, INCLUDING THE WARMING UP, REPAIR, ARRIVAL, DEPARTURE OR RUNNING OF TRUCKS, EARTH MOVING EQUIPMENT, CONSTRUCTION EQUIPMENT OR ANY OTHER ASSOCIATED GRADING EQUIPMENT SHALL BE LIMITED TO THE PERIOD BETWEEN 7:00AM AND 6:00PM MONDAY THROUGH SATURDAY. NO EARTH MOVING OR GRADING SHALL BE CONDUCTED ON SUNDAYS OR HOLIDAYS.
13. THE CONTRACTOR SHALL VERIFY THE EXISTENCE AND LOCATION OF ALL UTILITES BEFORE COMMENCING WORK. NOTICE OF THE PROPOSED WORK SHALL BE PROVIDED TO THE FOLLOWING AGENCIES BY CALLING 1–800–422–4133 FOR UTILITY CONTACT INFORMATION
    A. SAN DIEGO GAS AND ELECTRIC
    B. PHONE SERVICE
    C. CABLE TV SERVICE
    D. WATER UTILITY
    E. SEWER UTILITY
14. APPROVAL OF THESE PLANS BY THE DIRECTOR OF PLANNING AND LAND USE DOES NOT AUTHORIZE ANY WORK OR GRADING TO BE PERFORMED UNTIL THE PROPERTY OWNER'S PERMISSION IS OBTAINED, RIGHT TO ENTRY FORM COMPLETED AND VALID GRADING PERMIT ISSUED.
15. THE ISSUANCE OF A GRADING PERMIT SHALL CONSTITUTE AN AUTHORIZATION TO PERFORM ONLY THAT WORK WHICH IS DESCRIBED OR SHOWN ON THE GRADING PERMIT APPLICATION AND APPROVED GRADING PLANS. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ANY CONDITIONS IMPOSED BY THE DIRECTOR OF PLANNING AND LAND USE AND IN ACCORDANCE WITH THE GRADING ORDINANCE.
16. EARTHWORK QUANTITIES:

EXCAVATION:	3,000	CUBIC YARDS
FILL:	3,225	CUBIC YARDS
IMPORT:	225	CUBIC YARDS
EXPORT:	0	CUBIC YARDS

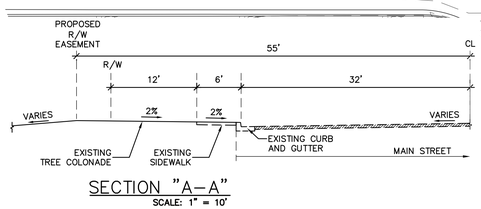
STORM DRAIN STRUCTURE SCHEDULE

ST#	STRUCTURE TYPE	CASTING (NEENAH)	COVER TYPE	RIM ELEVATION	INVERT ELEVATIONS	PIPE DIAMETER	CONNECT TO ST#
*M.H. #A	3'ø M.H.	SAN DIEGO REGIONAL STANDARD DWG M–2	SOLID LID	1417.50	1412.50 1416.50	6" – E 2" – W	BMP #1 –
M.H. #B	3'ø M.H.	SAN DIEGO REGIONAL STANDARD DWG M–2	SOLID LID	1420.53	1417.37 1417.37	13" x 22" – E 18" – N	EXISTING PIPE M.H. #C
M.H. #C	3'ø M.H.	SAN DIEGO REGIONAL STANDARD DWG M–2	SOLID LID	1419.55	1417.03 1417.03	18"" – S 18" – W	M.H. #B F.E.S.
F.E.S.	CONCRETE FLARED END SECTION	~	GALVANIZED STEEL ANIMAL GRATE	~	1417.00	18" – E	M.H. #C

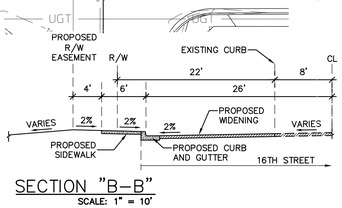
*STORM STRUCTURE TO INCLUDE PUMP TO DISCHARGE AT ALLOWABLE RELEASE RATE

BIOFILTRATION BASIN SCHEDULE

BMP#	ELEV.	RISER RIM ELEV.	SUBDRAIN ORIFICE ELEV.	SUBDRAIN ORIFICE DIA.
BMP #1	1416.50	1417.50	1413.50	1.5"



SECTION "A–A"
SCALE: 1" = 10'



SECTION "B–B"
SCALE: 1" = 10'

LEGEND

1420	EXISTING CONTOUR LINE
1420	PROPOSED CONTOUR LINE
X 1420.00	PROPOSED SPOT ELEVATION AT PAVEMENT
X 1420.00 FG	PROPOSED SPOT ELEVATION AT FINISH GRADE
X 1420.00 BC	PROPOSED SPOT ELEVATION AT BACK OF CURB
X 1420.00 C	PROPOSED SPOT ELEVATION AT TOP OF CONCRETE
X 1420.00 G	PROPOSED SPOT ELEVATION AT GUTTER
X 1420.00 EX	EXISTING SPOT ELEVATION AT PAVEMENT
X 1420.00 MATCH 1420.00 EXIST.	PROPOSED SPOT ELEVATION TO MATCH EXISTING SPOT ELEVATION
	PROPOSED FIRE HYDRANT
ST	PROPOSED STORM DRAIN STRUCTURES
	DRAINAGE FLOW ARROW

STORMWATER MANAGEMENT NOTES

1. DURING THE RAINY SEASON FROM OCTOBER 1ST TO APRIL 30TH THE AMOUNT OF EXPOSED SOIL ALLOWED AT ONE TIME SHALL NOT EXCEED THAT WHICH CAN BE ADEQUATELY PROTECTED WITHIN 48 HOURS OF A PREDICTED RAIN.
2. 125% OF ALL NEEDED BMP MATERIALS SHALL BE STORED ONSITE YEAR–ROUND TO ALLOW FULL DEPLOYMENT AND INSTALLATION WITHIN 48 HOURS OF A PREDICTED RAIN.
3. THE PROPERTY OWNER SHALL COMPLY WITH ALL APPLICABLE STORMWATER REGULATIONS AT ALL TIMES. THE BMPs THAT HAVE BEEN INCORPORATED INTO THIS PLAN SHALL BE IMPLEMENTED AND MAINTAINED TO PREVENT ONSITE EROSION AND TO PREVENT DISCHARGES OF POLLUTANTS FROM LEAVING THE SITE. MAINTENANCE OF BMPs IS THE RESPONSIBILITY OF THE PROPERTY OWNER AND FAILURE TO PROPERLY INSTALL OR MAINTAIN THE BMPs MAY RESULT IN ENFORCEMENT ACTION BY THE COUNTY OF SAN DIEGO OR OTHERS. IF INSTALLED BMPs FAIL, THEY MUST BE REPAIRED OR REPLACED WITH AN ACCEPTABLE ALTERNATE AS SOON AS IT IS SAFE TO DO SO.
4. PERIMETER SEDIMENT CONTROL BMPs SHALL BE INSTALLED IMMEDIATELY AFTER THE AREA TO BE GRADED IS BRUSHED OR CLEARED, BUT PRIOR TO THE START OF GRADING OPERATIONS.
5. EROSION CONTROL BMPs USED FOR SLOPE STABILIZATION SHALL BE INSTALLED AS SOON AS THE FINISHED SLOPES ARE COMPLETE.

PRELIMINARY GRADING PLANS
NOT FOR CONSTRUCTION

IngenAE
301 N. Main Street, Suite B
South Bend, IN 46601
www.ingenae.com
(574) 400-2167

PROPERTY OWNER INFORMATION

NAME: ALDI, INC.

ADDRESS: 12661 ALDI PLACE
MORENO VALLEY, CA 92555

TELEPHONE NUMBER: 951–530–5750
(24 HOUR CONTACT NUMBER)

SITE A.P.N. NUMBER: 281–171–04–00

SITE ADDRESS: MAIN & 16TH STREET
RAMONA, CA 92065

GRADING ON ADJACENT PARCELS

LIST ANY ADJACENT PARCELS UNDER THE SAME OWNERSHIP AS THIS PARCEL FOR WHICH A GRADING PLAN HAS BEEN SUBMITTED OR A GRADING PERMIT ISSUED:

APN(s):

PROPERTY OWNER CERTIFICATION

I CERTIFY THAT I HAVE READ AND UNDERSTAND THE STORMWATER MANAGEMENT NOTES AND THE GRADING NOTES:

OWNER'S SIGNATURE (REQUIRED): DATE:

DISTURBED AREA CALCS

PAD + SLOPES:	90,272	SF
DRIVEWAY:	1,732	SF
PRIMARY SEPTIC:	0	SF
TOTAL:	108,910	SF

IF ≥1 AC, PROVIDE WDID# : TBD

FIRE CLEARING: 0 SF

IF FIRE CLEARING AREA = 0
"ALL REQUIRED FIRE CLEARING WILL NOT CREATE A LAND DISTURBANCE ACTIVITY AS DEFINED BY COUNTY CODE."

PLAN CHECK/PERMITS

BUILDING PERMIT
PLAN CHECK NUMBER:

PARCEL MAP NUMBER: MAP 643, RAMONA LOT 49

ENGINEER OF WORK

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT AND THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT.

NAME: RYAN A. VLIEK DATE: 02/20/20

RCE NO: C 82980 EXPIRES: 09/30/20

PRIVATE CONTRACT

COUNTY OF SAN DIEGO
PLANNING AND DEVELOPMENT SERVICES

MINOR GRADING PLAN FOR:
ALDI INC.

GRADING PLAN

SHEET: C.2 OF

APPROVED PLANNING AND DEVELOPMENT SERVICES
BY: DATE:

GRADING PERMIT NUMBER:
PDS2018–STP–18–021

MINOR GRADING PLAN

ATTACHMENT 6

Copy of Project's Drainage Report

This is the cover sheet for Attachment 6.

If hardcopy or CD is not attached, the following information should be provided:

Title:
Prepared By:
Date:

This page was left intentionally blank.

ALDI Inc. – Ramona, CA
IngenAE, LLC
Storm Water Calculations

ALDI INC.

MAIN STREET & 16TH STREET
RAMONA, CA 92065

DRAINAGE STUDY

December 16, 2019

ALDI Inc. – Ramona, CA
IngenAE, LLC
Storm Water Calculations

DRAINAGE STUDY SUMMARY

PROJECT DESCRIPTION

The proposed 2.5 acre ALDI development is located at the northwest corner of Main Street (CA-67) and 16th Street in Ramona, CA. The site is bordered by existing commercially zoned parcels on all sides. ALDI is proposing to construct a new 19,857 sft grocery store with associated, parking lot, utilities, stormwater management, landscaping and irrigation. Improvements to the surrounding right of way, including the widening of 16th street adjacent to the project, are also proposed as part of this project. The existing site is vacant and generally drains from the south towards the northwest. There is no existing drainage conveyance network through the site. There are no existing drainage structures. The site sheet flows to a single existing onsite discharge point at the northwest portion of the site onto Ramona Street and adjacent properties. There is also run-on drainage that flows from the undeveloped property directly east of the site, via an old existing culvert pipe under 16th street that discharges on to the site at the east side of the property. The runoff from the proposed site will sheet flow from the proposed parking lot areas into the biofiltration basin located at the north end of the site. The landscape areas will drain into the parking area or proposed drainage swales that discharge into the biofiltration basin. The storm water that does not infiltrate within the basin, will be released at a restricted rate to Ramona Street at the existing condition discharge location. The run-off from the new improvements in the 16th street R/W will flow into and be fully captured by tree wells located within the proposed sidewalk area. The existing storm water run-on from the adjacent site to the east will be diverted around the proposed site and discharge to Ramona Street at the existing condition discharge location. This report will present and summarize the analysis and computations for determining the hydrologic and hydraulic sizing based on the requirements from the County of San Diego Hydrology Manual and Hydraulic Design Manual.

COMPUTATIONAL METHOD

The hydrologic and hydraulic design sizing was based on the guidelines from the County of San Diego Hydrology Manual and Hydraulic Design Manual. The FAA Method to calculate overland flows along with the shallow concentrated flow calculation from the Caltrans Highway Design Manual were utilized to determine the Time of Concentrations. The Rational Method was used to calculate runoff and the Rational Hydrograph Procedure was followed to determine the detention volume requirements. Open channel capacity equations were based on the San Diego County Hydraulic Design Manual.

RESULTS/CONCLUSION

The proposed design will adequately mitigate the storm water after the proposed ALDI site is constructed.

	C	Tc	I	A	Q100 w/o Mit	Q100 w/ Mit.
Pre-Development	0.23	14 min	4.34 in/hr	2.5 acres	2.5 cfs	-
Post-Development	0.63	10.5 min	5.22 in/hr	2.5 acres	8.22 cfs	2.13 cfs

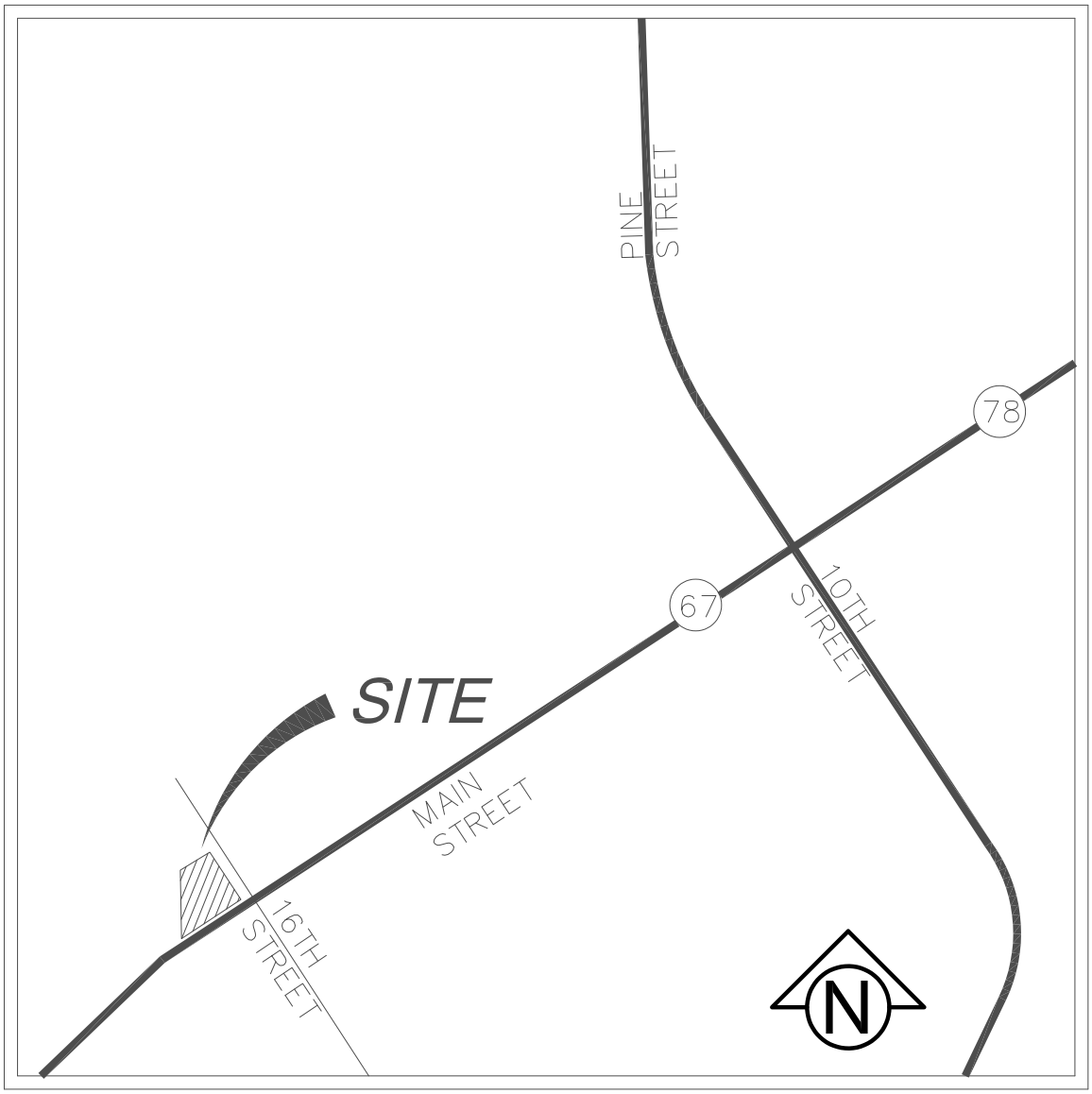
The proposed project will not alter the existing drainage patterns off-site, including erosion or siltation to streams or rivers. Although the project will create additional runoff from the existing undeveloped conditions, mitigation through a proposed biofiltration basin that will be discharged at a restricted release rate will reduce the surface runoff exiting the site to at or below the existing conditions. This will ensure the existing storm water drainage system beyond the site are not exceeded. The project will not be proposing any structures or housing within a 100-year flood hazard area.

DECLARATION OF RESPONSIBLE CHARGE:

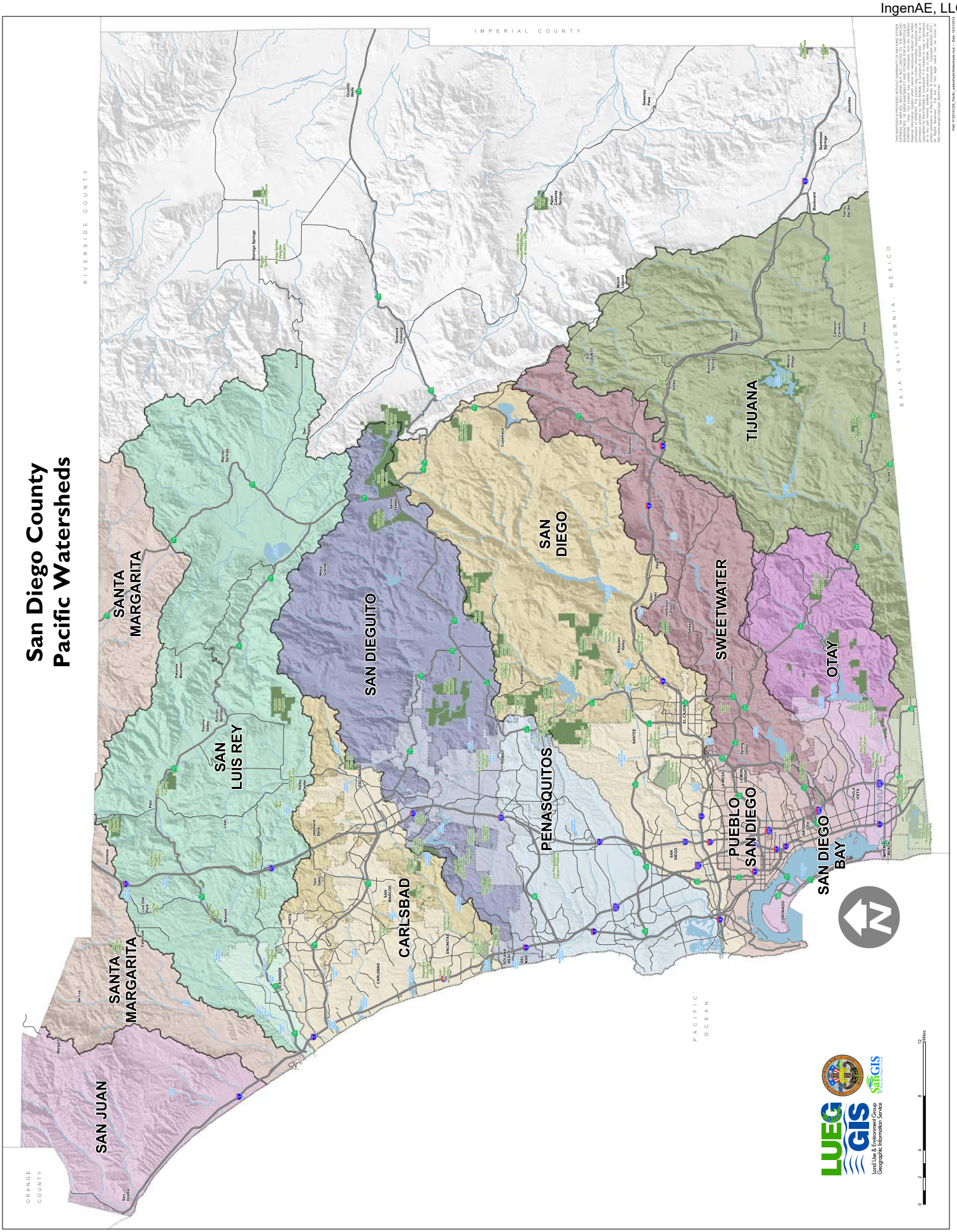
I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF RAMONA IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

RYAN A. VLIEK	C 82980	12/16/2019
NAME	RCE#	DATE



VICINITY MAP


San Diego County
Pacific Watersheds
IMPERIAL COUNTY
RIVERSIDE COUNTY
ORANGE COUNTY
BAJA CALIFORNIA, MEXICO
PACIFIC OCEAN
SANTA MARGARITA
SAN LUIS REY
SAN DIEGUITO
SAN DIEGO
SWEETWATER
OTAY
TIJUANA
PENASQUITOS
CARLSBAD
PUEBLO SAN DIEGO
SAN DIEGO BAY
SAN JUAN
SANTA MARGARITA
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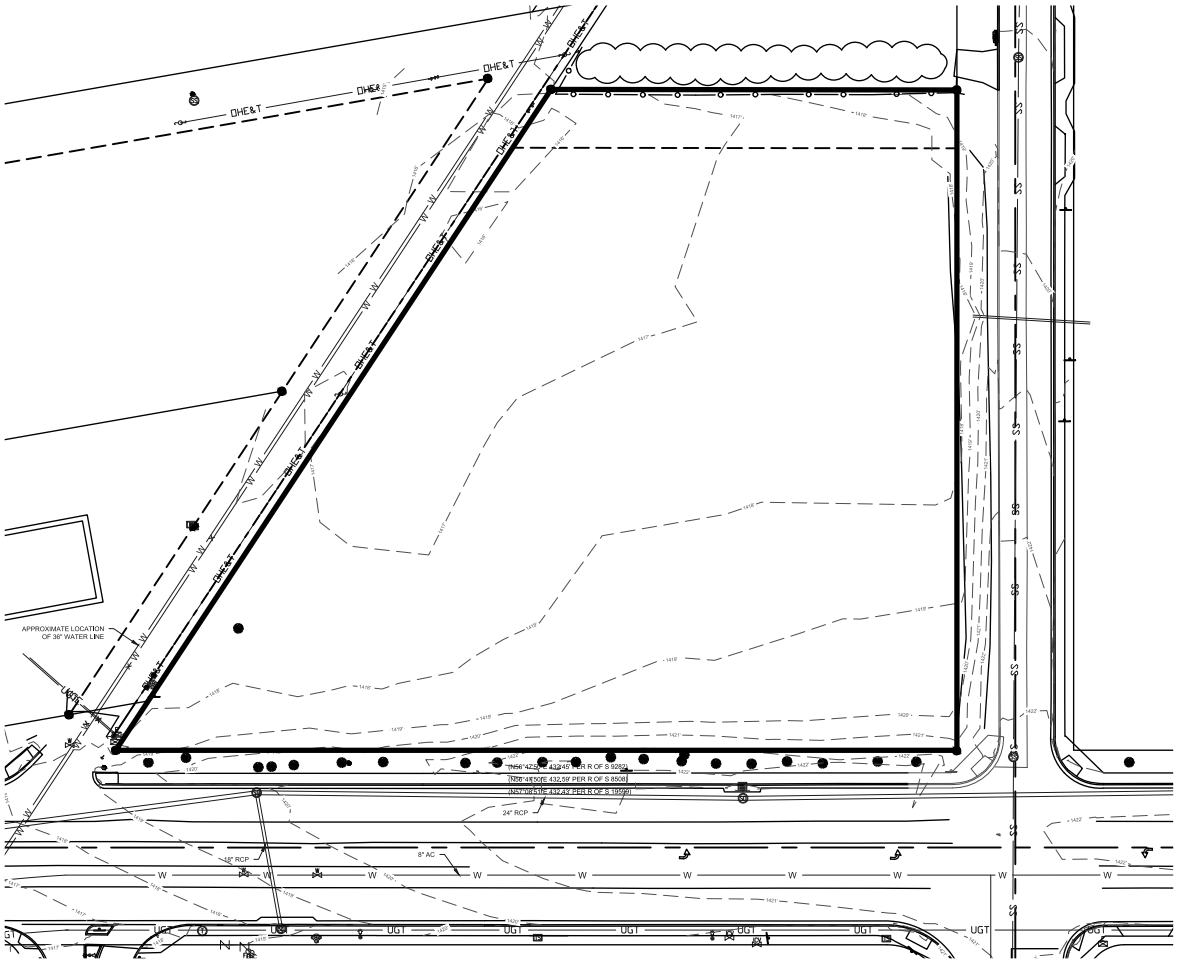
SAN DIEGUITO WATERSHED MAP



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ALDI Inc.
12661 ALDI PLACE
MORENO VALLEY, CA
92555-5703
(951) 330-9700

Project Name & Location:

ALDI
16TH STREET &
MAIN STREET
RAMONA, CA

Drawing Name:
EXISTING SITE PLAN

Date:	Project No.
12/16/19	AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	

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Ramona, CA
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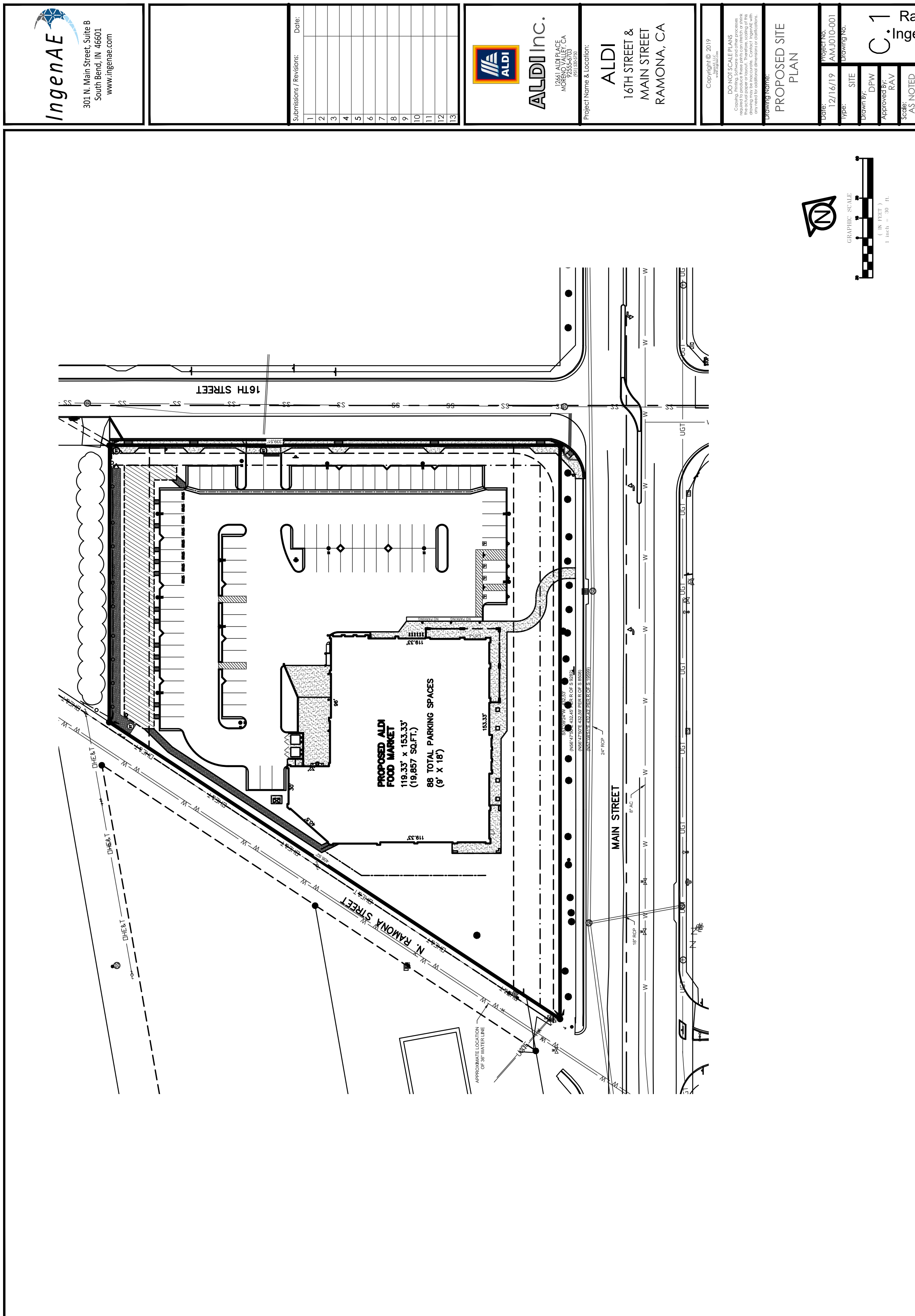
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ALDI Inc.
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92555-6703
Project Name & Location:
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16TH STREET &
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RAMONA, CA
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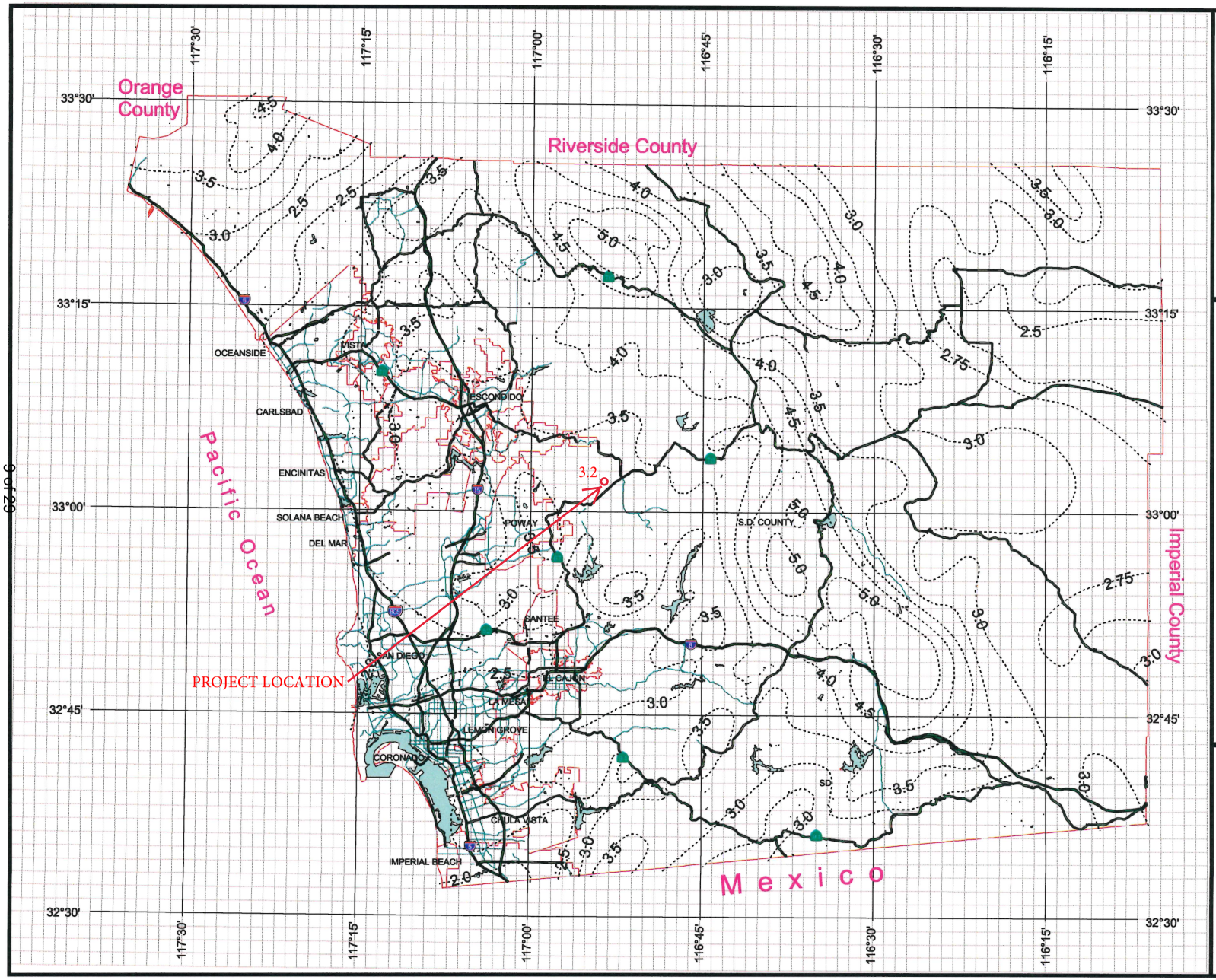
DO NOT SCALE PLANS
Drawing Name:
PROPOSED SITE PLAN
Date:
12/16/19
Type:
SITE
Drawn By:
DPW
Approved By:
RAV
Scale:
AS NOTED
Project No.
AMJ010-001
Drawing No.
C.1
GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.
16TH STREET
MAIN STREET
N. RAMONA STREET
PROPOSED ALDI
FOOD MARKET
119.33' x 153.33'
(19,857 SQ.FT.)
88 TOTAL PARKING SPACES
(9' X 18')
119.33'
153.33'
24" RCP
18" RCP
8" AC
APPROXIMATE LOCATION
OF 36" WATER LINE



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

3 0 3 Miles

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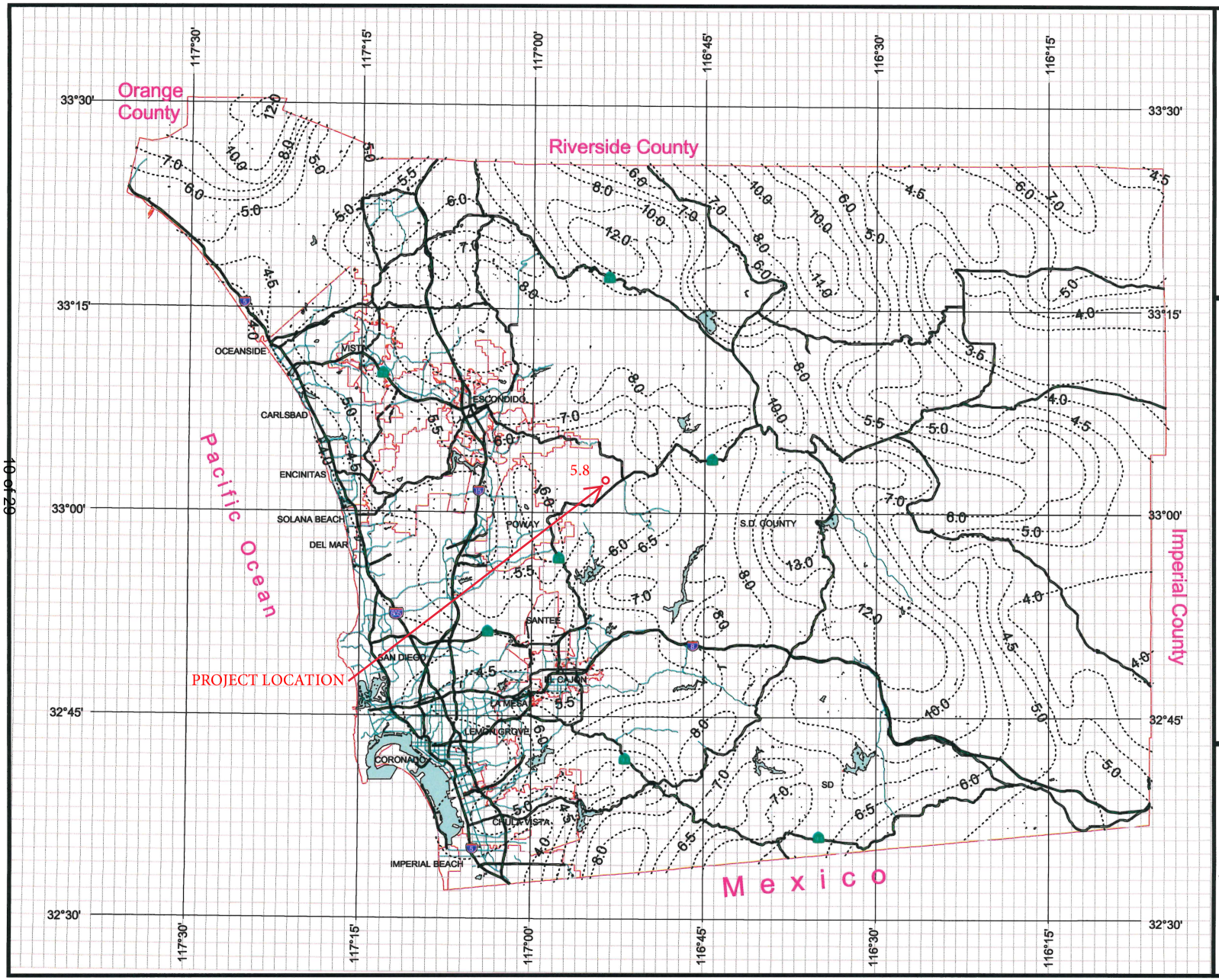

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works Geographic Information Services

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N W E S

3 0 3 Miles

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Hydrologic Soil Group—San Diego County Area, California
(ALDI Inc. - Ramona, CA)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 1:24,000.

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: San Diego County Area, California
Survey Area Data: Version 14, Sep 16, 2019

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

Date(s) aerial images were photographed: Dec 31, 2009—Oct 25, 2017

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BIC	Bonsall sandy loam, 2 to 9 percent slopes	D	0.9	18.8%
FaC2	Fallbrook sandy loam, 5 to 9 percent slopes, eroded	C	0.8	16.3%
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	C	3.0	64.9%
Totals for Area of Interest			**4.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

B.1.2 Step 1B - Tributary Area

Determine the total tributary area through evaluation of the drainage area delineations performed as outlined in Section 3. These areas will be analyzed in additional detail in Step 1C below.

B.1.3 Step 1C - Runoff Factor

Runoff factors (C) represent the ratio of storm water runoff over rainfall that is anticipated for a particular surface type. Impervious surfaces typically have high runoff factors (0.90) as nearly all rainfall is converted into runoff. Pervious surfaces typically have low runoff factors (0.10) as much of the rainfall is retained in natural surface features. Applicants should evaluate all of the surface coverages within a drainage area and assign runoff factors consistent with the values in Table B.1-1.

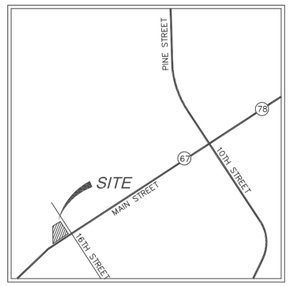
Table B.1**-1: Runoff factors for surfaces draining to BMPs – Pollutant Control BMPs**

Category	Surface Type	Runoff Factor (C)
Impervious Surfaces	Roofs, Concrete, Asphalt, Unit Pavers (grouted)	0.90
Semi-Pervious Surfaces	Decomposed Granite, Cobbles, Crushed Aggregate, Compacted soil (unpaved parking)	0.30
Engineered Pervious Surfaces	Green Roofs per SD-C Permeable Pavement per SD-D, Amended Soils per SD-F, Landscaped/Mulched Soils	0.10
Natural Pervious Surfaces	Type A Soil	0.10
	Type B Soil	0.14
	Type C Soil	0.23
	Type D Soil	0.30
Impoundments	Swimming pools, fountains, ponds, etc.	0.00
Dispersion Areas	Areas routed to or serving as a dispersion area per SD-B	See Dispersion Area Text Below

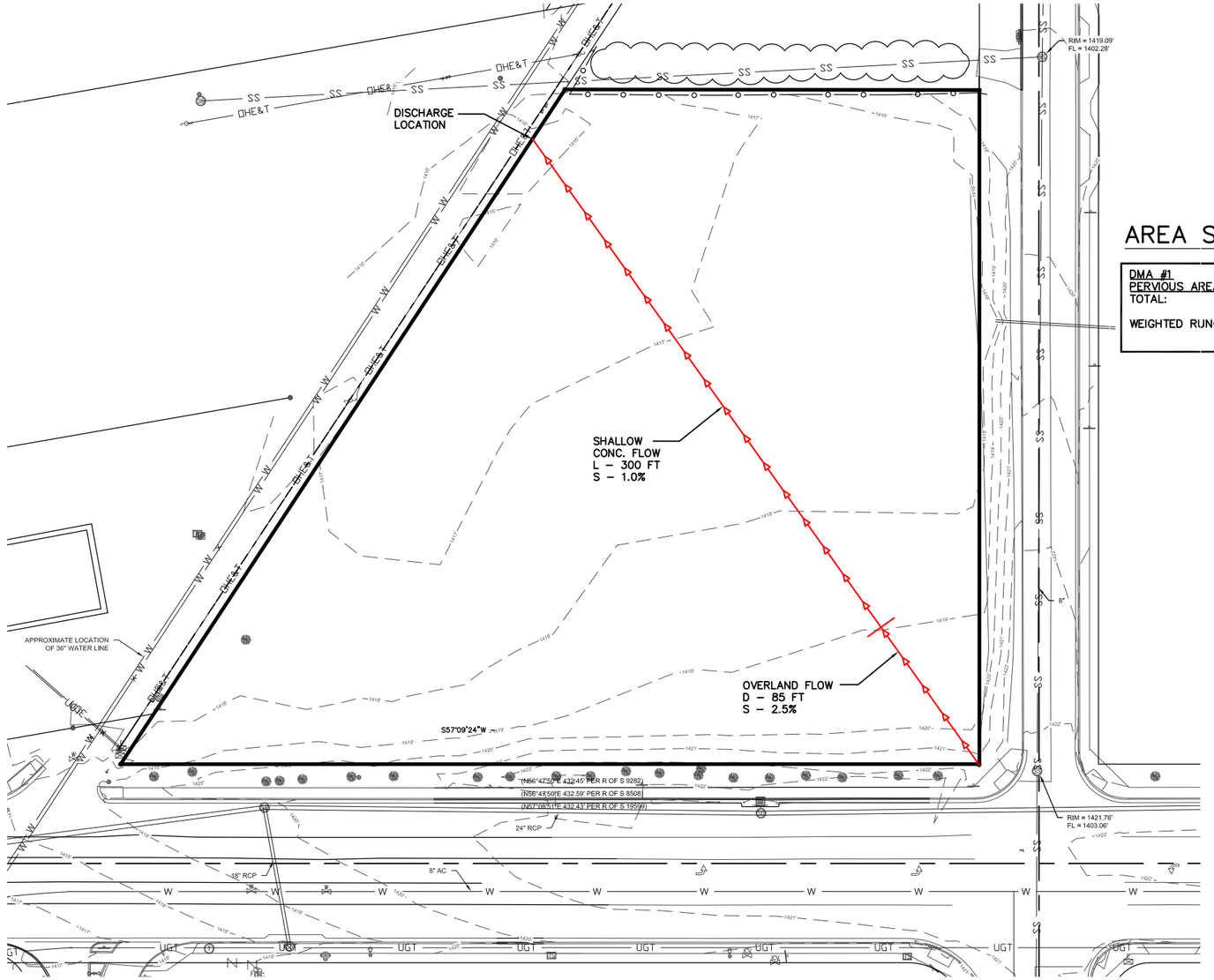
If a drainage area is comprised of more than one surface type, an area-weighted runoff factor must be calculated per the following equation where C represents the runoff coefficient and A represents the area of each surface.

SITE DETENTION CALCULATIONS

CALCULATIONS



VICINITY MAP



AREA SUMMARY

DMA #1	
PERVIOUS AREA:	2.500 ACRES
TOTAL:	2.500 ACRES

WEIGHTED RUNOFF FACTOR = 0.23

GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.

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12661 ALDI PLACE
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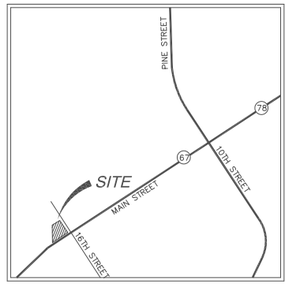
92555-6703
(951) 530-5750

Project Name & Location:

ALDI
16TH STREET &
MAIN STREET
RAMONA, CA

Drawing Name:
EXISTING TOC EXHIBIT

Date:	Project No.: AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	

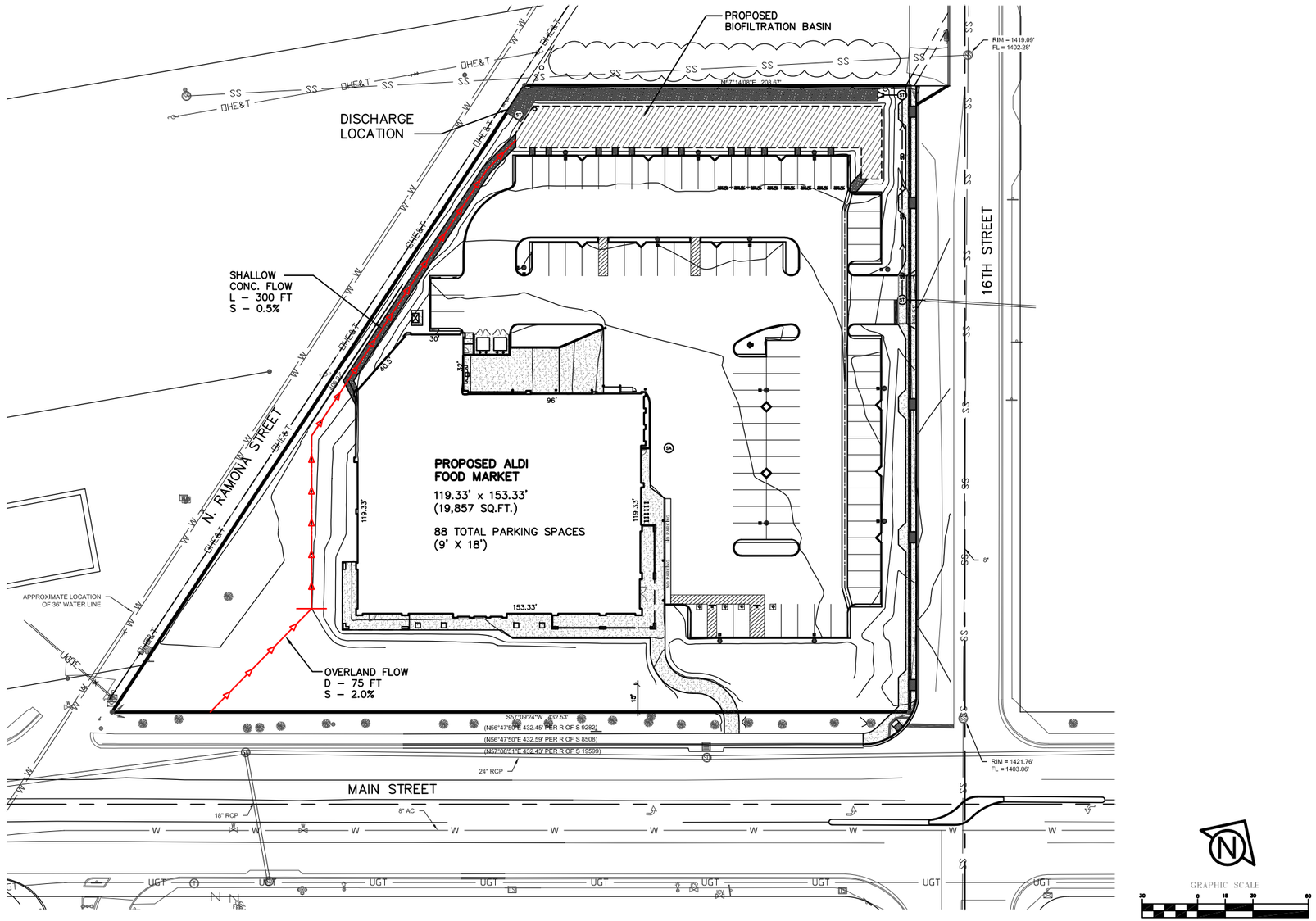


VICINITY MAP

AREA SUMMARY

PROJECT SITE	
IMPERVIOUS AREA:	1.5 ACRES
PERVIOUS AREA:	1.0 ACRES
TOTAL:	2.5 ACRES

WEIGHTED RUNOFF FACTOR = 0.63



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(951) 330-5750

Project Name & Location:

ALDI
16TH STREET &
MAIN STREET
RAMONA, CA

Drawing Name:
PROPOSED TOC
EXHIBIT

Date:	Project No.
	AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	

INGENAE, LLC	Job # AMJ010-001	Sheet	
301 N. MAIN ST, SUITE B	By	Date	
SOUTH BEND, INDIANA 46601	Ck'd	Date	

Project : ALDI INC - RAMONA, CA Subject : Storm Water Volume Calculations

TIME OF CONCENTRATION CALCULATION

Per San Diego County Hydrology Manual

Overland Flow
Ti = (1.8*(1.1-C)*(D)^1/2)/(S)^1/3

Shallow Concentrated Flow **
V = (3.28)*k*S^1/2 **Tt = L/(60*V)**

Tc = Ti + Tt

** Per Caltrans HDM

EXISTING SITE

Gross Area -	2.5	acre
Impervious Area (C = 0.90) -	0.0	acre
Pervious Area (C = 0.23) -	2.5	acre

C = 0.90*(% Impervious + Cp*(1-% Impervious)
C = 0.23

Overland Flow			**Shallow Concentrated Flow**		
D =	85	ft	**k =**	0.457	**
S =	2.5	%	**S =**	1.0	%
Ti =	10.6	min	**L =**	300	ft
			Tt =	3.34	min
Tc =	14.0	min			

PROPOSED SITE

Gross Area -	2.5	acre
Impervious Area (C = 0.90) -	1.5	acre
Pervious Area (C = 0.23) -	1.0	acre

C = 0.90*(% Impervious + Cp*(1-% Impervious)
C = 0.63

Overland Flow			**Shallow Concentrated Flow**		
D =	75	ft	**k =**	0.457	**
S =	2.0	%	**S =**	0.5	%
Ti =	5.8	min	**L =**	300	ft
			Tt =	4.72	min
Tc =	10.5	min			

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Project : ALDI INC - RAMONA, CA	Subject :	Storm Water Volume Calculations	

DETENTION VOLUME CALCULATION

Per San Diego County Hydrology Manual

Allowable Release Rate

Q = C * I * A

Existing Site

Gross Area -	2.5	acre
Impervious Area (C = 0.90) -	0.0	acre
Pervious Area (C = 0.23) -	2.5	acre

C = 0.90*(% Impervious + Cp*(1-% Impervious)

C = 0.23

I = 7.44*P6*Tc^-0.645

Tc =	14	min
P6 =	3.20	inches (100 yr event)
I =	4.34	in/hr

$Q_{allowed}$ = 2.50 cfs **Q_{max} = 2.13 cfs**

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Job # AMJ010-001 Sheet
By Date
Ck'd Date

Project : ALDI INC - RAMONA, CA Subject : Storm Water Volume Calculations

DETENTION VOLUME CALCULATION

Per San Diego County Hydrology Manual

Proposed Site

Gross Area - 2.5 acre
Impervious Area (C = 0.90) - 1.5 acre
Pervious Area (C = 0.23) - 1.0 acre

C = 0.90*(% Impervious + Cp*(1-% Impervious)
C = 0.63

Tc = 10.5 min
P6 = 3.20 inches (100 yr event)

PT(N) = 0.124*P6*(N*Tc)^0.355
Q(N)=60*C*A*P(N)/Tc

Hydrograph/Flow

N	PT(N)	P(N)	Q(N)	N	TT(N)	PT(N)	Q(N)
0	0	0	0	0	0	0	0
1	0.91	0.91	8.25	24	15	0.04	0.38
2	1.17	0.26	2.30	23	30	0.04	0.39
3	1.35	0.18	1.63	21	45	0.05	0.42
4	1.50	0.15	1.31	20	60	0.05	0.43
5	1.62	0.12	1.11	18	75	0.05	0.46
6	1.73	0.11	0.98	17	90	0.05	0.48
7	1.82	0.10	0.88	15	105	0.06	0.52
8	1.91	0.09	0.80	14	120	0.06	0.55
9	1.99	0.08	0.74	12	135	0.07	0.61
10	2.07	0.08	0.69	11	150	0.07	0.64
11	2.14	0.07	0.64	9	165	0.08	0.74
12	2.21	0.07	0.61	8	180	0.09	0.80
13	2.27	0.06	0.57	6	195	0.11	0.98
14	2.33	0.06	0.55	5	210	0.12	1.11
15	2.39	0.06	0.52	3	225	0.18	1.63
16	2.45	0.06	0.50	2	240	0.26	2.30
17	2.50	0.05	0.48	1	255	0.91	8.25
18	2.55	0.05	0.46	4	270	0.15	1.31
19	2.60	0.05	0.45	7	285	0.10	0.88
20	2.65	0.05	0.43	10	300	0.08	0.69
21	2.69	0.05	0.42	13	315	0.06	0.57
22	2.74	0.04	0.41	16	330	0.06	0.50
23	2.78	0.04	0.39	19	345	0.05	0.45
24	2.83	0.04	0.38	22	360	0.04	0.41

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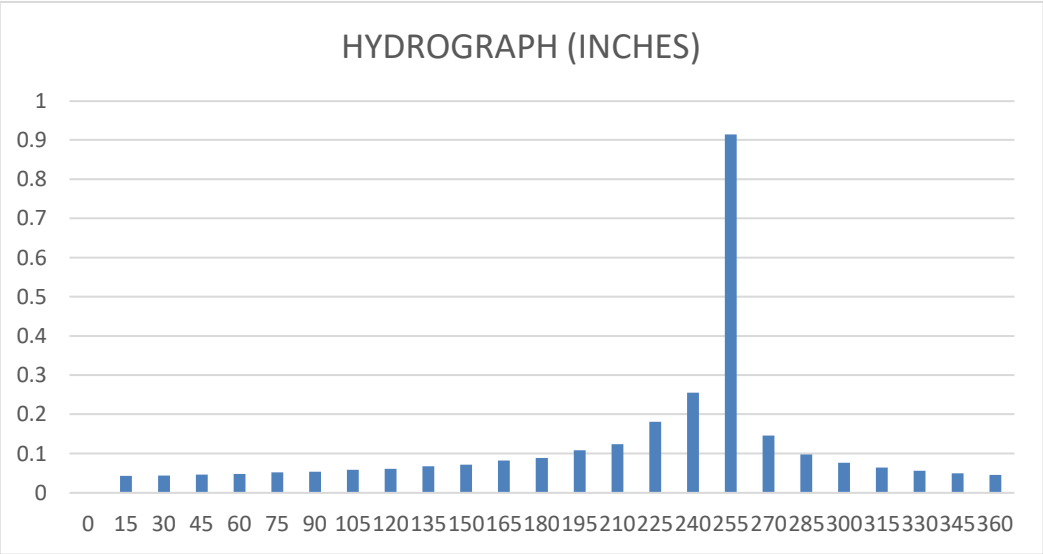
Job # AMJ010-001 Sheet
By Date
Ck'd Date

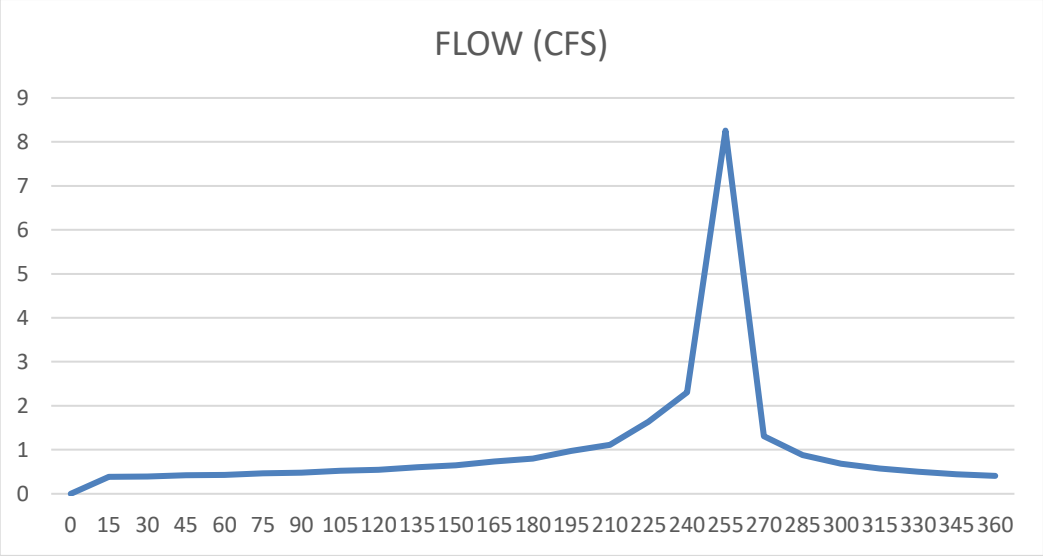
Project : ALDI INC - RAMONA, CA Subject : Storm Water Volume Calculations

Detention Required

Time (min)	Inflow (cfs)	Inflow Volume (cft)	Outflow (cfs)	Storage Rate (cfs)	Volume Req (cft)	Cumulative Volume Req (cft)	Pond Depth (ft)
0	0.00	0	0.00	0.00	0	0	0.00
15	0.38	344	0.51	-0.13	-114	0	0.06
30	0.39	354	0.52	-0.12	-111	0	0.06
45	0.42	376	0.53	-0.11	-103	0	0.06
60	0.43	388	0.54	-0.11	-98	0	0.06
75	0.46	416	0.56	-0.10	-88	0	0.07
90	0.48	432	0.57	-0.09	-81	0	0.07
105	0.52	470	0.59	-0.07	-65	0	0.08
120	0.55	492	0.61	-0.06	-56	0	0.08
135	0.61	546	0.64	-0.03	-31	0	0.09
150	0.64	579	0.66	-0.02	-15	0	0.10
165	0.74	664	0.71	0.03	27	27	0.11
180	0.80	720	0.74	0.06	57	85	0.12
195	0.98	880	0.81	0.16	147	232	0.15
210	1.11	1002	0.87	0.24	220	452	0.17
225	1.63	1471	1.05	0.58	524	976	0.25
240	2.30	2073	1.25	1.05	948	1,924	0.35
255	8.25	7429	2.13	6.13	5516	7,440	1.00
270	1.31	1180	2.13	-0.82	-734	6,706	1.00
285	0.88	789	2.13	-1.25	-1124	5,582	1.00
300	0.69	618	2.13	-1.44	-1296	4,286	1.00
315	0.57	517	1.90	-1.33	-1194	3,092	0.80
330	0.50	450	1.63	-1.13	-1020	2,072	0.59
345	0.45	402	1.36	-0.92	-827	1,246	0.41
360	0.41	365	1.10	-0.70	-626	619	0.27

Total Pond Depth = 1.00 ft
Total Pond Volume = 6003 cft


HYDROGRAPH (INCHES)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 15 30 45 60 75 90 105 120 135 150 165 180 195 210 225 240 255 270 285 300 315 330 345 360


FLOW (CFS)
9
8
7
6
5
4
3
2
1
0
0 15 30 45 60 75 90 105 120 135 150 165 180 195 210 225 240 255 270 285 300 315 330 345 360

INGENAE, LLC	Job # AMJ010-001	Sheet
301 N. MAIN ST, SUITE B	By	Date
SOUTH BEND, INDIANA 46601	Ck'd	Date
Project : ALDI INC - RAMONA, CA	Subject : Storm Water Volume Calculations	

ORIFICE FLOW

Q = A*C*(2*G*H)^0.5

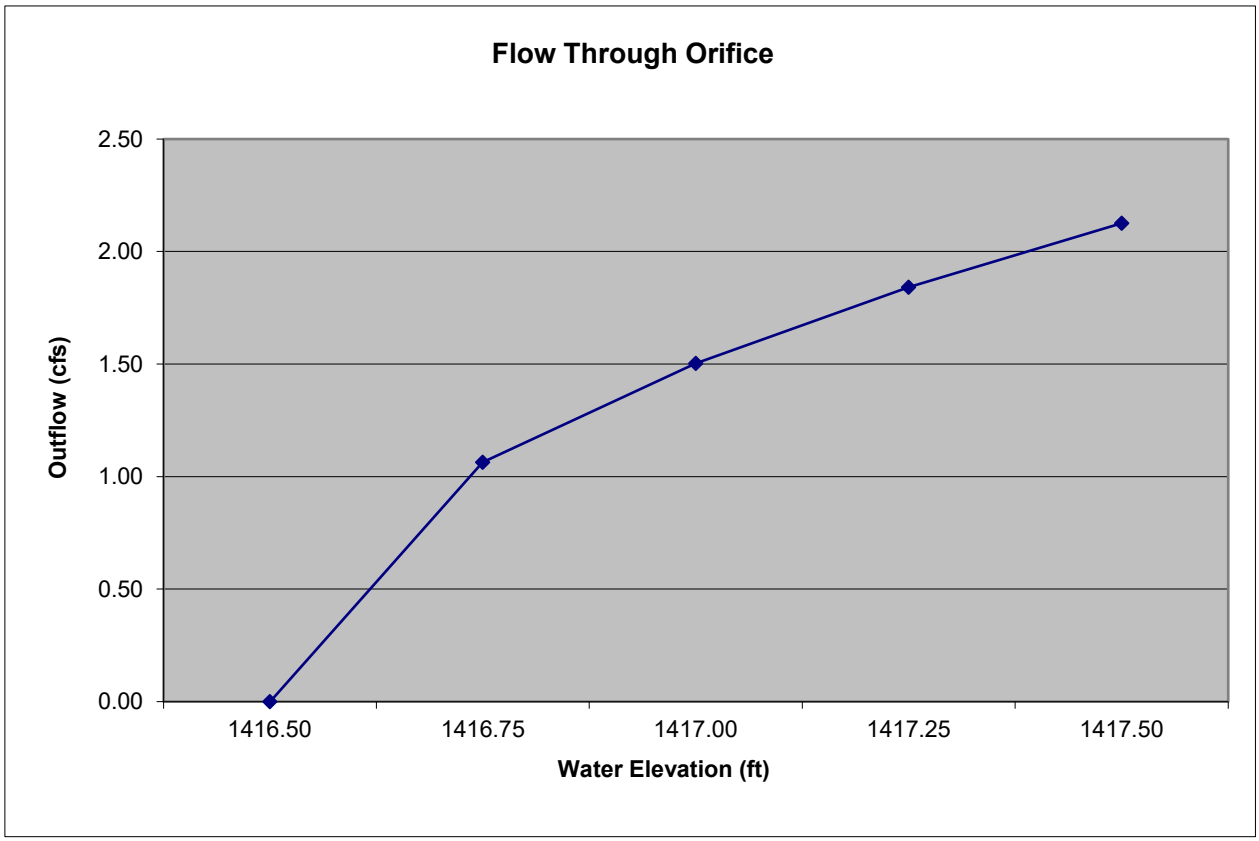
Q = Flow (cfs) **H = Head (ft)**
A = Area (ft^2) **G = 32.2 (ft/s^2)**
C = Orifice Coefficient

Orifice Diameter (in)=	**9**	***
Orifice Area (ft^2) =	**0.442**	
Proposed invert Elev. =	**1416.50**	
Orifice Coeffient =	**0.6**	**
Allowable Release Rate (cfs) =	**2.5**	

	Water Elev. (ft)	Head (ft)	Flow (cfs)
	1416.50	0.00	0.00
	1416.75	0.25	1.06
	1417.00	0.50	1.50
	1417.25	0.75	1.84
HWL	1417.50	1.00	2.13

** Per San Diego County Hydraulic/Hydrology Manual

*** Size depicted to model maximum allowable flow when water elevation is at top of basin; water will be pumped when maximum levels are reached



INGENAE, LLC	Job # AMJ010-001	Sheet	
301 N. MAIN ST, SUITE B	By	Date	
SOUTH BEND, INDIANA 46601	Ck'd	Date	
Project : ALDI INC - RAMONA, CA	Subject : Storm Water Volume Calculations		

DETENTION VOLUME

V = Volume (ft^3)
H = Height (ft)
A1 = Contour Area (ft^2)
A2 = Contour Area (ft^2)

V = H /3 * (A1 + A2 + (A1 * A2) ^ 0.5) * Contour Areas obtained from AutoCAD

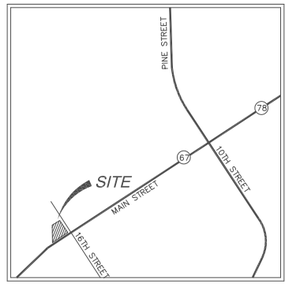
Proposed Volume in BMP #1 Above Water Quality Volume

Contour Elevation (ft)	Contour Area (ft^2)*	Depth (ft)	Volume of Pond (ft^3)	Volume of Pond (acre-ft)
1416.50	4,584	0.00	0	0.000
1417.50	7,545	1.00	6,003	0.138
		-	-	-
		-	-	-
		-	-	-

Total Storage = 6,003 ft^3

RUN-ON FLOW CONVEYANCE

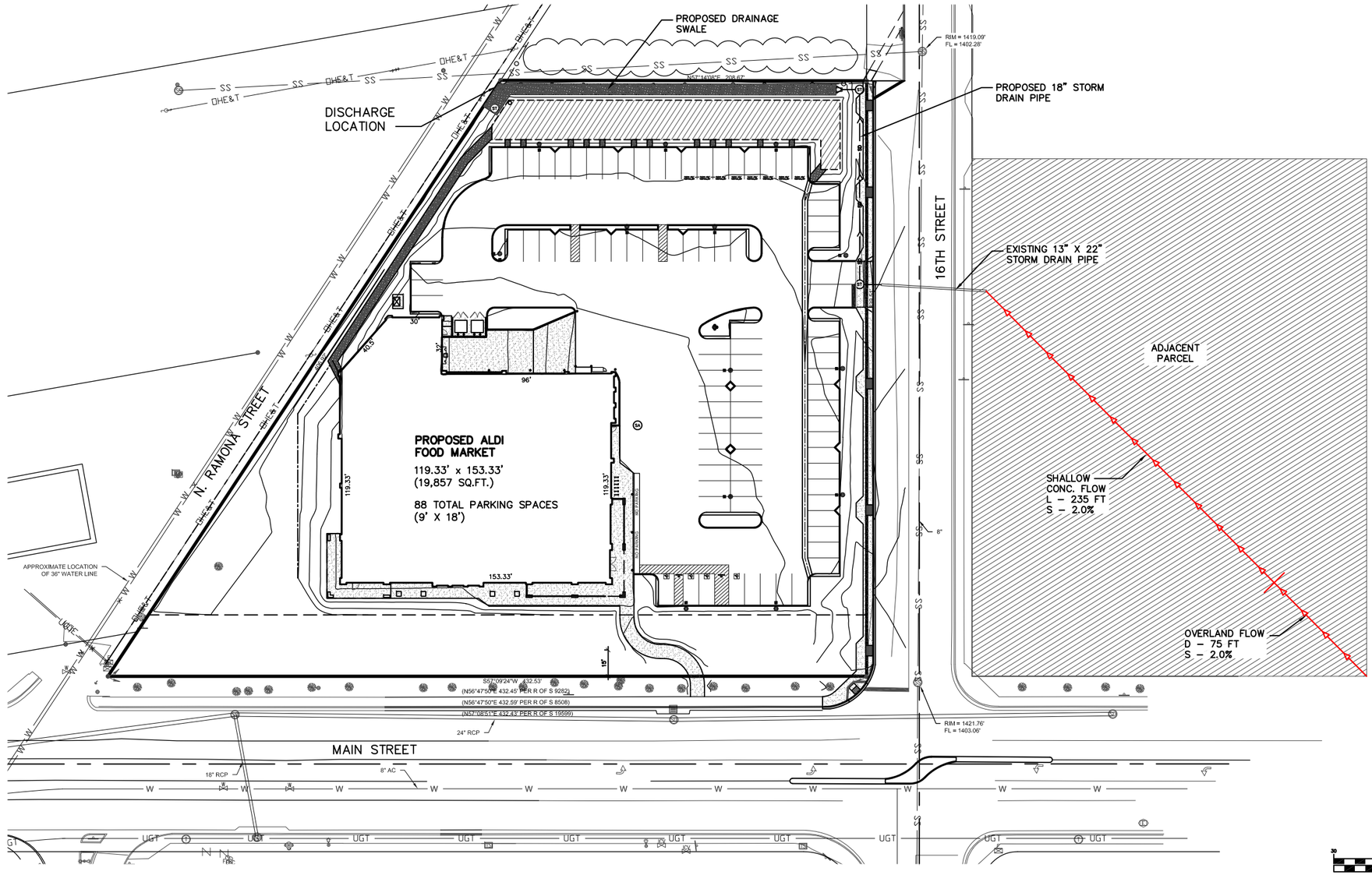
CALCULATIONS



VICINITY MAP

AREA SUMMARY

ADJACENT PARCEL (RUN-ON FLOW)	
PERVIOUS AREA:	1.5 ACRES
TOTAL:	1.5 ACRES
WEIGHTED RUNOFF FACTOR = 0.23	



IngenAE
301 N. Main Street, Suite B
South Bend, IN 46601
www.ingenae.com

Submissions / Revisions:	Date:
1	
2	
3	
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6	
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9	
10	
11	
12	
13	

ALDI Inc.
12661 ALDI PLACE
MORENO VALLEY, CA
92555-6703
(951) 330-5750

Project Name & Location:

ALDI
16TH STREET &
MAIN STREET
RAMONA, CA

Drawing Name:
ADJ. PARCEL
TOC EXHIBIT

Date:	Project No. AMJ010-001
Type: SITE	Drawing No.
Drawn By: DPW	
Approved By: RAV	
Scale: AS NOTED	

INGENAE, LLC	Job # AMJ010-001	Sheet	
301 N. MAIN ST, SUITE B	By	Date	
SOUTH BEND, INDIANA 46601	Ck'd	Date	
Project : ALDI INC - RAMONA, CA	Subject : Storm Water Volume Calculations		

TIME OF CONCENTRATION CALCULATION

Per San Diego County Hydrology Manual

Overland Flow
Ti = (1.8*(1.1-C)*(D)^1/2)/(S)^1/3

Shallow Concentrated Flow **
V = (3.28)*k*S^1/2 **Tt = L/(60*V)**

Tc = Ti + Tt

** Per Caltrans HDM

ADJACENT PARCEL (RUN-ON FLOW)

Gross Area -	1.5	acre
Impervious Area (C = 0.90) -	0.0	acre
Pervious Area (C = 0.23) -	1.5	acre

C = 0.90*(% Impervious + Cp*(1-% Impervious)
C = 0.23

Overland Flow			**Shallow Concentrated Flow**		
D =	75	ft	**k =**	0.457	**
S =	2	%	**S =**	2.0	%
Ti =	10.8	min	**L =**	235	ft
			Tt =	1.85	min
Tc =	12.6	min			

RUNOFF CALCULATION

Per San Diego County Hydrology Manual

ADJACENT PARCEL (RUN-ON FLOW)

Gross Area -	1.5	acre
Impervious Area (C = 0.90) -	0.0	acre
Pervious Area (C = 0.23) -	1.5	acre

C = 0.90*(% Impervious + Cp*(1-% Impervious)
C = 0.23

I = 7.44*P6*Tc^-0.645

Tc =	12.5	min
P6 =	3.20	inches (100 yr event)
I =	4.67	in/hr
Q_{RUN-ON} =	**1.61**	**cfs**

INGENAE, LLC	Job # AMJ010-001	Sheet
301 N. MAIN ST, SUITE B	By	Date
SOUTH BEND, INDIANA 46601	Ck'd	Date
Project : ALDI INC - RAMONA, CA	Subject : Storm Water Volume Calculations	

RUN-ON FLOW CONVEYANCE

Per San Diego County Hydraulic Design Manual

V = (1.49*R^2/3*S^1/2)/n **R = A/P**

Q = V*A

ADJACENT PARCEL (RUN-ON FLOW)

Q_{RUN-ON} = 1.61 cfs

PROPOSED PIPE CAPCACITY

Diameter =	18 in	**R =**	0.375 ft
A =	1.77 ft^2	**S =**	0.30 %
P =	4.71 ft	**n =**	0.011
V =	3.86 ft/s		
Q =	**6.81 cft/s**		

PROPOSED TRAPEZOID SWALE CAPCACITY

b =	2 ft	**y =**	0.5 ft - (minimum)
z =	4	**R =**	0.33 ft
A =	2.00 ft^2	**S =**	0.25 %
P =	6.12 ft	**n =**	0.034 (Riprap)
V =	1.04 ft/s		
Q =	**2.08 cft/s**		

ATTACHMENT 7

Copy of Project's Geotechnical and Groundwater Investigation Report

This is the cover sheet for Attachment 7.

If hardcopy or CD is not attached, the following information should be provided:

Title:
Prepared By:
Date:

This page was left intentionally blank.

Geotechnical Engineering Report

ALDI Store – Ramona

Western Corner of Main Street and 16th Street
Ramona, California

March 7, 2017

Terracon Project No. 60175002

Prepared for:
ALDI, Inc.
Moreno Valley, California

Prepared by:
Terracon Consultants, Inc.
Tustin, California

March 7, 2017

ALDI, Inc.
12661 Aldi Pl
Moreno Valley, CA 92555

Attn: Mr. Skip Janes
E: skip.janes@aldi.us
P: (951) 530-5750

Re: Geotechnical Engineering Report
ALDI Store – Ramona
Western Corner of Main Street and 16th Street
Ramona, California
Terracon Proposal No. 60175002

Dear Mr. Janes:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. These services were performed in general accordance with our Task Order dated January 6, 2017.

This geotechnical engineering report presents the results of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, infiltration systems and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Sivasubramaniam (Raj) Pirathiviraj, P.E., G.E.
Senior Engineer

F. Fred Buhamdan, P.E.
Department Manager

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TABLE OF CONTENTS (continued)

EXECUTIVE SUMMARY

A geotechnical exploration has been performed for the proposed project to be located at the western Corner of Main Street and 16th Street in Ramona, California. Terracon's geotechnical scope of work included the advancement of eight (8) test borings to approximate depths ranging between 5 and 31 feet below the ground surface (bgs).

Based on the information obtained from our subsurface exploration, the site is suitable for development of the proposed project provided the recommendations included within this report are implemented during the design and construction phases of the project. The following geotechnical considerations were identified:

- The subsurface materials generally consisted of predominantly medium dense to very dense interbedded layers of clayey sand and silty sand to the maximum depth explored at 31 feet bgs where, auger refusal was encountered in boring B-1.
- Groundwater was encountered at 20 feet bgs.
- Based on the subsurface conditions encountered at the project site, the spread footings should be supported on engineered fill extending to the minimum depth of 12 inches below the bottom of footings. The on-site clayey sand soils may be used as engineered fill, provided they are blended with the sandy soils and resulting mixture conform to the low volume change specifications.
- The interior floor slab should be supported on a minimum of 18 inches of engineered fill comprised of low volume change soils.
- Light (automobile) parking areas – 3" AC over 6" Class II AB or 5" PCC over 4" Class II AB; On-site driveways and delivery areas – 3" AC over 11" Class II AB or 6" PCC over 4" Class II AB. All pavements should be supported on a minimum of 10 inches of scarified, moisture conditioned, and compacted materials.
- The 2013 California Building Code (CBC) seismic site classification for this site is C.
- Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during construction.

This geotechnical executive summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled General Comments should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT
ALDI STORE - RAMONA
WESTERN CORNER OF MAIN STREET AND 16TH AVENUE
RAMONA, CALIFORNIA

Terracon Project No. 60175002
March 7, 2017

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the proposed structure to be located at the western corner of Main Street and 16th Street in Ramona, California. The Site Location Plan (Exhibit A-1) is included in Appendix A of this report. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- earthwork
- seismic considerations
- floor slab design and construction
- groundwater conditions
- foundation design and construction
- pavement design and construction
- infiltration systems

Our geotechnical engineering scope of work for this project included the advancement of eight (8) test borings to approximate depths ranging between 5 and 31 feet bgs where, auger refusal was encountered in boring B-1.

Logs of the borings along with a Boring Location Diagram (Exhibit A-2) are included in Appendix A of this report. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included in Appendix B of this report. Descriptions of the field exploration and laboratory testing are included in their respective appendices.

2.0 PROJECT INFORMATION

2.1 Project Description

ITEM	DESCRIPTION
Site layout	Refer to the Boring Location Diagram (Exhibit A-2 in Appendix A).
Structures	The project will include construction of a 19,056 square-foot new Aldi Store.
Construction	We assume that the proposed building will be a single-story, structure with a concrete slab-on-grade floor, and will be supported on a shallow spread footing foundation system.
Finished floor elevation	Within one foot of existing grade (assumed).

ITEM	DESCRIPTION
Maximum loads (assumed)	Columns: 40 to 80 kips Walls: 1 to 2 klf Slabs: 150 psf max.
Grading	Grading will include overexcavation and backfill to bring the site back to grade.
Traffic loading	Assumed Design Traffic Index (TI's): Automobile Parking Areas: 4.5 On-site Driveways and Delivery Areas: 6.5

2.2 Site Location and Description

Item	Description
Location	This project is located at the western corner of the intersection of Main Street and 16th Street in Ramona, San Diego County, California.
Existing site features	Vacant farm land.
Surrounding developments	Northeast: 16th Street Southeast: Main Street Northwest: Residential West: N Ramona Street
Current ground cover	Soils and vegetation.
Existing topography	Relatively level project site.

3.0 SUBSURFACE CONDITIONS

3.1 Site Geology

The site is situated within the Southern Peninsular Ranges Geomorphic Province in Southern California. Geologic structures within this Province trend mostly northwest, in contrast to the prevailing east-west trend in the neighboring Transverse Ranges Geomorphic Province to the north. The Peninsular Range Province extends into lower California, and is bounded by the Colorado Desert to the east, the Pacific Ocean to the west and the San Gabriel and San Bernardino mountains to the north. [1,2] Surficial geologic units mapped at the site consists of Quaternary aged recent alluvium[3].

[1] Harden, D. R., "*California Geology, Second Edition*," Pearson Prentice Hall, 2004.
[2] Norris, R. M. and Webb, R. W., *"Geology of California, Second Edition,"* John Wiley & Sons, Inc., 1990.
[3] Division of Mines and Geology, "*Geologic Map of California, Olaf P. Jenkins Edition, Santa Ana Sheet*", Compilation by Thomas H. Rogers, 1973, Scale 1:250,000.

3.2 Typical Subsurface Profile

Specific conditions encountered at the boring locations are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details for the borings can be found on the boring logs included in Appendix A. Based on the results of the borings, subsurface conditions encountered on the project site is predominantly medium dense to very dense interbedded layers of clayey sand and silty sand to the maximum depth explored at 31 feet bgs. In Boring B-1, auger refusal was encountered at the depth of 31 feet bgs.

Laboratory tests were conducted on selected soil samples and the test results are presented in Appendix B and on the boring logs. Atterberg limit test results indicate that the near surface clayey sand materials exhibit low to medium plasticity. Consolidation/swell tests indicate that the clayey sand materials encountered at approximate depth of 2½ feet have no swell potential when saturated under normal footing load of 2,000 psf.

3.3 Groundwater

Groundwater was encountered at a depth of 20 feet bgs. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations.

Based on regional data recorded from nearby groundwater monitoring wells, the historical highest groundwater level in the project vicinity is approximately 20 feet bgs.[4]

3.4 Seismic Considerations

3.4.1 Seismic Site Classification Parameters

DESCRIPTION	VALUE
2016 California Building Code Site Classification (CBC) [1]	C
Site Latitude	N 33.0367°
Site Longitude	W 116.8790°
S_s Spectral Acceleration for a Short Period	1.082g
S_1 Spectral Acceleration for a 1-Second Period	0.401g

[4] Groundwater data measured approximately 1,600 feet north of the project site in Well MW-2 (Located at 110 14th Street, Ramona, California; www.geotracker.waterboards.ca.gov)

DESCRIPTION	VALUE
F_a Site Coefficient for a Short Period	1.000
F_v Site Coefficient for a 1-Second Period	1.399

[1] Note: The 2016 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. Borings were extended to a maximum depth of 31 feet, and this seismic site class definition considers that similar or denser soils continue below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

3.4.2 Faulting and Estimated Ground Motions

The site is located in Southern California, which is a seismically active area. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. Based on calculations using the USGS Earthquake Hazard Program 2008 interactive deaggregations, the Elsinore Fault with maximum credible earthquake magnitude of 7.45 is considered to have the most significant effect at the site from a design standpoint. The Elsinore Fault is located approximately 24 kilometers from the site.

Based on the USGS Design Maps Summary Report, using the American Society of Civil Engineers (ASCE 7-10) standard, the peak ground acceleration (PGA_M) at the project site is expected to be 0.407 g. Based on the USGS 2008 interactive deaggregations, the project site has a mean magnitude of 6.39. Furthermore, the site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.[5]

3.4.3 Liquefaction Potential

Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils exist below groundwater. The County of Riverside GIS has designated certain areas within the county as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table.

The project site is located within a liquefaction hazard zone as designated by the County of San Diego Hazard Mitigation Planning Map. Based on the materials encountered at the project site, subsurface conditions encountered on the project site is predominantly medium dense to very dense interbedded layers of clayey sand and silty sand to the maximum depth explored at 31 feet bgs. Auger refusal is encountered at the depth of about 31 feet bgs. Groundwater was encountered at 20 feet bgs. Historical high groundwater in the project vicinity is 20 feet bgs.

[5] California Department of Conservation Division of Mines and Geology (CDMG), *"Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region"*, CDMG Compact Disc 2000-003, 2000.

Liquefaction analysis for the site was performed in general accordance with the DMG Special Publication 117. The liquefaction study utilized the software "LiquefyPro" by CivilTech Software. This analysis was based on the soils data from Boring B-1. Peak Ground Acceleration (PGA) was of 0.407g was used. Calculations utilized historical groundwater depths. Settlement analysis used the Tokimatsu, M-correction method. Fines were corrected for liquefaction using modified Stark and Olson. Liquefaction potential analysis was calculated from a depth of 0 to 31 feet bgs. Liquefaction potential analysis is attached in Appendix D of this report.

Based on the subsurface conditions presented in Boring B-1 and analytical results, liquefiable saturated sands are not encountered below the historical high groundwater depth. Based on the calculation results, total and differential seismically-induced settlement of saturated and dry sands are expected to be less than 0.5 inch.

3.5 Percolation Test Results

Two (2) in-situ percolation tests (falling head borehole permeability) were performed to approximate depths of 5 and 10 feet bgs. A 2-inch thick layer of gravel was placed in the bottom of each boring after the borings were drilled to investigate the soil profile. A 3-inch diameter perforated pipe was installed on top of the gravel layer in each boring. Gravel was used to backfill between the perforated pipes and the boring sidewall. The borings were then filled with water for a pre-soak period. Testing began after the entire amount of water added to the borings had infiltrated into the ground. At the beginning of each test, the pipes were refilled with water and readings were taken at standardized time intervals. Percolation rates are provided in the following table:

TEST RESULTS				
Test Location (depth, feet bgs)	**Soil Classification**	**Slowest Measured Percolation Rate (in/hr)**	**Correlated Infiltration Rate* (in/hr)**	**Water Head (in)**
B-7 (5 to 10 ft)	Clayey Sand	3.5	0.1	59
B-8 (0 to 5 ft)	Clayey Sand	2.0	< 0.1	54

*If the proposed infiltration systems will mainly rely on vertical downward seepage, the correlated infiltration rates should be used. The correlated infiltration rates were calculated using the Porchet Method.

The field test results are not intended to be design rates. They represent the result of our tests, at the depths and locations indicated, as described above. The design rate should be determined by the designer by applying an appropriate factor of safety. The designer should take into consideration the variability of the native soils when selecting appropriate design rates. With time, the bottoms of infiltration systems tend to plug with organics, sediments, and other debris. Long term maintenance will likely be required to remove these deleterious materials to help reduce decreases in actual percolation rates.

The percolation test was performed with clear water, whereas the storm water will likely not be clear, but may contain organics, fines, and grease/oil. The presence of these deleterious materials will tend to decrease the rate that water percolates from the infiltration systems. Design of the storm water infiltration systems should account for the presence of these materials and should incorporate structures/devices to remove these deleterious materials.

Based on the soils encountered in our borings, we expect the percolation rates of the soils could be different than measured in the field due to variations in fines and gravel content. The design elevation and size of the proposed infiltration system should account for this expected variability in infiltration rates.

Infiltration testing should be performed after construction of the infiltration system to verify the design infiltration rates. It should be noted that siltation and vegetation growth along with other factors may affect the infiltration rates of the infiltration areas. The actual infiltration rate may vary from the values reported here. Infiltration systems should be located at least 10 feet from any existing or proposed foundation system.

3.6 Corrosion Potential

Results of soluble sulfate testing indicate that ASTM Type I/II Portland cement may be used for all concrete on and below grade. Foundation concrete may be designed for low sulfate exposure in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

Laboratory test results indicate the on-site soils have a pH of 8.73, a minimum resistivity of 970 ohm-centimeters, a water soluble sulfate content of 0.01%, Red-Ox potential of +639 mV, negligible sulfides, and a chloride content of 150 parts per million (ppm) as shown on the attached Results of Corrosivity Analysis sheet. These values should be used to evaluate corrosive potential of the on-site soils to underground ferrous metals.

Refer to the Results of Corrosivity Analysis sheet in Appendix B for the complete results of the corrosivity testing conducted in conjunction with this geotechnical exploration.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided the recommendations included within this report are implemented. Based on the geotechnical engineering analyses, subsurface exploration, and laboratory test results, we recommend supporting the proposed building on a spread footing foundation system.

Based on the subsurface conditions encountered at the project site, the spread footings should be supported on engineered fill extending to the minimum depth of 12 inches below the bottom of footings. The on-site soils can be used as engineered fill, provided the material meets the low-volume change material specification presented in Section 4.2.3.

The interior floor slab should be supported on a minimum of 18 inches of engineered fill comprised of low volume change soils.

Expansive soils are present on this site. This report provides recommendations to help mitigate the effects of soil shrinkage and expansion; however, even if these procedures are followed, some movement and at least minor cracking in the structure should be anticipated. The severity of cracking and other cosmetic damage such as uneven floor slabs will probably increase if any modification of the site results in excessive wetting or drying of the expansive soils. Eliminating the risk of movement and cosmetic distress may not be feasible, but it may be possible to further reduce the risk of movement if significantly more expensive measures are used during construction. We would be pleased to discuss other construction alternatives with you upon request.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing (which are presented in Appendices A and B), engineering analyses, and our current understanding of the proposed project.

4.2 Earthwork

The following presents recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for the design and construction of earth supported elements including, foundations, slabs, and pavements, are contingent upon following the recommendations outlined in this section. All grading for the proposed building should incorporate the limits of the proposed construction plus a lateral distance of 12 inches beyond the perimeter of the proposed building.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

4.2.1 Site Preparation

Strip and remove any vegetation and other deleterious materials from proposed building and pavement areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

Evidence of underground facilities such as septic tanks, cesspools, and basements, was not observed during the site reconnaissance, however such features could be encountered during construction. If fill materials, underground facilities, and/or utilities lines are encountered, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

4.2.2 Subgrade Preparation

The spread footings should be supported on engineered fill extending to the minimum depth of 12 inches below the bottom of footings. The interior floor slab should be supported on a minimum of 18 inches of engineered fill comprised of low volume change soils.

The over-excavation bottom, once properly cleared, should be scarified to a minimum depth of 10 inches, moisture conditioned, and compacted per the compaction requirements in Section 4.2.4. The over-excavation should then be backfilled up to the footing base elevation with engineered fill placed in lifts of 8 inches or less in loose thickness and should be moisture conditioned and compacted following the recommendations in section 4.2.4 of this report.

Subgrade soils beneath exterior slabs, and pavements may be scarified, moisture conditioned, and compacted to a minimum depth of 10 inches. The moisture content and compaction of subgrade soils should be maintained until slab or pavement construction.

4.2.3 Fill Materials and Placement

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

On-site clayey sand materials may be used as engineered fill provided they are blended with the sandy soils and resulting mixture conform to the low volume change specifications provided below the imported engineered fill materials.

Imported or blended on-site soils may be used as engineered fill materials in the following areas:

- foundation areas
- interior floor slab areas
- foundation backfill

Imported or on-site soils (including clayey sand materials) may be used in the following areas:

- general site grading
- exterior slab areas
- pavement areas

Imported or blended on-site soils should conform to low volume change materials as indicated in the following specifications:

Gradation	Percent Finer by Weight (ASTM C 136)
3”	100
No. 4 Sieve	50 to 100
No. 200 Sieve	10 to 40

- Liquid Limit ..... 30 (max)
- Plasticity Index ..... 15 (max)
- Maximum expansive index* ..... 20 (max)

*ASTM D 4829

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed ten inches loose thickness.

4.2.4 Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
Imported or blended on-site materials:			
Beneath foundations:	90%	-1%	+4%
Beneath slabs:	90%	-1%	+4%
Imported or on-site materials (including clayey sand materials)			
Utility trenches*:	90%	-1%	+4%
Beneath pavements:	95%	-1%	+4%
Bottom of excavation to receive fill:	90%	-1%	+4%
Miscellaneous backfill:	90%	-1%	+4%
Aggregate base (beneath pavements):	95%	-2%	+2%

* Upper 12 inches should compacted to 95% within pavement and structural areas

4.2.5 Grading and Drainage

Positive drainage should be provided during construction and maintained throughout the life of the development. Infiltration of water into utility trenches or foundation excavations should be

prevented during construction. Planters and other surface features which could retain water in areas adjacent to the building or pavements should be sealed or eliminated. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls.

Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration. We recommend a minimum horizontal setback distance of 10 feet from the perimeter of any building and the high-water elevation of the nearest storm-water retention basin.

Roof drainage should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems and landscaped irrigation should not be installed within 5 feet of foundation walls.

4.2.6 Exterior Slab Design and Construction

Exterior slab-on-grade, exterior architectural features, and utilities founded on, or in backfill may experience some movement due to the volume change of the backfill. To reduce the potential for damage caused by movement, we recommend:

- exterior slabs should be supported directly on subgrade fill with no, or very low expansion potential;
- strict moisture-density control during placement of subgrade fills;
- maintain proper subgrade moisture until placement of slabs;
- placement of effective control joints on relatively close centers and isolation joints between slabs and other structural elements;
- provision for adequate drainage in areas adjoining the slabs;
- using of designs which allow vertical movement between the exterior slabs and adjoining structural elements.

4.2.7 Utility Trenches

It is anticipated that the on-site soils will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unsuitable material encountered at the bottom of excavations should be removed and be replaced with an adequate bedding material. A non-expansive granular material with a sand equivalent greater than 30 is recommended for bedding and shading of utilities, unless otherwise allowed by the utility manufacturer.

On-site materials are considered suitable for backfill of utility and pipe trenches from one foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances. Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of

engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

4.2.8 Construction Considerations

It is anticipated that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. On-site soils may pump or become unworkable at high water contents. The workability of the subgrade may be affected by precipitation, repetitive construction traffic or other factors. Workability may be improved by scarifying and drying. Lightweight excavation equipment may be required to reduce subgrade pumping. Should unstable subgrade conditions develop stabilization measures will need to be employed.

At the time of our study, moisture contents of the surface and near-surface native soils ranged from about 8 to 15 percent. Based on these moisture contents, some moisture conditioning may be needed for the project. The soils may need to be dried by aeration during dry weather conditions, or an additive, such as lime, cement, or kiln dust, may be needed to stabilize the soil. If the construction schedule does not allow for drying by aeration, clayey sand soils may be stabilized using triaxial geogrid and coarse aggregate materials.

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to floor slab and pavement construction.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proof-rolling, placement and compaction of controlled compacted fills, backfilling of excavations to the completed subgrade.

We recommend that the earthwork portion of this project be completed during extended periods of dry weather if possible. If earthwork is completed during the wet season (typically November through April) it may be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork operations may require additional mitigation measures beyond that which would be expected during the drier summer and fall months. This could include diversion of surface runoff around exposed soils and draining of ponded water on the site. Once subgrades are established, it may be necessary to protect the exposed subgrade soils from construction traffic.

The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottom. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

4.3 Foundations

DESCRIPTION	RECOMMENDATION
Foundation Type	Conventional Shallow Spread Footings
Bearing Material	Engineered fill comprised of low volume change soils extending to a minimum depth of 12 inches below the bottom of the proposed foundations
Allowable Bearing Pressure	3,000 psf
Minimum Dimensions	Walls: 18 inches; Columns: 24 inches
Minimum Embedment Depth Below Finished Grade	18 inches
Total Estimated Settlement	1 inch
Estimated Differential Settlement	½ inch across 40 feet

Finished grade is defined as the lowest adjacent grade within five feet of the foundation for perimeter (or exterior) footings. The allowable foundation bearing pressures apply to dead loads plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. The weight of the foundation concrete below grade may be neglected in dead load computations.

Foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of control joints at openings or other discontinuities in masonry walls is recommended.

Foundation excavations should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

4.4 Floor Slab

DESCRIPTION	RECOMMENDATION
Interior floor system	Slab-on-grade concrete
Floor slab support	A minimum of 18 inches of engineered fill comprised of low volume change soils
Subbase	Minimum 4-inches of Aggregate Base

DESCRIPTION	RECOMMENDATION
Modulus of subgrade reaction	250 pounds per square inch per inch (psi/in) (The modulus was obtained based on estimates obtained from NAVFAC 7.1 design charts). This value is for a small loaded area (1 Sq. ft or less) such as for forklift wheel loads or point loads and should be adjusted for larger loaded areas.

In areas of exposed concrete, control joints should be saw cut into the slab after concrete placement in accordance with ACI Design Manual, Section 302.1R-37 8.3.12 (tooled control joints are not recommended). Additionally, dowels should be placed at the location of proposed construction joints. To control the width of cracking (should it occur) continuous slab reinforcement should be considered in exposed concrete slabs.

The use of a vapor retarder or barrier should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI 302 and ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder/barrier.

4.5 Lateral Earth Pressures

For engineered fill comprised of imported or blended on-site materials above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are:

ITEM	VALUE[1]
Active Case	34 psf/ft
Passive Case	420 psf/ft
At-Rest Case	53 psf/ft
Coefficient of friction	0.35

[1]Note: The values are based on import materials or blended on-site materials used as backfill.

The lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if such conditions are to be included in the design.

Fill against foundation and retaining walls should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors.

4.6 Pavements

4.6.1 Design Recommendations

An estimated design R-Value was used to calculate the asphalt concrete pavement thickness sections and the portland cement concrete pavement sections. R-value testing should be completed prior to pavement construction to verify the design R-value.

Assuming the pavement subgrades will be prepared as recommended within this report, the following pavement sections should be considered minimums for this project for the traffic indices assumed in the table below. As more specific traffic information becomes available, we should be contacted to reevaluate the pavement calculations.

	Recommended Pavement Section Thickness (inches)*	
	Light (Automobile) Parking Assumed Traffic Index (TI) = 4.5	**On-site Driveways and Delivery Areas Assumed TI = 6.5**
Section I Portland Cement Concrete (600 psi Flexural Strength)	5.0-inches PCC over 4-inches Class II Aggregate Base	6.0-inches PCC over 4-inches Class II Aggregate Base
Section II Asphaltic Concrete	3-inches AC over 6-inches Class II Aggregate Base	3-inches AC over 11-inches Class II Aggregate Base

* All materials should meet the CALTRANS Standard Specifications for Highway Construction.

All pavements should be supported on a minimum of 10 inches of scarified, moisture conditioned, and compacted materials. These pavement sections are considered minimal sections based upon the expected traffic and the existing subgrade conditions. However, they are expected to function with periodic maintenance and overlays if good drainage is provided and maintained.

Subsequent to clearing, grubbing, and removal of topsoil, subgrade soils beneath all pavements should be scarified, moisture conditioned, and compacted to a minimum depth of 10 inches. All materials should meet the CALTRANS Standard Specifications for Highway Construction. Aggregate base materials should meet the gradation and quality requirement of Class 2 Aggregate Base (¾ inch maximum) in Caltrans Standard Specifications, latest edition, Sections 25 through 29.

All concrete for rigid pavements should have a minimum flexural strength of 600 psi (4,250 psi Compressive Strength), and be placed with a maximum slump of four inches. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

4.6.2 Construction Considerations

Materials and construction of pavements for the project should be in accordance with the requirements and specifications of the State of California Department of Transportation, or other approved local governing specifications.

Base course or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade.

Preventative maintenance should be planned and provided for through an on-going pavement management program in order to enhance future pavement performance. Preventative maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment.

Preventative maintenance consists of both localized maintenance (e.g. crack sealing and patching) and global maintenance (e.g. surface sealing). Preventative maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

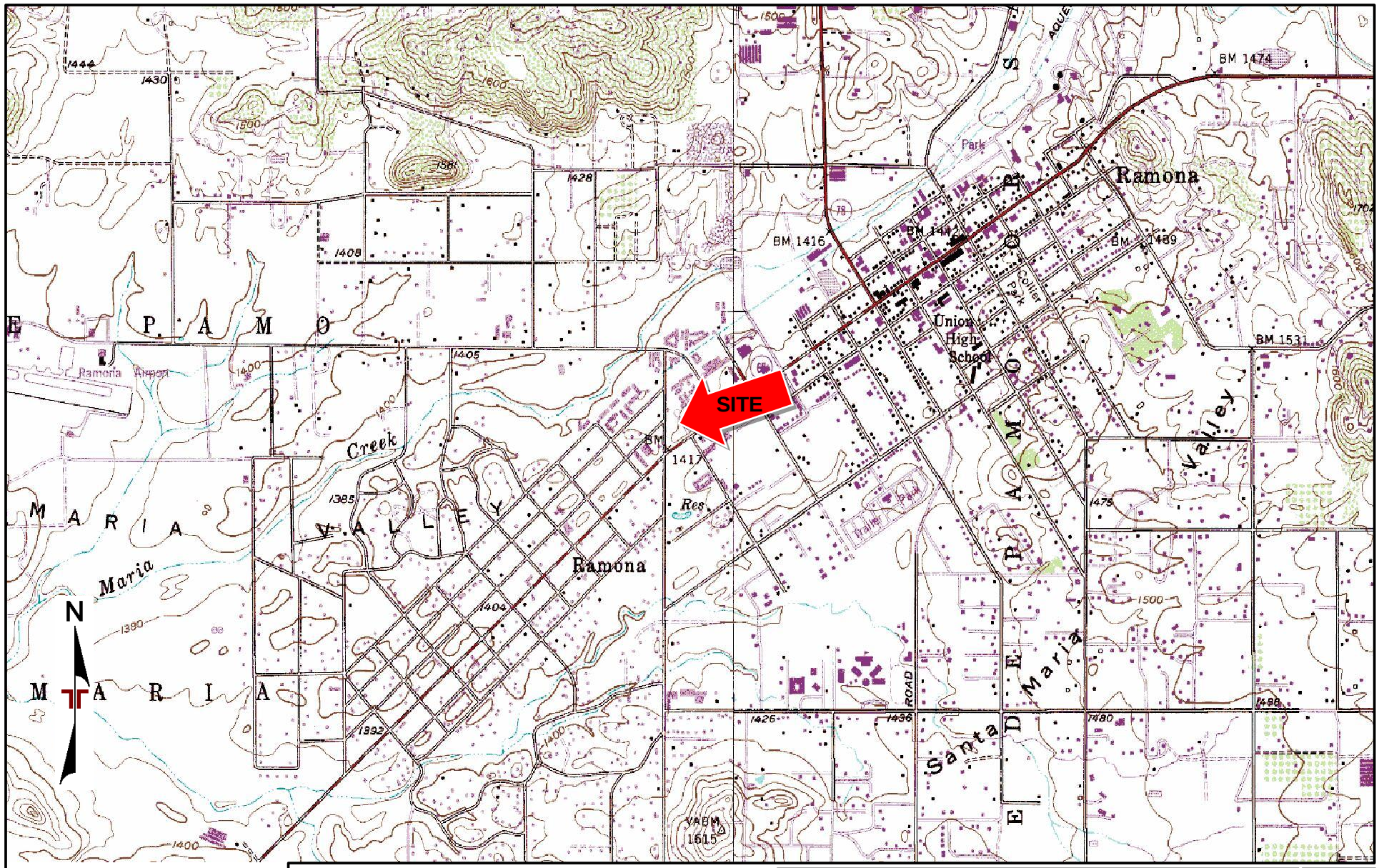
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

FIELD EXPLORATION



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY QUADRANGLES INCLUDE: SAN PASQUAL, CA (1/1/1997) and RAMONA, CA (1/1/1997).

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	SP
Drawn by:	GA
Checked by:	SP
Approved by:	FH

Project No.	60175002
Scale:	1"=2,000'
File Name:	A-1
Date:	3/5/2017

Terracon
1421 Edinger Ave Ste C
Tustin, CA 92780-6287

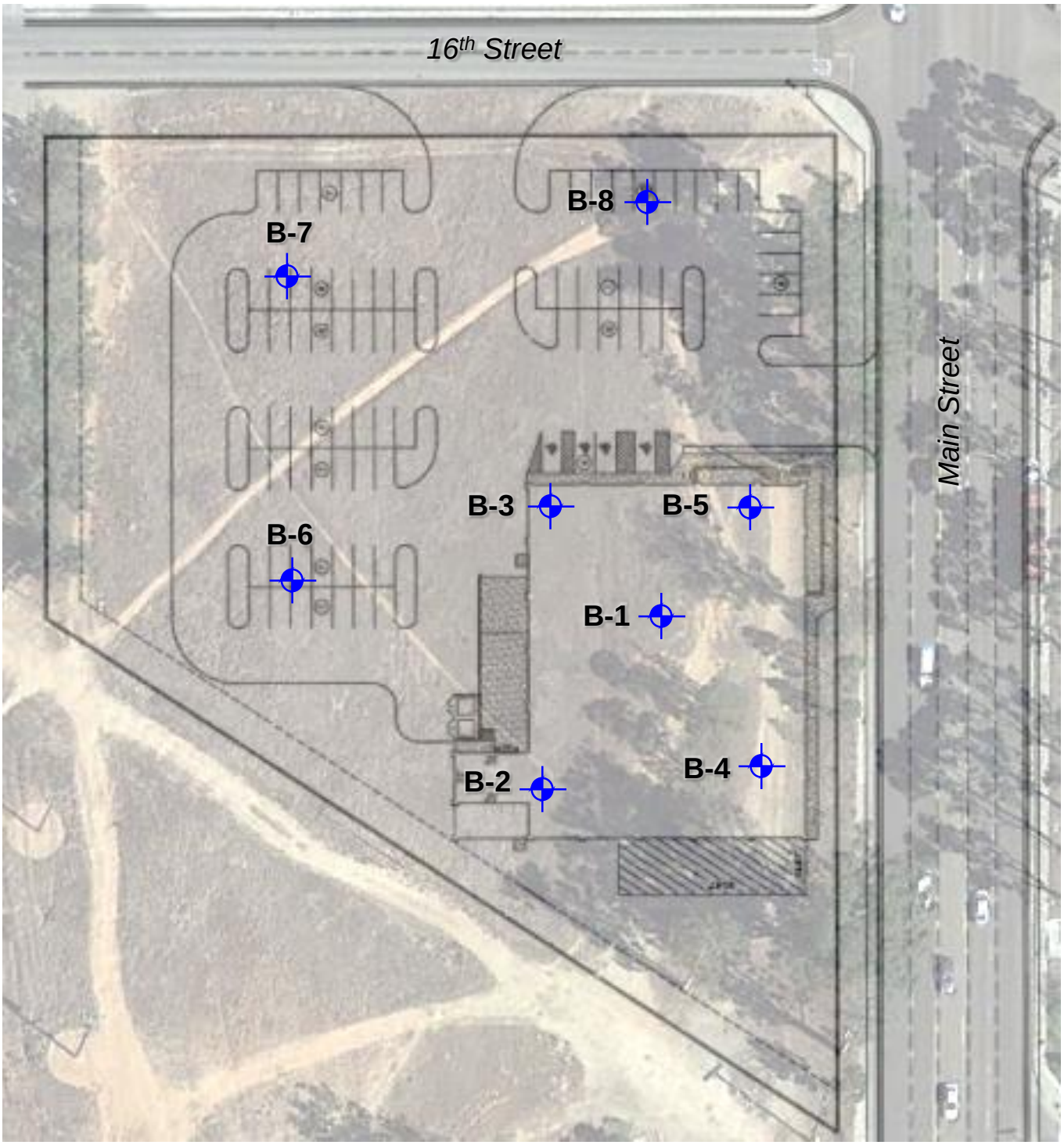
SITE LOCATION

ALDI Store- Ramona

Western Corner of Main Street and 16th Street
Ramona, CA

Exhibit

A-1



LEGEND

B-1 **SOIL BORING APPROXIMATE LOCATION**

N

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	SP
Drawn by:	GA
Checked by:	SP
Approved by:	FH

Project No.	P60175002
Scale:	1" ~ 65'
File Name:	A-2
Date:	2/2/2017

Terracon
Consulting Engineers & Scientists
1421 Edinger Avenue Ste C Tustin, California 92614
PH. (949) 261-0051 FAX. (949) 261-6110

BORING LOCATION PLAN

ALDI Store- Ramona
Western Corner of Main Street and 16th Street
Ramona, CA

Exhibit

A-2

Field Exploration Description

A total of eight (8) test borings were drilled at the site on February 13, 2017. The borings were drilled to approximate depths ranging between 5 and 31 feet bgs at the approximate locations shown on the attached Boring Location Diagram, Exhibit A-2. Test borings were advanced with a track-mounted limited access drill rig utilizing 6-inch diameter hollow-stem augers. Two (2) of those borings were utilized for percolation testing. Boring B-1 encountered auger refusal at the depth of 31 feet bgs.

The borings were located in the field by using the proposed site plan, aerial photographs of the site, and hand held GPS device. The accuracy of boring locations should only be assumed to the level implied by the method used.

Continuous lithologic logs of the borings were recorded by the field engineer during the drilling operations. At selected intervals, samples of the subsurface materials were taken by driving split-spoon or ring-barrel samplers. Bulk samples of subsurface materials were also obtained. Groundwater conditions were evaluated in the borings at the time of site exploration.

Penetration resistance measurements were obtained by driving the split-spoon and ring-barrel samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the consistency or relative density of materials encountered.

An automatic hammer was used to advance the split-barrel sampler in the borings performed on this site. A significantly greater efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the SPT-N value. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

BORING LOG NO. B-1

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03702° Longitude: -116.87888°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
											36-16-20	38
					3-4-14 N=18							
5.0		5			16-28-28 N=56						NP	17
					14-25-37 N=62							
		10			18-26-32 N=58							
		15			16-34-50/4"							
		20	▽		34-50/6"							

CLAYEY SAND (SC), brown

medium dense

SILTY SAND (SM), yellowish-brown, very dense

brown

tan to light gray

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered at 20 feet after drilling*

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 Boring Completed: 2/13/2017

Drill Rig: LAR Driller: Cal Pac

Project No.: 60175002 Exhibit: A-4

BORING LOG NO. B-1

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03702° Longitude: -116.87888°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), yellowish-brown, very dense *(continued)*											
		25			50/5"							
		30			50/4"							
	31.0											
	Auger Refusal at 31 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered at 20 feet after drilling*

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 | Boring Completed: 2/13/2017

Drill Rig: LAR | Driller: Cal Pac

Project No.: 60175002 | Exhibit: A-4

BORING LOG NO. B-2

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03702° Longitude: -116.87888°

DEPTH	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), brown										
2.5	**SILTY SAND (SM)**, yellowish-brown very dense			39-50/3"				15	99		
5				16-31-36 N=67							
				22-50/5"				12	126		
10	dense			7-18-28 N=46							
15	very dense			19-50/5"				8	126		
20		▽		19-25-36 N=61							
21.5	***Boring Terminated at 21.5 Feet***										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered at 20 feet after drilling*

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 Boring Completed: 2/13/2017

Drill Rig: LAR Driller: Cal Pac

Project No.: 60175002 Exhibit: A-5

BORING LOG NO. B-3

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03702° Longitude: -116.87888°

DEPTH	GRAPHIC LOG	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
		CLAYEY SAND (SC), brown											
2.5		**SILTY SAND (SM)**, yellowish-brown, very dense				28-30-39 N=69							
5.0		**CLAYEY SAND (SC)**, light gray, very dense	5			22-50/5"				8	121		
7.5		**SILTY SAND (SM)**, yellowish-brown, medium dense				14-10-19 N=29							
		very dense	10			50/6"				5	118		
		tan	15			27-50/6"							
			20	▽		21-25-29 N=54							
21.5		***Boring Terminated at 21.5 Feet***											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered at 20 feet after drilling*

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 Boring Completed: 2/13/2017

Drill Rig: LAR Driller: Cal Pac

Project No.: 60175002 Exhibit: A-6

BORING LOG NO. B-4

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03702° Longitude: -116.87888°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
CLAYEY SAND (SC), brown											39-21-18	35
2.5												
SILTY SAND (SM), light brown, very dense					12-20-36 N=56							
yellowish-brown		5			30-50/5"				8	124		
					25-34-50/5"							
10.0		10										
CLAYEY SAND (SC), light gray, very dense					14-50/4"				6	120		
15.0		15										
SILTY SAND (SM), dark gray, very dense					20-50/5"							
19.0												
SANDY LEAN CLAY (CL), light gray, hard		20			50/6"				30	92		
20.5												
Boring Terminated at 20.5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 | Boring Completed: 2/13/2017

Drill Rig: LAR | Driller: Cal Pac

Project No.: 60175002 | Exhibit: A-7

BORING LOG NO. B-5

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03702° Longitude: -116.87888°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
					23-33-50/5"				12	121		
		5			20-35-50/5"							
					22-50/5"				14	102		
		10			11-19-23 N=42							
		15			21-50/5"				7	128		
		20	▽		13-27-50 N=77							

CLAYEY SAND (SC), yellowish-brown

dense

very dense

8.0

SILTY SAND (SM), brown, very dense

dense

very dense

21.5

Boring Terminated at 21.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Groundwater encountered at 20 feet after drilling*

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 Boring Completed: 2/13/2017

Drill Rig: LAR Driller: Cal Pac

Project No.: 60175002 Exhibit: A-8

BORING LOG NO. B-6

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03702° Longitude: -116.87888°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), brown											
	5.0	5										
	Boring Terminated at 5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 Boring Completed: 2/13/2017

Drill Rig: LAR Driller: Cal Pac

Project No.: 60175002 Exhibit: A-9

BORING LOG NO. B-7

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03695° Longitude: -116.87879°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), brown											
	yellowish-brown	5									31-19-12	39
	10.0	10										
	Boring Terminated at 10 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 Boring Completed: 2/13/2017

Drill Rig: LAR Driller: Cal Pac

Project No.: 60175002 Exhibit: A-10

BORING LOG NO. B-8

PROJECT: ALDI Store- Ramona

CLIENT: ALDI, Inc.
Moreno Valley, CA

SITE: West corner of Main St and 16th
Ramona, CA

LOCATION See Exhibit A-2

Latitude: 33.03702° Longitude: -116.87888°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (psf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS: LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), brown											
	5.0	5										
	Boring Terminated at 5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

See Exhibit A-3 for description of field procedures.
See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 2/13/2017 Boring Completed: 2/13/2017

Drill Rig: LAR Driller: Cal Pac

Project No.: 60175002 Exhibit: A-11

APPENDIX B

LABORATORY TESTING

Laboratory Testing

Samples retrieved during the field exploration were taken to the laboratory for further observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System (USCS) described in Appendix C. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples and the test results are presented in this appendix. The laboratory test results were used for the geotechnical engineering analyses, and the development of foundation and earthwork recommendations. Laboratory tests were performed in general accordance with the applicable ASTM, local or other accepted standards.

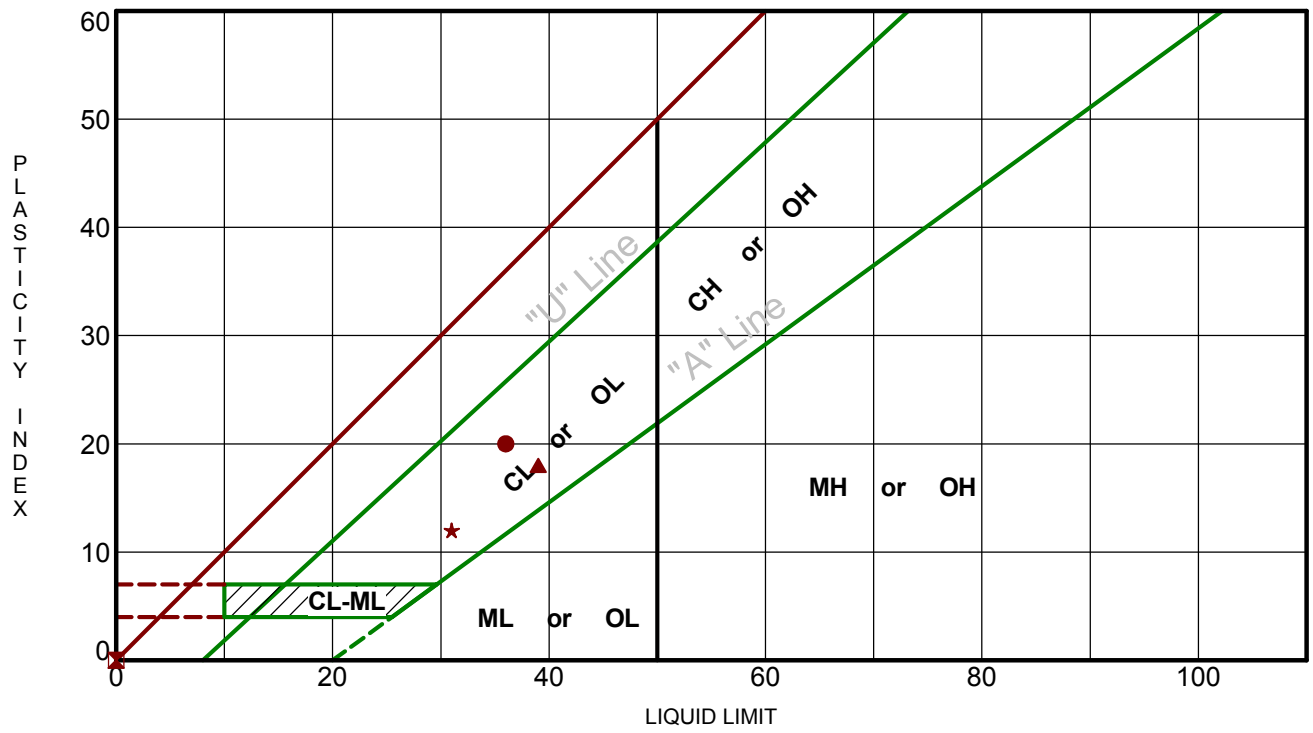
Selected soil samples obtained from the site were tested for the following engineering properties:

- ASTM D7263 Dry Density
- CT422 Chloride Content
- CT643 pH
- ASTM D4318 Atterberg Limits
- ASTM D3080 Direct Shear
- ASTM D2216 Moisture Content
- CT417 Soluble Sulfates
- CT643 Minimum Resistivity
- ASTM C136 Percent Passing #200 Sieve
- ASTM D4546 Collapse/Swell Potential

Procedural standards noted above are for reference to methodology in general. In some cases variations to methods are applied as a result of local practice or professional judgment.

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
● B-1	0 - 2.5	36	16	20	38	SC	CLAYEY SAND
⊠ B-1	5 - 6.5	NP	NP	NP	17	SM	SILTY SAND
▲ B-4	0 - 2.5	39	21	18	35	SC	CLAYEY SAND
★ B-7	5	31	19	12	39	SC	CLAYEY SAND

PROJECT: ALDI Store- Ramona

SITE: West corner of Main St and 16th
Ramona, CA

Terracon
1421 Edinger Ave Ste C
Tustin, CA

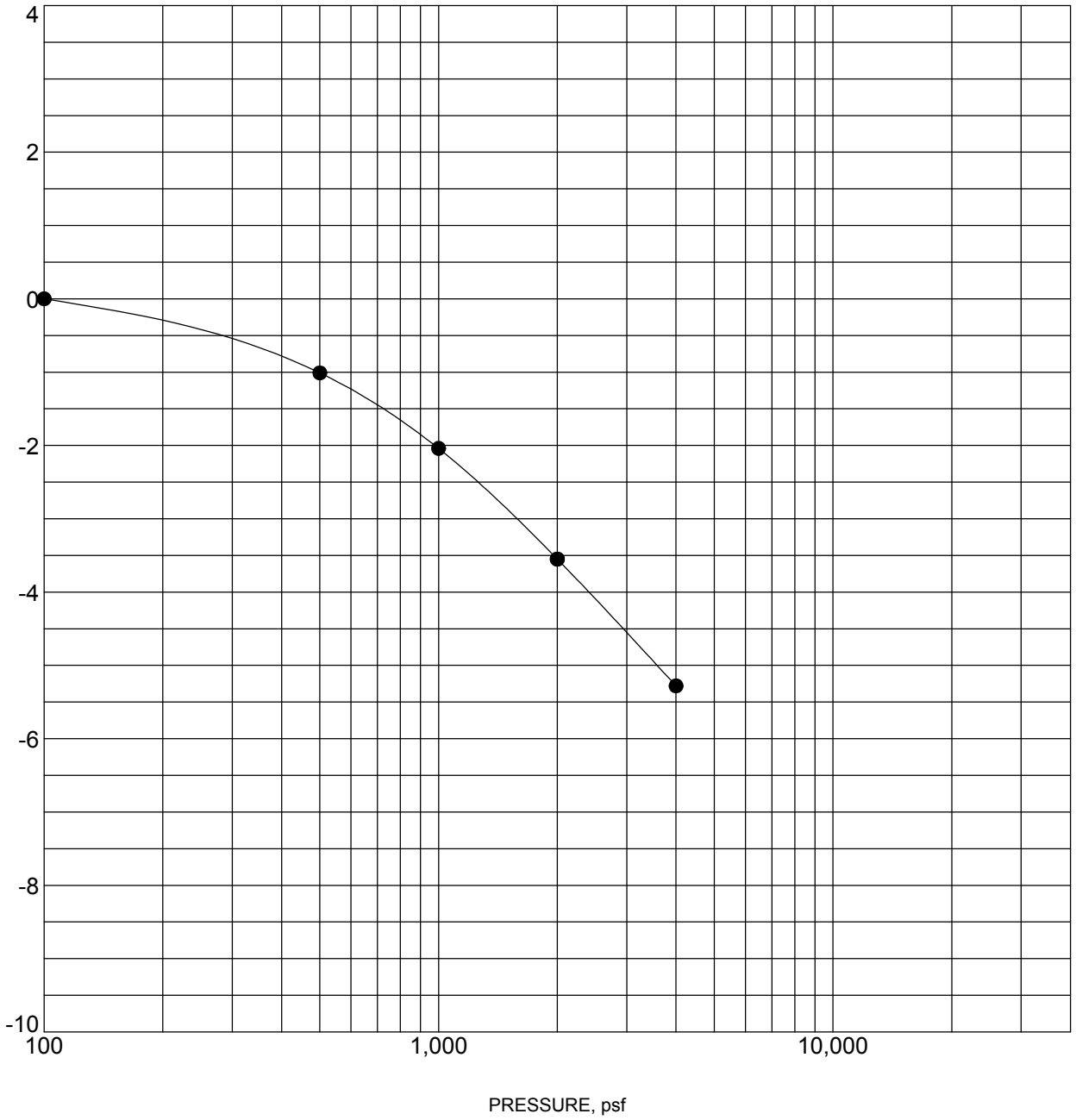
PROJECT NUMBER: 60175002

CLIENT: ALDI, Inc.
Moreno Valley, CA

EXHIBIT: B-2

SWELL CONSOLIDATION TEST

ASTM D4546



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-5	2.5 ft	CLAYEY SAND	121	12

NOTES: Water added at 2000 psf

PROJECT: ALDI Store- Ramona	Terracon 1421 Edinger Ave Ste C Tustin, CA	PROJECT NUMBER: 60175002
SITE: West corner of Main St and 16th Ramona, CA		CLIENT: ALDI, Inc. Moreno Valley, CA
		EXHIBIT: B-3

CHEMICAL LABORATORY TEST REPORT

Project Number: 60175002
Service Date: 03/01/17
Report Date: 03/02/17
Task:

Terracon
750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

Project
ALDI: Ramona

Sample Submitted By: Terracon (60) **Date Received:** 2/24/2017 **Lab No.: 17-0176**

Results of Corrosion Analysis

Sample Number	
Sample Location	B-11
Sample Depth (ft.)	0.0
pH Analysis, AWWA 4500 H	8.73
Water Soluble Sulfate (SO4), AWWA 4500 E (percent %)	0.01
Sulfides, AWWA 4500-S D, (mg/kg)	Nil
Red-Ox, AWWA 2580, (mV)	+639
Total Salts, AWWA 2510, (mg/kg)	890
Chlorides, AWWA 4500 Cl B, (mg/kg)	150
Resistivity, ASTM G-57, (ohm-cm)	970

Analyzed By: Kurt D. Ergun
Chemist

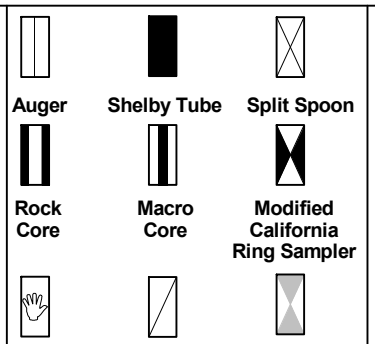
APPENDIX C

SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL

Water Initially Encountered

Water Level After a Specified Period of Time

Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	**Hand Penetrometer**
(T)	**Torvane**
(b/f)	**Standard Penetration Test (blows per foot)**
N	**N value**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**
(WOH)	Weight of Hammer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels and sands.			**CONSISTENCY OF FINE-GRAINED SOILS** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance Includes silts and clays.			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

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UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.

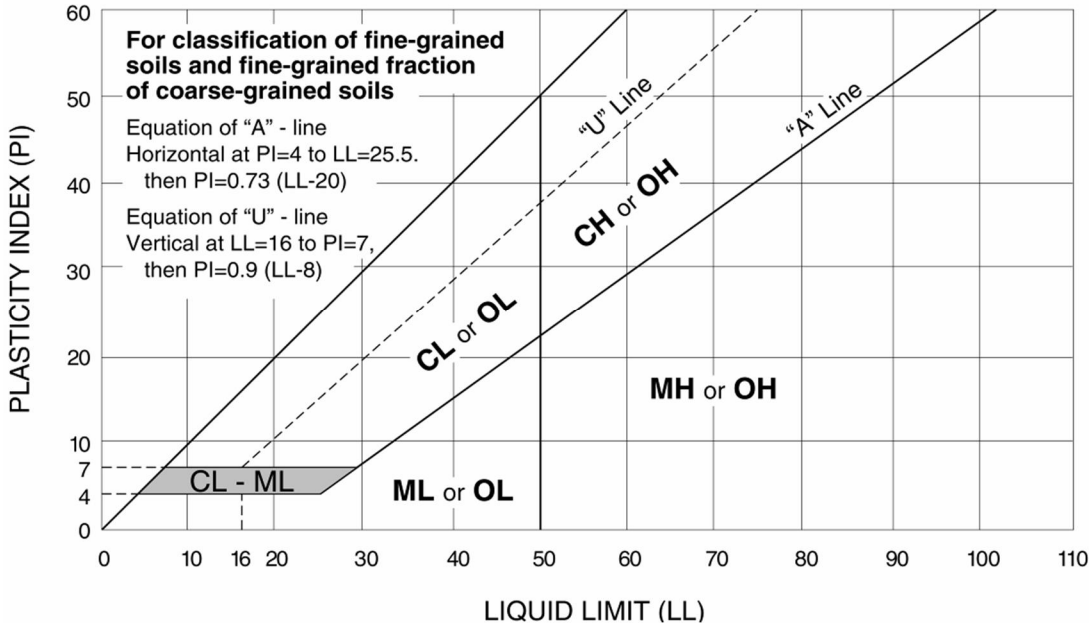

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Exhibit C-2

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.0367°N, 116.879°W)

Site Class C – “Very Dense Soil and Soft Rock”, Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_s = 1.082 g
From Figure 22-2 [2]	S_1 = 0.401 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class C, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\overline{v}_s$	$\overline{N}$ or $\overline{N}_{ch}$	$\overline{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content w ≥ 40%, and • Undrained shear strength $\overline{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = C and S_S = 1.082 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = C and S_1 = 0.401 g, F_v = 1.399

Equation (11.4–1):	$S_{MS} = F_a S_S = 1.000 \times 1.082 = 1.082$ g
Equation (11.4–2):	$S_{M1} = F_v S_1 = 1.399 \times 0.401 = 0.561$ g

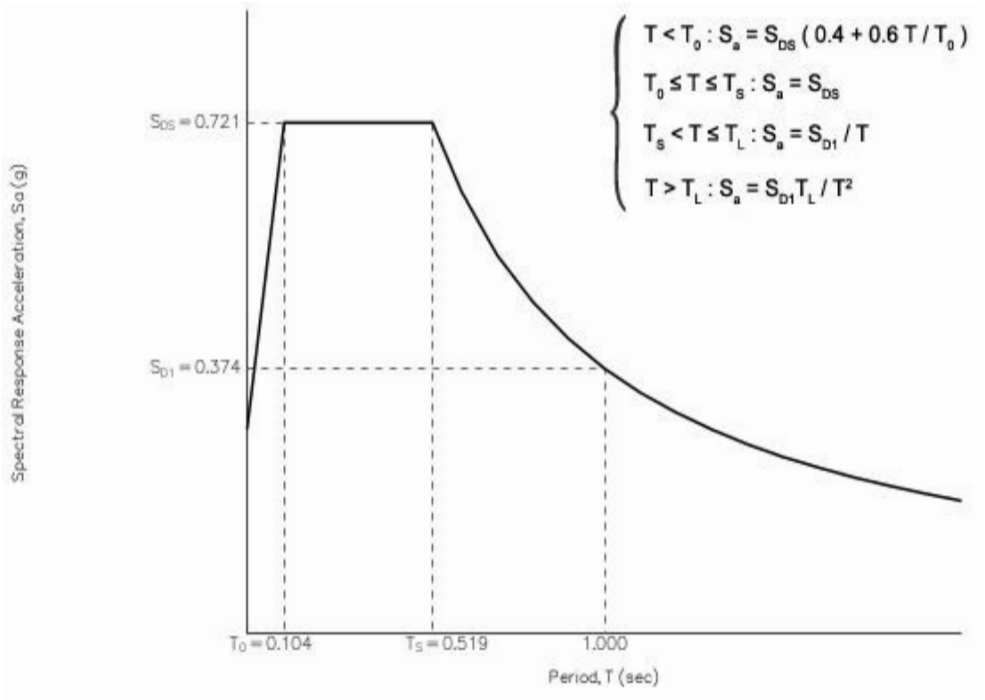
Section 11.4.4 — Design Spectral Acceleration Parameters

Equation (11.4–3):	$S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.082 = 0.721$ g
Equation (11.4–4):	$S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.561 = 0.374$ g

Section 11.4.5 — Design Response Spectrum

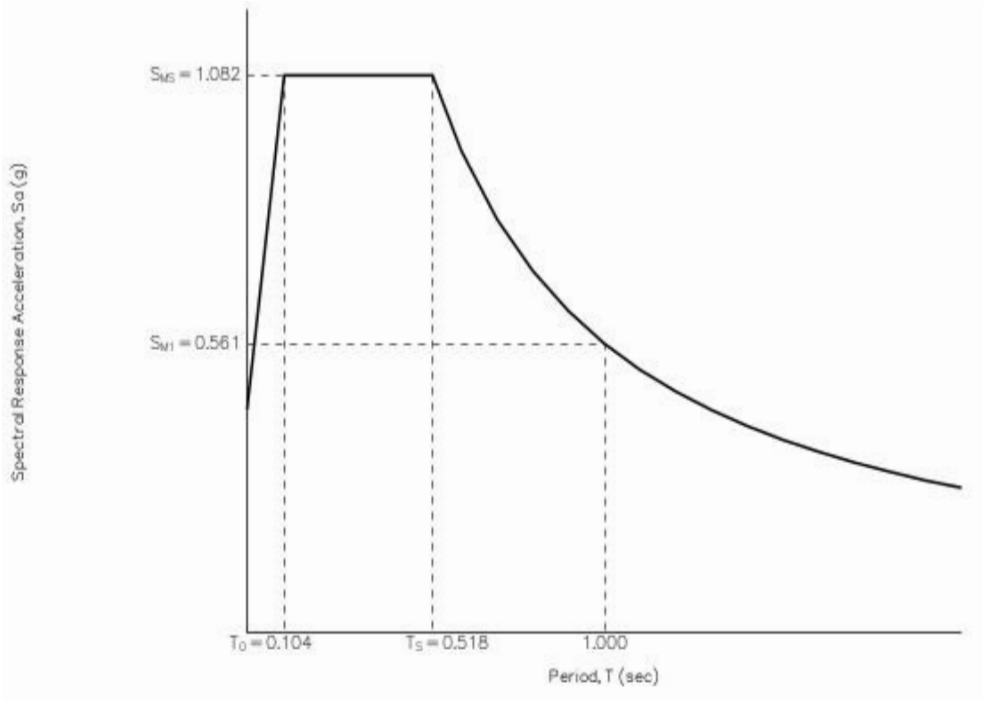
From Figure 22-12 [3]	$T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.407

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.407 = 0.407$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = C and PGA = 0.407 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 1.027

From Figure 22-18 [6] C_{R1} = 1.076

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \leq S_{DS} < 0.33g$	B	B	C
$0.33g \leq S_{DS} < 0.50g$	C	C	D
$0.50g \leq S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 0.721 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \leq S_{D1} < 0.133g$	B	B	C
$0.133g \leq S_{D1} < 0.20g$	C	C	D
$0.20g \leq S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.374 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is E for buildings in Risk Categories I, II, and III, and F for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ “the more severe design category in accordance with Table 11.6-1 or 11.6-2” = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

APPENDIX D

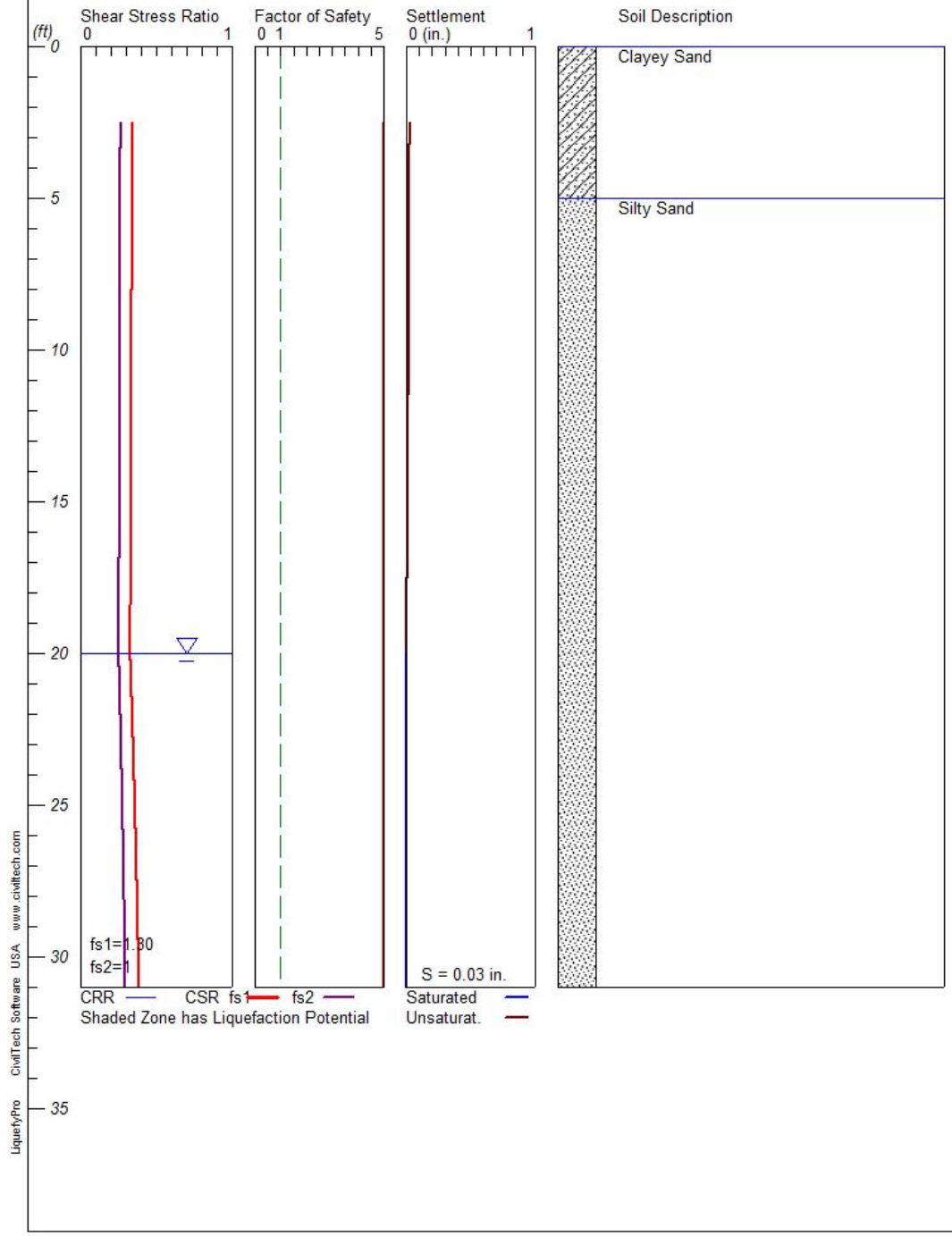
LIQUEFACTION ANALYSIS

LIQUEFACTION ANALYSIS

ALDI Ramona

Hole No.=B-1 Water Depth=20 ft

Magnitude=6.39
Acceleration=0.407g



Terracon **60175002** **Exhibit D1**

****

LIQUEFACTION ANALYSIS SUMMARY

****

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Input File Name: N:\Projects\2017\60175002\Working Files\Calculations-Analyses\B1.liq
Title: ALDI Ramona
Subtitle: 60175002

Surface Elev.=
Hole No.=B-1
Depth of Hole= 31.00 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration= 0.41 g
Earthquake Magnitude= 6.39

Input Data:
Surface Elev.=
Hole No.=B-1
Depth of Hole=31.00 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration=0.41 g
Earthquake Magnitude=6.39
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot two CSR (fs1=User, fs2=1)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
2.50	18.00	115.00	38.00
5.00	56.00	130.00	17.00
7.50	62.00	130.00	17.00
10.00	58.00	130.00	17.00
15.00	100.00	130.00	17.00
20.00	84.00	130.00	17.00
25.00	100.00	130.00	17.00
30.00	100.00	130.00	17.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.03 in.
Total Settlement of Saturated and Unsaturated Sands=0.03 in.
Differential Settlement=0.013 to 0.017 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
2.50	3.01	0.34	5.00	0.00	0.03	0.03
4.50	3.01	0.34	5.00	0.00	0.02	0.02
6.50	3.01	0.34	5.00	0.00	0.02	0.02
8.50	3.01	0.34	5.00	0.00	0.02	0.02
10.50	3.01	0.34	5.00	0.00	0.02	0.02
12.50	3.01	0.33	5.00	0.00	0.01	0.01
14.50	3.01	0.33	5.00	0.00	0.01	0.01
16.50	3.01	0.33	5.00	0.00	0.01	0.01
18.50	3.01	0.33	5.00	0.00	0.00	0.00
20.50	3.01	0.33	5.00	0.00	0.00	0.00
22.50	3.01	0.34	5.00	0.00	0.00	0.00
24.50	3.01	0.36	5.00	0.00	0.00	0.00
26.50	3.01	0.37	5.00	0.00	0.00	0.00
28.50	3.01	0.38	5.00	0.00	0.00	0.00
30.50	3.03	0.38	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils

CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils